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"It was not the intent of the law to allow a person to make his location crosswise of a vein so that the side lines shall cross it, and thereby give him the right to follow the strike of the vein outside of his side lines. That would subvert the whole system sought to be established by the law. If he does locate his claim in that way, his rights must be subordinated to the rights of those who have properly located on the lode. Their right to follow the dip outside of their

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side lines cannot be interfered with by him. His right to the lode only extends to so much of the lode as his claim covers. If he has located crosswise of the lode, and his claim is only one hundred feet wide, that one hundred feet is all he has a right to.

These decisions show that while the express purpose of the statute was to grant the vein for so many feet along its course, yet such grant could only be made effectively by a surface location covering the course to such extent. This Act of 1866 remained in force only six years, and was then superseded by the Act of May 10, 1872, (17 Stat. 91), found in the Revised Statutes, sections 2319 and following. This is the statute which is in force to-day, and under which the controversies in this case arise. Section 2319, Revised Statutes, (corresponding to section 1 of the Act of 1872), reads:

"All valuable mineral deposits in lands belonging to the United States, both before and after discovery, are hereby declared to be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase by citizens of the United States and those who have declared their intention to become such, under regulations prescribed by law, and according to the local customs or usages of miners in several mining districts, so far as the same are applicable and not inconsistent with the law of the United States."

It needs no argument to show that if this were the only section bearing upon the question, patents for land containing mineral would, except in cases affected by local customs and rules of miners, be subject to the ordinary rules of the common law, and would convey title to only such minerals as were found beneath the surface. We therefore turn to the following sections to see what extralateral rights are given to what conditions they may be exercised, and what must be borne in mind in considering the various provisions that we are dealing simply with statutory rights. There is no showing of any local customs or rules affecting the rights defined in and prescribed by the statute, and beyond the terms of the statute courts may not go. They have no power of legislation. They cannot assume the existence of any natural equity and rule that by reason of such equity a party may follow a vein into the territory of his neighbor, and in some of the opinions asserted arise by which Congress has made no provision, the courts cannot supply the defect. Congress having prescribed the conditions upon which extralateral rights may be acquired, a party must bring himself within those conditions or else be content with simply the mineral beneath the surface of his territory. It is undoubtedly true that the primary thought of the statute is the disposal of the mines and minerals, and that the intent of the statute is to give the primary purpose must be recognized and given effect. Hence, whenever a party has acquired the title to ground within whose surface area is the apex of a vein with a few or many feet along its course or strike, a right to follow the vein on its dip for the same length ought to be awarded to him if it can be done, and only if it can be done, under any fair and natural construction of the language of the statute. If the surface of the ground was, whether level or uneven, constantly pursued a straight line there would be little difficulty in legislation to provide for all contingencies, but mineral is apt to be found in mountainous regions where great irregularity of surface exists and the course or strike of the veins is as irregular as the surface, so that many cases may arise in which statutory provisions will fail to secure to a discoverer of a vein such an amount thereof as equitably it would seem he ought to receive. We make these observations because we find in some of the opinions asserted arise by writers that they have devised rules which will work out equitable solutions of all difficulties. Perhaps those rules may have all the virtues which are claimed for them, and if so it were well if Congress could be persuaded to enact them into statute; but be that as it may, the question in the courts is not, what is equity, but what saith the statute. Thus, for instance, there is no inherent necessity that the end lines of a mining claim should be parallel, yet the statute has so specifically prescribed. See 2320. It is not within the province of the courts to ignore such provision and hold that a locator, failing to comply with its terms, has all the rights, extralateral and otherwise, which he would have been entitled to if he had complied, and so it has been adjudged. (*Iron Silver Mining Company v. Elgin Mining Company*, 118 U. S. 196.)

This case, which is often called the "Horseshoe case," on account of the form of the location, is instructive. The following diagram, which was in the record in that case, illustrates the scope of the decision: (See page 1.)

The locator claimed in his application for a patent the lines 1, 14 and 5, 6, as the end lines of his location, and because of their parallelism, that he had complied with the letter of the statute, but the court ruled against him, saying in his opinion (page 208):

"The exterior lines of the Stone claim formed a curved figure somewhat in the shape of a horseshoe, and its end lines are not and cannot be parallel. What are marked on the plat as end lines are not such. The one between numbers 1 and 14 is a side line. The draughtsman or surveyor seems to have hit upon two parallel lines of his nine-sided figure, and apparently for no other reason than their parallelism called them end lines."

"We are the more inclined to think that the objection that, by reason of the surface form of the Stone claim, the defendant could not follow the lode existing therein in its downward course beyond the lines of the claim, was well taken to the offered proof."

It is true the court also observed that if the two lines named by the locator were to be considered the end lines, no part of the vein in controversy fell "within vertical planes drawn through those lines, contained in their own direction." But notwithstanding this observation the point of the decision was that the line in question, the end lines of the location as made on the surface of the ground, were not parallel, and that this defect could not be obviated by calling that which was in fact a side line an end line. This is made more clear by the observation of the Chief Justice, who, with Mr. Justice Bradley, dissented, in which he said:

"I cannot agree to this judgment. In my opinion the end lines of a mining location are to be projected parallel to each other and crosswise of the general course of the vein within the surface limits of the location, and whenever the top or apex of the vein is found within the surface lines extended vertically downwards, the vein may be followed outside of the vertical side lines. The end lines are not necessarily those which are marked on the map as such, but they

may be projected at the extreme points where the apex leaves the location as marked on the surface."

In other words, the court took the location as made on the surface by the locator, determined from that what were the end lines, and made those surface end lines controlling upon his rights; and rejected the contention that it was proper for the court to ignore the surface location and create for the locator a new location whose end lines should be crosswise of the general course of the vein as finally determined by explorations. That this decision and that in the *Target case*, *supra*, were correct expositions of the statute and correctly comprehended the intent of Congress therein, is evident from the fact that, although they were announced in 1885 and 1878, respectively, Congress had not seen fit to change the language of the statute, or in any manner to indicate that any different measure of rights should be awarded to a mining locator.

These preliminary observations we pass to a consideration of the questions propounded. The first is:

"May any of the lines of a junior lode location be laid within, upon or across the surface of a valid senior location for the purpose of defining for or securing to such junior location underground or extralateral rights not in conflict with any rights of the senior locator?"

By section 2319, quoted above, the mineral deposits which are declared to be open to exploration and purchase are those found in lands belonging to the United States, and such lands are the only ones open to occupation and purchase. While this is true, it is also true that until the legal title has passed the public lands are within the jurisdiction of the Land Department, and although equitable rights may be established Congress retains a certain measure of control. (*Michigan Land & Lumber Company v. Rust*, 168 U. S. 589.) The grant is, as is often said, in process of administration. Passing to section 2320, beyond the recognition of the governing force of custom and regulations, and a variation as to the extreme length and width of a mining claim, it is provided that "no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located." The end lines of each claim shall be parallel to each other."

Section 2321 gives to the locators of all mining locations, so long as they comply with the laws of the United States, and with State, territorial or local laws not in conflict therewith, "the exclusive right of possession and enjoyment of all the surface included within the lines of their locations, and of all veins, lodes, and ledges throughout their entire depth, the top or apex of which lies inside of such surface lines extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side lines of such surface claim." But their right of possession is to such outside parts of surface claim, or ledges, may be confined to such portions thereof as lie between vertical planes drawn downward as above described, through the end lines of their locations, so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges. And nothing in this section shall authorize the locator or possessor of a vein or lode which extends in its downward course beyond the vertical lines of his claim to enter upon the surface of a claim owned or possessed by another."

Section 2324 in terms authorizes "the miners of each mining district to make regulations, not in conflict with the laws of the United States, or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of location, and such other particulars as the claim or claims located by reference to some natural object or permanent monument as will identify the claim. On each claim located after the tenth day of May, eighteen hundred and seventy-two, and until a patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year. On all claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made on the tenth day of June, eighteen hundred and seventy-four, and each year thereafter, for each one hundred feet in length along the vein until a patent has been issued therefor; but where such claims are held in common, such expenditure may be made upon any one claim; and upon a failure to comply with these conditions the claim or mine upon which such failure occurred shall be open to relocation in the same manner as shall be a copy of the notice in any one of the following: The register of the land office, upon the filing of such application, plat, field notes, notices, and affidavits, shall publish a notice that such application has been made for the period of sixty days in a newspaper to be by him designated as published nearest to such claim; and he shall also post such notice in his office for the same period. 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Sectional Cushioned Rolls.

At the last meeting of the American Institute of Mining Engineers, J. W. Pinder of Elko, Nevada, presented the subject of sectional cushioned rolls, citing the common experience of millmen handling crushing rolls, viz: that in ordinary practice, when fine product is desired, the ore materials delivered to the machine, divided into four sizes, may be estimated, approximately, as follows: Passing a 4-mesh screen, 40%; passing a 2-mesh screen, 30%; passing a 1-inch-mesh screen, 20%; larger, 10%. This estimate refers more particularly to the requirements of medium-sized rolls and fine crushing. But, depending largely on the character of work to be performed, the coarser material is often larger and of a greater percentage, while the bulk is always more or less fine.

As the common Cornish or other crushing rolls are now operated in ordinary plants, it is almost impossible, economically, to regulate the first operation of preparing the ores for the rolls so that any approach to a uniform size may be obtained. Owing to this unevenness in size it is always necessary to pass and re-pass the same material several times through the machine in order to make a successful operation.

As the ore is fed into the rolls, when the larger pieces are clutched, and the pressure begins to bear upon them, the first strain on the springs tends to separate the rolls until the crushing point, or point of greatest resistance, is reached before the pieces are actually crushed. In this way, especially in crushing hard ores, the rolls are forced apart as much as 60% to 80% of the time. This parting is not infrequently as much as half an inch and more.

By far the greater part of the material, says Mr. Pinder, being fine when it reaches the machine, has a tendency to pass through the rolls when thus opened by the larger pieces, and so to escape the desired grinding. The same may be said of coarser work, the relative proportion of sizes being the same.

To approximately correct this defect, and increase the efficiency in crushing the finer material that would otherwise pass the rolls, he has devised and practically tested a sectional cushioned system of rolls, applicable as well to all mills using rolls or rollers as a means of crushing and grinding ores of all kinds.

The system, as applied to the Cornish, or ordinary rolls of that class, consists in the division of one of the two rolls in several sections (four, six or eight), and the introduction of a stiff rubber cushion for each section, fitting snugly into the bore of the hub, and closely around the shaft which passes through it. This cushion is made of stiff car-spring rubber, from $\frac{1}{4}$ inch to 1 inch thick, according to the size of the machine.

This sectional roll receives impulse from two steel arms, one on each side, keyed to the shaft, each arm passing through and pressing against the spokes of one-half of the section.

In every other respect the machine remains the same as usual, except that the main springs should be stiffer. In the operation of this system he argues that when the larger and harder pieces of ore fall into the rolls, and the strain on the springs in the act of crushing causes the rolls to part, only that section in contact with such a piece will be parted until the necessary crushing pressure is reached, after which it will spring back into place, while all the other sections will continue to crush such finer material as may fall in contact with each, which might otherwise pass between solid rolls without crushing. He adds: "Experiment has already proved more than 30% increased results. When larger rolls are used, and coarser product is desired, the cushioned rolls, of course, may be set to crush to any size. With broader face to the rolls, and an even, well-distributed feed, the increase in capacity is very great."

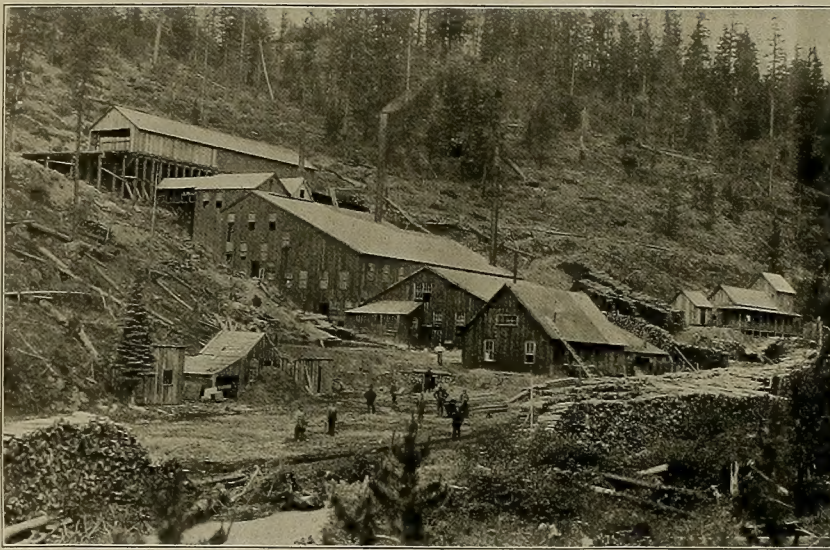
Buildings in Mining Camps.

Editor Goodwin of the Salt Lake *Tribune* wonders if there will ever be a mining camp that will not from the first be a fire trap. "Of course, you have to go up a ravine to find a mine. Who ever saw a mine that was not at the head of a ravine? Well, as the opening of the mine begins, the building of the houses on either side of the ravine likewise begins. The general course of the ravine is generally in line with the direction of the prevailing wind. Always, too, when a fire breaks out it is up toward the head of the ravine and the wind is always blowing down, so that there is no chance for anything to be saved. We believe that miners should make a law among themselves that at short distances fire breaks of earth should be thrown up. The houses are mostly one-story. It would not be much to, say every twenty rods, throw up a bank of dirt say 10 feet thick at the base and as high as a one-story house, from the street back each way, to the depth of the buildings. These, supplemented by a primitive fire brigade, would stop a fire. But it is never done. In no other way do men seem to place so implicit a trust in Providence as when they build houses in a mining camp. In that respect, too, nothing ever seems to be learned by experience."

Some Eastern Oregon Mines.

The Sumpter Valley Railroad runs from Baker City to the town of Sumpter, thirty miles distant. The latter is the outfitting point for several mining districts from twelve to twenty miles away. At Bourne, twelve miles from Sumpter, are the North Pole, Eureka & Excelsior, Columbia, Golconda, Ohio and California mines. Granite, fourteen miles in another direction from Sumpter, is a staging center, from which there are routes to the La Bellevue, Grant's placers, Red Boy, Robinsonville, Bonanza and Clifford, and other mines and villages farther

which dips slightly, is between a quartzite foot wall and a slate hanging wall, and varies in width from 30 to 75 feet. The ore near the walls is high-grade, running about \$75 per ton, while the interior vein matter is lower, running about \$18 per ton. Near the surface is a decomposed quartz, bearing considerable free gold, but at greater depth the ores take the form of iron sulphides and make it more of a concentrating proposition. On each level a large amount of ore is blocked out, giving assurances of continuous production in the future. The mine and mill are connected by tram cars, the trackage being under cover. The mill has ten stamps, with amal-



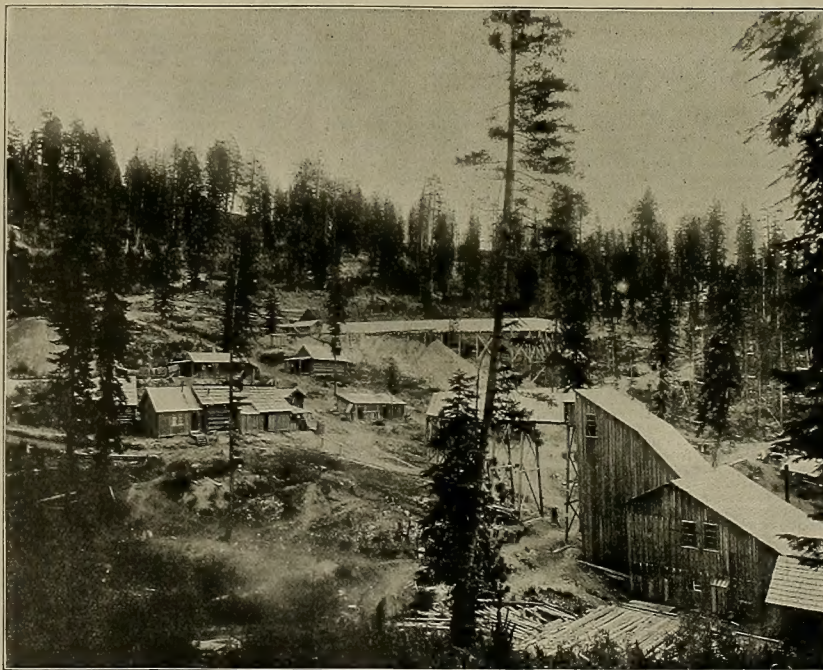
NORTH POLE MILL, SUMPTER, OREGON.

away. This section throughout is mountainous, well watered and heavily timbered.

The Eureka & Excelsior, which was worked for some time under lease to Longmaid & Son, is now in charge of its owners. Its main workings are from a double compartment shaft 320 feet deep, with levels at 100-foot stations, aggregating 3100 feet. The work of stoping is now in progress between the sec-

gam plates, and six concentrators; also canvas tables for handling tailings.

The North Pole mine and mill belong to the Eastern Oregon Mining Co., Emil Melzer being resident manager. The mine is opened and being developed through two main tunnels, which cut the vein at from 1000 to 1200 feet. According to a local newspaper, the ore being produced averages \$16 per ton.



COLUMBIA MINE AND MILL, BOURNE, OREGON.

ond and third levels. Besides these workings, an adit level runs in 1700 feet. The product is an arsenical pyrites, with no free gold, the values running about \$9 per ton. Near the mine is the company's 20-stamp concentration mill, run most of the time with water power. The concentrates are shipped to the smelters.

The Columbia is a well equipped property and is steadily operating. It is owned by the Columbia Gold Mining Co., composed of Eastern people, with Frank S. Baillie as managing director. R. J. Eakman is mine superintendent and F. H. Nettleton is in charge of the mill. The mine is developed by three tunnels, which go in on the ledge, aggregating 3000 feet, and a shaft at the lower tunnel, which sinks 225 feet on the vein. These workings give a depth of 650 feet on the vein, as the three tunnels, one above the other, are connected. The ledge,

The reduction plant comprises well-equipped cyanide works, an illustration of which is herewith given.

The Golconda is a prospect which is being developed, and, if tests are satisfactory, will be equipped with a chlorine-bromine treatment mill.

La Bellevue mine, ten miles from Granite, is on Cabell mountain. It was located in 1877 by W. F. Cabell and by him partially developed. It contains two parallel veins, in a gneiss formation, the ore being an iron pyrites in a quartz gangue, and carries about equal proportions of gold and silver. It also contains some ruby and native silver, grey copper and copper pyrites. The workings consist of 7000 feet of tunnels, winzes and upraises, with a large amount of ore blocked out. The first shipments from this property were to San Francisco, via Umatilla, at a cost of \$100 per ton. The general run of the ore is about \$20 per ton. The prop-

erty was recently sold by Mr. Cabell to Keith & Bamberger of Salt Lake City, who are now operating. The concentration mill on the property is handling about twenty-five tons of ore per day. It is stated the mill will be enlarged this year. J. X. Ferguson is superintendent, John Roden mine foreman and Frank Robb mill foreman.

The Grant Gold Mining Co. are operating hydraulic placer works on the north fork of the John Day river. They have about \$150,000 invested in the vicinity, employ thirty men and operate a No. 4 and No. 5 giant, having about 2000 miners' inches of water and 300 feet pressure. B. F. Grant is local manager.

The Red Boy, four miles from Granite, is well developed and is a reliable producer. The two parallel veins, which follow the alignment of a mountain ridge, are tapped by crosscut tunnels, the first of which cuts the vein at 400 feet and 250 feet below the surface, the second tunnel cutting the vein at 1000 feet and at 300 feet depth. The work of drifting on the veins has progressed to a considerable degree.

The ore is quite free milling, the management claiming to save 75 per cent of the values on the amalgam plates. A new 20-stamp mill is in course of construction, which will be equipped with modern machinery for amalgamation and concentration. In connection with the property is a covered flume, two miles long, by which water power is developed to operate the mill. The ores run in value from \$12 to \$20 per ton. The Red Boy is the property of E. J. Godfrey and Clark Taber.

George J. Barrett, manager of the May Queen M. & M. Co., is developing a group of claims which adjoin the Red Boy. A 300-foot tunnel has been driven on the vein from the outcrop, which shows the ledge of ore to run from 15 to 40 feet wide. The ore, while partially free milling, is in the main a sulphuret of iron, carrying good values in gold. Mr. Barrett states that a mill will be built as soon as the development of the ore body shall fully warrant it.

WASCOTT.

Sumpter, Or., June 14th, '98.

A British Columbia Enterprise.

R. H. Campbell, formerly of Siskiyou Co., Cal., has put two hydraulic elevators on the property of the Cariboo G. M. Co., Ltd., of London, capital stock \$500,000, which secured five mining leases and five government grants on Williams creek. Over \$250,000 is reported to have been spent in preparing this property for mining. The property is near Barkersville. Work is being started on the end of the Ballarat claim, where the two elevators stand side by side.

In the bottom is an inlet nozzle for the water under a head of nearly 800 feet, that will direct this stream of water up the pipe, in the lower side of which is an opening or gate into which the gravel is run by other streams and then elevated in the sluices by the force of the elevating jet from the nozzle. In this pipe the diameter is contracted to 12 inches at the throat, but above that the pipe is 18 inches in diameter. These elevators are set at an inclination of 30° from the vertical, and it is estimated that with the head of water, 1200 to 1500 cubic yards of gravel can be raised per twenty-four hours in each elevator with 600 miners' inches or 900 cubic feet of water per minute.

In beginning this work a shaft 5x8 ft. 4 in. was sunk to bedrock through 68 feet of gravel, in which was placed the elevators; another inclined shaft sunk at right angles to the first one, down which pass the water pipes to the bottom of the elevators. The vertical lift from bedrock to the sluices is 88 feet. A pit will be worked out about the elevators and down to bedrock by using monitors with nozzles 3 to 4 inches in diameter to wash the material towards the gates in the elevators, and as this pit enlarges, the sluices will be extended and the elevators moved farther up the stream. On trestles 20 feet above the surface, 800 feet long, are the sluices, in two compartments, 4x4 feet, paved with wooden riffle blocks. The top of the pipe of the elevator is let into the floor of the sluice, and a hood is placed over the discharge. A drain tunnel, 2900 feet, has been run to the bottom of the elevator shaft to drain all the water down to bedrock.

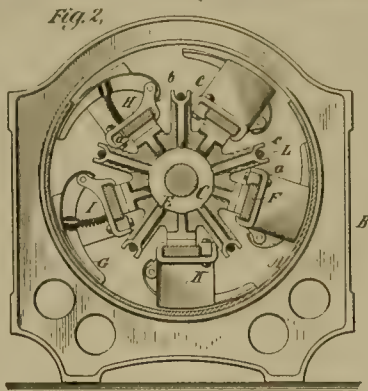
To carry the waters of Williams creek past these operations a small dam was built across the creek 1400 feet above the elevator shaft. A flume 2200 feet long, 6x14 feet, in two compartments, discharges near the lower end of the sluices. From a pressure box at the ditch two lines of piping, 5000 feet each, carry the water to the foot of the elevators under a vertical head of 792 feet. The welded wrought-iron piping decreases the diameter from 36 inches at the top to 18 inches at the bottom, the lower pipes being of 1-inch metal.

Fourteen miles of ditch have been completed to carry water from all the lakes and streams on the mountain sides tributary to Williams creek and reservoirs were made to impound all water that could be got. This ditch, 9 feet wide on the top, 4 feet on the bottom, 2½ feet deep, with a grade of 9½ feet per mile, is expected to carry 2000 miners' inches of water.

Some New Patents.



Fig. 1.



MIXER.—Patent No. 605,668, dated June 14, 1898: Thomas A. Edison, Llewellyn Park, New Jersey: apparatus for mixing concentrated pulverized iron ore with a binding material preparatory to the molding of the material in briquets. Fig. 1 is a longitudinal section of the mixing trough, showing in elevation two sets of the mixing devices. Fig. 2 is a cross-section on line 2-2 of Fig. 1.

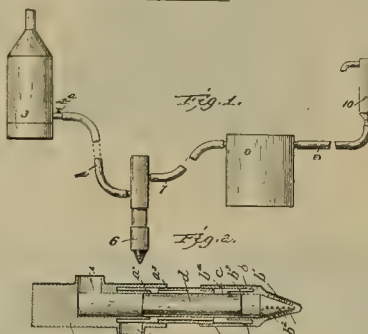
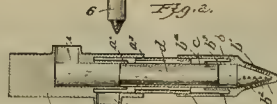
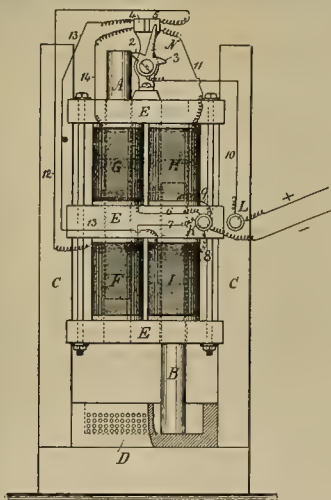


Fig. 1.



APPARATUS FOR REMOVING GRAVEL FROM FROZEN GROUND.—Patent No. 605,512, dated June 14, 1898: R. H. Pinkham, Wakefield, Mass. The object of the invention is to provide a device capable of use in winter, when the ground or gravel to be extracted is frozen solid. Fig. 1 is an elevation of the complete apparatus in the relative positions assumed in operation. Fig. 2 is an enlarged detail view of the extracting nozzle.



ORE STAMP.—Patent No. 605,615, dated June 14, 1898: D. M. Smyth, Pasadena, California: improvement in ore stamps. The stamps are actuated by electromagnetism; two stamps are so connected that one stamp is raised as the other one is projected downward, thereby causing the stamps to work in unison. The drawing is a diagrammatic elevation illustrative of two stamps, their actuating helices, and switch and circuit connections to a battery or other source of electric energy. The stamps A B are of any desired character, and the material to be pulverized is introduced upon a bed D, either dry or in connection with water, in any desired manner, and the stamps advantageously are operated vertically, and a suitable frame C, with cross-bars E, is provided for supporting the helices F G H I, through which the stamps A B are free to reciprocate, and

to the binding posts K L conductors are led from a battery or other source of electric energy, and there is a switch N, having arms 2 and 3, acted upon by the stamps and serving to move the switch to the contact 5 and then to the contact 4, and the circuit connections are arranged substantially as indicated—that is to say, the return wires 9 6 7 8 from the respective helices lead to the binding post K and the negative electrode, and the wire 10 leads from the positive electrode to the switch N, and the contact 5 of the switch is connected by the wire 11 to the magnet H and by the wire 12 to the magnet F, and the contact 4 is connected by the wire 13 to the magnet I and by the wire 14 to the magnet G.

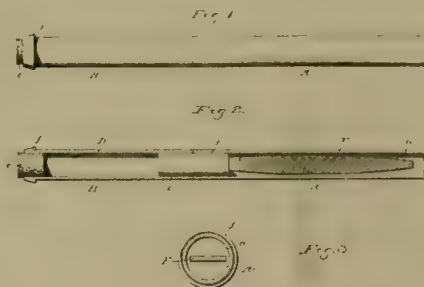


Fig. 1.

COMBINATION BLASTING TOOL.—Patent No. 605,727, dated June 14, 1898: George Laws, Philipsburg, Penn. Fig. 1 is a view of completed tool. Fig. 2 is a longitudinal section thereof. Fig. 3 is a view showing how a paper cartridge cylinder may be formed on the tool.

Primitive Mining.

H. R. Ayres, returned from a European tour, tells the *Denver Republican* about primitive methods in vogue in some of the mining districts there. "I decided to make an investigation into methods of mining and the treatment of ores, to see if there was anything in use in Europe that was an improvement over our processes of ore treatment and concentration. I may say right here that the United States is far in advance of any other nation, both in mining machinery and the processes for saving the precious metals. They can make our machines in Europe, but they do not make them as well as we do, and certainly do not secure as good results. The most interesting portion of the tour was in the mining regions of Hungary and Austrian Silesia. I visited Schemnitz, Kremnitz, Veraspatic and Brad in Hungary and Freiwaldau in Silesia. At Schemnitz there is a plant in operation equipped with Huntington mills, at Kremnitz there is a 20-stamp mill, at Brad two stamp mills, one of forty and the other of twenty stamps, and at Freiwaldau a 10-stamp mill and a plant of Huntingtons. All of the machinery in these mills was imported from this country except the boilers and engines. The concentration is done with Frue vanners, jigs and sizers. The work done is fairly good, but it is my opinion that under similar labor conditions Americans would secure much better results.

"Most interesting to me was the method of reduction in vogue among the poorer classes of miners. This was especially noticeable in the gulch that I visited at Veraspatic, though the same conditions prevail at Schemnitz and Kremnitz. The gulch is lined with miners' cabins all the way up to the mines, and in front of each cabin is a battery of from ten to twenty stamps, operated by water power from the stream which runs down the gulch. These mills are of the most primitive character, being constructed entirely of timber, the heads of the stamps being heavy stones. The main shaft is a heavy timber, in which are inserted strong pegs, which, as the shaft revolves, catch on shoulders in the stems of the stamps, the stems being also heavy timbers. These pegs raise the stamps up and as they pass from the shoulder let them drop on the ore in the mortar, which is usually a trough constructed of heavy stones. The labor at the mills is all performed by women. The men are engaged in the mines and in bringing down the ore on pack mules. The women shovel the ore into the mortars and catch the pulp in great rawhide basins, in which the amalgamation is done. All of the manipulation is done in these basins, which are skillfully handled by the women, and serve both as amalgamators and concentrators, the earthy matter and silica being washed out in the same manner as in panning in placer mines, leaving the free gold amalgamated and the concentrates ready for collection. The concentrates are saved and shipped to Zollinger, Hungary, where they are treated in a smelter owned by the Government. I am told that the saving by these methods is very close, and that practically the entire low-grade product of the mines is utilized in this way. Of course, this is only practicable where the labor conditions are as they are there. The people make a good living as things go there, are industrious and seem contented and happy. I counted no fewer than 1500 of these primitive stamps, all of which were in operation. The concentrates from the mills at Freiwaldau are shipped to Swansea, Wales, for reduction."

Notes on Some Supposed Nickel and Cobalt Minerals.

By WALDEMAR LINDGREN.

The color of certain minerals may often be misleading to inexperienced eyes, causing the prospector to expend much energy and money without corresponding result. A striking instance of this came under my observation last summer in one of the mining counties of the Sierra Nevada. In this case the deception was caused by chromium, the salts of which, as is well known, are often characterized by brilliant colors. At a contact of serpentine and slate some vein matter was found, chiefly dolomite, with green mariposite. Bunches of chromite also accompanied the occurrence, and on fractures in this chromite bright rose-colored and green crusts were noted. It was decided by some local expert that these crusts were cobalt and nickel minerals, many of which indeed have this color. Assays were said to have been made showing the presence of these metals. Excavations were begun and even smelting works were proposed to reduce this rich nickel and cobalt ore. Upon examination it was found that the rose-colored crusts consisted of a chromium chloride, first recognized in this State some years ago by the writer, described in the Proceedings of the California Academy of Sciences, and known to mineralogists as "kotschubeite." The green mineral proved to be a garnet likewise colored by chromium, and closely allied to the species uvarovite. The bright green color of the mariposite is also, as is well known, caused by a small percentage of chromium.

All of this tends to show that it is, in general, a good plan to consult a competent assayer and mineralogist before starting a nickel and cobalt mine. In this connection, it may be of some interest that one of the few occurrences of cobalt minerals in this State is about two miles north of Cisco, Placer Co., where cobaltine—a silvery white mineral with reddish tinge—occurs as impregnation in a mica schist, near the granite contact.

San Francisco, June 24th, '98.

Liquid Chlorine.

TO THE EDITOR:—I have something new—liquid chlorine. The use of liquid chlorine in chlorination is new, and is a great step in advance in the metallurgy of gold. By its use chloride of lime, manganese, salt and sulphuric acid, for generating chlorine gas at the chlorination works, are to be remembered, for they will be of the past.

Liquid chlorine is condensed chlorine gas, and, as we have received it, comes in steel drums 10 inches in diameter by 5 feet high, weighing 300 pounds and holding 110 pounds of liquid chlorine under pressure of eight to twelve atmospheres. Each drum contains enough gas to successfully treat fifty to seventy-five tons of sulphides. We began to use liquid chlorine at the Utica chlorination works May 8th, and we have found it perfect in every particular.

THOS. N. SMITH.

Angels Camp, Cal., June 20th.

The chlorination process was practically a California invention, the late G. F. Deetken of Placer Co., Cal., making it commercially important. Now it appears another California mining man makes further advance in economic methods. It is understood that the liquid chlorine used by Mr. Smith, as above, is the first consignment of the kind from Germany, where it is manufactured. Some of the chlorine gas hitherto used has been a California production, being locally manufactured from binoxide of manganese.

We are already in the dawning twilight of the National Birthday, and next Monday promises to be the largest and most intense Fourth of July which the country has known since the centennial year. It could hardly be otherwise. Never before has such patriotic fervor so permeated the nation, because an issue has arisen in which the American people are a unit. Never before has the issue seemed so widely significant, not only to ourselves, but to the world. Never before have we been called upon to realize so keenly how important our national principles are to mankind and how splendid our mission to maintain them. This being the case, it is to be expected that the observation of the greatest national holiday will be characterized this year with exceptional spirit and unanimity on the part of the people. Clear indications of this fact are already appearing in the arrangements for the day at all centers of population, and no doubt quiet communities will also be stirred to their depths by the spirit if not by the noisiest demonstrations of it. The cities of the Bay will have the advantage of the thousands of troops gathering for the Manila expedition to serve as nuclei and the multitude of civic organizations will cluster around them. If the people, young and old, do not become prostrated by the intensity of patriotic ardor and its various manifestations, it will speak well for the elasticity of their heart tissue and their aural membranes. All that is needed now to carry the people out of their depth in the surging sea of emotion is for Sampson and Shafter to give Uncle Sam the city of Santiago before Monday morning. And there seems a good chance of it.

Mining Congress Officials.

The second annual session of the International Mining Congress will be held at Salt Lake, Utah, July 6th, 7th, 8th and 9th. The delegate appointments to date number nearly 1800, representing twenty-seven States and Territories. The funds in hand exceed \$5000 and will be at least \$6000 by the opening of the Congress. The programme just announced by the committee includes a number of social features as well as the practical business affairs of the convention. It is expected the first day, Wednesday, July 6th, will be occupied with organization. Thursday's business sessions will be devoted to the subjects designated by the Committee on Order of Business. Among the subjects to be presented in papers prepared for the occasion are the following: Coal and Coke; Advances in Methods of Concentration; Relation of the Geological Survey to the Mining Industry; Relative Merits of Cyaniding and Chlorination; Mine Inspection; History of Reduction of Smelting Costs; Long Distance Transmission of Electric Power; Fuel Cost in Pumping; Recent Advances in Smelting; A New Treatment of Low Grade Ore; Copper; Relations of Investors and Miners. The selection of the next place of meeting will be left until Saturday, the last day of the session.

Herewith is presented engravings from photo-



GOV. H. M. WELLS.
Chairman Local Executive Committee International Mining Congress.



JNO. DERN.
Vice-President International Mining Congress.



W. D. JOHNSON.
Sec'y Executive Committee International Mining Congress.

graphs taken especially for the MINING AND SCIENTIFIC PRESS of three men prominent in local furtherance of the work. Gov. Wells, the chairman of the Mining Congress, is a native of Utah and its first executive. John Dern, vice-president of the Congress, is a native of Germany, long resident of Nebraska, but now of Utah. He is president of the Mercur Gold Mining Co., is heavily interested in the Geyser-Marion Co. of Mercur and its president and general manager. He was one of the most active delegates in the Denver Congress of 1897. W. D. Johnson, the secretary, was born in Lawrence, Kas., moved to Chicago in his youth and was educated there. He went to Utah in 1896, where he has been engaged in mining investment, was chosen a member of the executive committee, and when the local organization was effected was made secretary of the executive committee.

Edison as a Humorist.

The manager of the Electrical Exposition in Philadelphia asked Mr. Edison to visit the show and give a short talk on some electrical subject, or if he found it inconvenient to do so, to send on a phonograph cylinder setting forth some of his latest ideas of electrical interest. Mr. Edison complied in his own way with the latter request, and in doing so, while omitting any reference to electricity, produced quite an electrical effect upon the management and the auditors by his contribution. It was as follows:

MY DEAR MARKS: [You asked me to send you a phonographic cylinder for your lecture this evening and to say a few words to the audience. I do not think the audience would take any interest in dry scientific subjects, but perhaps they might be interested in a little story that a man sent me from a phonograph cylinder the other day from San Francisco:

In the year 1873 a man from Massachusetts came to California with a chronic liver complaint. He searched all over

the coast for a mineral spring to cure the disease, and finally he found down in the San Joaquin valley a spring the waters of which almost instantly cured him. He thereupon started a sanitarium, and people from all over the world came and were quickly cured.

Last year this man died, and so powerful had been the action of the waters that they had to take his liver out and kill it with a club. Yours truly,

EDISON.

—Electricity.

Liquid Hydrogen.

At the meeting of the London Chemical Society on June 2nd, Prof. Dewar gave a short account of the first attempts made to determine the physical constants of liquid hydrogen. Among the most interesting points brought forward, according to the report in *Science*, was that just as in the middle of the last century chemists were startled by Cavendish's discovery of a factitious gas, namely, hydrogen, having a density one-fourteenth that of air, so now they were startled by finding in liquid hydrogen a liquid having a density of 0.07, or, roughly, one-fourteenth that of water. Hydrogen occluded in palladium has been found to have a density of 0.62. Whatever, therefore, be the form in which it exists in that metal, it is more than eight times denser than in the liquid condition, and, consequently, must be in a state of chemical combination, and not merely in one of liquefaction. Liquid hydrogen is thus by far the most extraordinary liquid known. The lightest liquid hitherto obtained is liquid marsh-gas, which has at its boiling point a density of about two-fifths that of water. Liquid hydrogen, therefore, has only one-sixth of the density of liquid marsh-gas.

Professor Dewar has determined the boiling-point of the liquid by means of a platinum resistance thermometer—practically the only form available at such low temperatures. The result he has obtained is -238° C. at atmospheric pressure; in other words, liquid hydrogen boils steadily at 35° above the zero of absolute temperature. From all analogy it is inferred that the lowering of temperature that will be produced by forcing the liquid to boil *in vacuo* cannot amount to more than 10° or 15° . It is, therefore, possible to say with confidence that at the present moment science can project no method that will get nearer to the absolute zero than 20° or 25° .

The boiling-point of liquid hydrogen is really higher than suggested by theory and the work of other experimenters. The density of the vapor coming off from the boiling liquid is eight times denser than the gas at ordinary temperatures, whereas in the case of liquid air the vapor is only four times heavier. Liquid hydrogen, again, is 100 times denser than the vapor it is giving off, whereas the density of liquid oxygen is 255 times greater than that of its vapor. The atomic volume of liquid hydrogen at its boiling point is 14.3, while that of oxygen is 13.7.

It may be mentioned that the platinum resistance thermometer when immersed in the liquid hydrogen is cooled to within six platinum degrees of its zero point, so that if cooled these few degrees more—as it can be by means of the liquid boiling under reduced pressure—it must break down, becoming an infinite conductor with no resistance.

State Maps and Register.

The State Mining Bureau has in present process of preparation maps of several of the mining counties, designed to show the location of the various mines and mineral deposits therein, to accompany registers of the same designating the names, character, etc., the first supplementing the other. About seventeen are now being compiled, the intention being to ultimately so district the entire State. The registers are prepared in tabulated form. That of Nevada Co. is about complete and gives a fair idea of the scope and character of the work. There are 357 quartz, drift and hydraulic mines enumerated and described.

The list begins with the "Ajax, Grass Valley, Sections 2-11, Township 15, Range 8, Map No. 148, Patented, 2200 feet elevation, 1 vein 12 inches wide, strike north and south, dip west, character of ore gold quartz, with galena and sulphide, hanging wall granodiorite, foot wall granodiorite, etc."

Descriptions are full and exact, as No. 3 on the list: "Allison Ranch, Grass Valley, Section 2, Township 15, Range 8, Map No. 146, Patented, 2140 feet elevation, 1 vein, width 6 feet 3 inches, strike north and south, dip 41° west, character of ore gold quartz with galena and sulphurets, hanging wall granodiorite, foot wall granodiorite, shaft incline, 800, 370, tunnel, drifts 5000 feet, greatest depth below outcrop 400 feet, mill power water, number of men employed 54, owners' name Allison Ranch Con. Mg. Co., residence San Francisco, superintendent's name Chas. E. Uren, residence Grass Valley."

In its issue of June 22 the usually correct Boston News Bureau gravely gives place to the following: "The directors of The Electrolytic Marine Salts Co. have declared a dividend of 3% to stockholders of record of June 22, 1898, payable July 15. Since February 4, 940.43 ounces of gold have been received and 1834.51 ounces silver. Over 5,000,000 tons sea water have been treated by the accumulators to produce the above result. Three hundred men are now at work constructing what is known as plant No. 2."

Coast Industrial Notes.

—The new foundry of the Standard Iron Works, Los Angeles, Cal., is completed. A ten-ton crane has been installed.

—An effort is on foot to sell the Bear Valley, Cal., irrigating plant to farmers of Redlands, Alessandro and Perris. It is valued at \$255,000.

—Baker City, Oregon, will hold a special election this month to decide upon bonding the city for \$124,000 for a gravity water system, or \$16,000 to sink wells.

—W. D. Hodus & Co. of Seattle, Wash., were the purchasers of the plant of the Port Townsend Wire and Nail Co., recently sold at receiver's sale for \$5000.

—The Pacific Sheet Metal Works at Fairhaven, Wash., are now making 150,000 cans per day. They have 2,500,000 salmon cans ready for shipment to the canneries.

—Thirty-one carloads of fruit were shipped East from Sacramento, Cal., last Wednesday. The shipments to date amount to 788 cars, 130 more than to the same date last season.

—C. S. Dunphy and associates propose to tap Malheur lake in Harney county, Oregon, by a canal forty-five miles long for irrigation purposes. The arid land to be benefited is estimated to comprise 65,000 acres.

—The Thermal Belt Water Co. at Santa Paula, Cal., at a cost of \$13,000, has installed a pumping plant for supplying irrigation water to farms and orchards. The pump has a capacity of 3000 gallons per minute.

—A movement has started at San Diego, Cal., to complete the Pamo dam and water-works, to furnish water for the Linda Vista irrigation district. The work will cost over \$800,000, and will open up 40,000 acres of fertile land.

—The Northern Pacific railroad is reported to have acquired the Spokane Falls & Northern railroad after competition with the Canadian Pacific. The road is 140 miles long, with allied lines of 77 miles running into the Kootenai country.

—Some large California and coast contracts have resulted from the war measures, mostly ships, clothing and food supplies, as in other parts of the country. The Armours of Kansas City, Mo., have one order for 3,250,000 pounds of corned beef for Tampa, Fla.

—The first cargo of coal ever shipped to the Philippines left Philadelphia last week for Admiral Dewey on the British ship East Lothian. The freight rate is \$7.50 per ton. Heretofore the Philippines have received their coal supply from Japan and New South Wales.

—The plant of the San Gabriel, Cal., Electric Power Co. was started last Saturday. The company develops its power in San Gabriel canyon, twenty-three miles from Los Angeles, and transmits it over wires which are laid underground in the business portion of the city.

—There arrived at San Francisco by the Coptic, the latest China steamer, 441 cases of opium prepared for smoking, which, at the price of \$15 per pound, duty paid, is valued at \$264,600. The duty amounts to \$158,760. This opium is only for smokers, and is intended for use in the United States.

—At New Whatcom, Wash., the Bellingham Bay Improvement Co. mill was burned last Monday. The loss is estimated at \$400,000. The principal stockholders of the company owning the mill are P. B. Cornwall, D. O. Mills and Alvina Hayward of San Francisco. The mill employed 140 men.

—At New York the American Asiatic Association has been formed for the purpose of "fostering and safeguarding the trade and commercial interests of the citizens of the United States and others associated therewith, in the empires of China, Japan and Corea, the Philippine Islands and elsewhere in Asia or Oceania."

—The Puente Oil Co. is building a storage tank near San Bernardino, Cal., that is 80 feet in diameter with a capacity of 30,000 gallons. It will be used for a reserve supply of the residuum from the stills, which is used for fuel by the sugar company. The refinery is turning out 60,000 gallons of refined illuminating oil, 30,000 gallons of gasoline and 10,000 gallons of distillate per month.

—Mention was made some months ago of the company which is developing a water supply and electrical power in Sutter Creek, Cal., preparing to transmit electric power to San Francisco and Oakland. G. De Golia, agent of the company, now petitions for permission and franchise to erect telegraph poles through Alameda county to the plant for the conveyance of electric current.

—All the oranges grown in southern California do not represent much more than one-half the value of southern California's mineral production. The Los Angeles Review notes that while southern California is producing from 12,000 to 15,000 carloads of oranges a year having a local value of something over \$3,000,000, the value of southern California's mineral production last year was \$5,685,608.

—Work upon the tunnel for the S. F. & S. J. Valley road is progressing. The contractors have seventy-five men at work night and day, working twelve-hour shifts. Engineer Storey says that the work of building the extension of the Visalia branch from Visalia south to Corcoran Junction, on the main line, is progressing. It is expected that the line will be ready for operation September 15th.

—The U. S. Government contemplates making a large contract for coal with which to supply its ships on this coast. This contract has aroused the interest of the coal sections of this coast. At present the department is analyzing samples of coal from different mines with a view to determining the efficiency of their product, and on this examination will

depend, to a great extent, the award of the contract.

—The Bolivian, S. A. rubber lands are situated on the headwaters of the Amazon river and its tributaries, and are as yet comparatively unknown. They are said to be very rich, and the Bolivian Government is making every effort to attract settlers by liberal concessions and by making it easy for settlers to claim lands. Senor Luis Paz, the Minister of Bolivia in the United States, wishes to have citizens of the United States know the opportunities which await them in Bolivia.

—Los Angeles, Cal., expects to deliver during the next year 180,000 barrels of oil to the new Spreckels beet sugar factory at Salinas. At present prices the rate of 8½ cents a barrel for this order is considered fair. The same San Francisco men making this contract have also closed contracts at Coalinga for the delivery of from 500 to 700 barrels of oil a day for a period of two years. All the furnaces at the different Spreckels sugar factories are being changed from coal to oil burners.

—I. Sternfeld says that his plan to utilize the waterfalls of the Monte Alto river, Mexico, has succeeded and that "the contract calls for a 6000 H. P. transmitter, and the current will be carried from the river into Mexico City, a distance of thirty-five miles. The pressure will be 23,000 volts, and it will be carried over three wires into the city. The incline of the Monte Alto river amounts to about 2000 feet, and there are five of the falls where generators will be placed, four of which will be set in each fall."

—So far the Pacific Mail Co. has furnished five steamers to the Government. The following valuations have been made on four of the boats: City of Pekin, \$650,000; City of Sidney, \$470,000; China, \$900,000; Colon, \$350,000. Should any of these vessels be destroyed by the enemy the Government would have to pay the valuation; if they are lost by the action of the elements, the company must stand the loss. The company asked \$1700 a day for the charter of the China, but the Government was unwilling to pay more than \$1500, and this offer was accepted.

—Washington State papers are opposing grain rates as imposed by the Northern Pacific and O. R. & N. Railway Companies, claiming that the present charge for transportation of grain from Eastern Washington to the sea coast is six times more than the price charged by Eastern lines for moving grain from Chicago to New York, a distance of 1000 miles, more than double, and in some instances three times greater than the distance from the wheat fields of Eastern Washington to Puget Sound. There may be 25,000,000 bushels of wheat produced in that State this year.

—At a meeting of the Merchants' Association June 29 the following resolution was ordered forwarded to the Pacific Coast representatives in Congress:

WHEREAS, The early construction of the Nicaragua canal is essential to the future development and prosperity of the Pacific coast by and from the markets of the world; and whereas, the completion of the Nicaragua canal under American control will duplicate the effective value of the United States navy, as shown by the recent perilous trip of the peerless Oregon around South America; and whereas a practicable bill for the construction and completion of the Nicaragua canal by our Government is now pending in the Senate of the United States; therefore, be it

Resolved, That the Merchants' Association appeals to all commercial and industrial organizations on the Pacific coast to unite in a vigorous movement that will ensure a prompt beginning of this invaluable undertaking.

—The results of the recent school census in southern California and the present population of the principal towns, as estimated on the basis of 4½ to 1, are as follows:

| | Estimated population. |
|---------------------|-----------------------|
| San Diego..... | 16,236 |
| Pasadena..... | 12,704 |
| Riverside..... | 8,199 |
| San Bernardino..... | 8,118 |
| Santa Barbara..... | 7,880 |
| Pomona..... | 5,652 |
| Santa Ana..... | 5,184 |
| Ventura..... | 4,818 |
| Redlands..... | 4,836 |
| State Monrovia..... | 3,089 |
| Anaheim..... | 2,983 |
| Ontario..... | 2,806 |
| Long Beach..... | 2,398 |
| Colton..... | 2,335 |
| Chino..... | 2,283 |

—Nearly \$33,000,000 in gold has been received in San Francisco from Australia since August 22, 1897. The most recent consignment was \$100,000 in English sovereigns—\$486,600—on the Sydney steamer which arrived here on the 29th ult. Nearly all the gold has been received at the San Francisco mint and in the shape of \$5, \$10 and \$20 gold pieces sent to New York; about \$33,000,000 went on the Newport with Gen'l Merritt to the Philippines last Wednesday. The several Australian gold consignments mentioned are in detail as follows:

| 1897— | |
|-------------------|--------------|
| August 22..... | \$2,189,925 |
| September 23..... | 3,587,069 |
| October 21..... | 2,207,047 |
| November 18..... | 1,581,450 |
| December 16..... | 1,238,154 |
| January 13..... | 1,021,986 |
| February 10..... | 2,510,160 |
| March 9..... | 1,459,800 |
| April 6..... | 2,185,023 |
| May 3..... | 1,703,100 |
| June 1..... | 2,800,828 |
| June 29..... | 486,600 |
| Total..... | \$22,970,849 |

—On the principle that trade follows the flag, and that our flag now floats over three United States expeditions en route to the Philippines, and over a victorious navy in far Eastern waters, United States trade conditions in that region are of interest. Last week was published figures relative to the Philippine trade. As to China, the exports from this country to that in 1896 amounted to less than \$7,000,000 in value, or only about 4 per

cent of the entire amount. The following table shows how our export trade to China developed in the course of one year, the figures being for the fiscal years 1896 and 1897:

| | 1897. | 1896. |
|--------------------------------------|--------------|-------------|
| Clocks and watches..... | \$31,242 | \$13,053 |
| Provisions..... | 45,640 | 50,191 |
| Wheat flour..... | 72,100 | 45,815 |
| Wood, and manufactures of..... | 118,400 | 154,045 |
| Tobacco manufactures of..... | 229,596 | 102,138 |
| Iron and steel, manufactures of..... | 33,007 | 84,398 |
| Mineral oils..... | 3,371,937 | 2,166,978 |
| Cotton cloths..... | 7,438,203 | 3,854,146 |
| All other articles..... | 281,304 | 359,467 |
| Totals..... | \$11,916,888 | \$8,921,138 |

This shows an increase of about \$5,000,000 in one year, but one in which the Pacific coast has borne but little part.

Personal.

F. CORRHILL is Supt. Deadhorse mine, Carvers, Cal.

J. HURLEY, a mine owner at Keisley, Cal., is in San Francisco.

A. L. BEGHE is Supt. Mt. Pleasant mine, Grizzly Flat, Cal.

F. C. INNES, Mgr. Fern mine, Nelson, B. C., is in San Francisco.

CAPT. J. R. DE LAMAR has arrived from Europe at Mercer, Utah.

J. W. RICHARDS is Supt. Uncle Sam mine, Quartz Mountain, Cal.

I. S. FOORMAN has returned to San Francisco from Calaveras county.

F. CHAPPELET, of Oakland, Cal., is visiting his mines at Forest Hill, Cal.

W. A. FARISH of Denver, Colo., is at the Old Spanish mine, Shasta, Cal.

W. CAMPBELL, a mine owner of Grass Valley, Cal., is in San Francisco.

CHAS. BUTTERS arrived at Oakland, Cal., from South Africa last Monday.

E. W. BARRY, banker and mining man, Idaho City, Idaho, is in San Francisco.

W. H. CLARY, Jr., Supt. Petticoat mine, Railroad Flat, Cal., is in San Francisco.

R. MC F. DOBLE is now president and manager of the Abner Doble Co., San Francisco.

S. McDONALD, Mgr. Payne mine, Kaslo, B. C., has returned home from San Francisco.

W. RHODES, managing owner Big Four mine, Garden Valley, Cal., is in San Francisco.

W. PELLEW HARVEY of Vancouver has been appointed engineer to the Associated G. Mines of B. C.

JNO. HAYS HAMMOND is in Paris, France, and is expected in San Francisco about September 1st.

W. ARMSTRONG, City of Mexico, a mine owner in Mexico and a former Comstock miner, is in San Francisco.

S. B. CHRISTY of the University of California will represent that institution at the Salt Lake Mining Congress.

W. S. KEYES of San Francisco arrived in Salt Lake City last Wednesday as a delegate to the International Mining Congress.

F. SEARLES, mining attorney Nevada City, Cal., was in San Francisco this week, attending the obsequies of Robt. McMurray.

J. P. EVANS, auditor Colorado Iron Works Co., Denver, Colo., and S. W. Traylor, also of that house, are in San Francisco.

F. D. MILLER arrived in San Francisco on the 28th ult., eleven days from London, en route to the Philippines as descriptive artist.

RALPH NICHOLS is in New York city, en route to West Australia, where he will be Gen. Mgr. Boulder group of mines at Kalgoolie.

JULIAN KENNEDY of Pittsburg has been appointed consulting engineer of the Nicopol-Maripol Mining & Metallurgical Co. of Maripol, Russia.

GEO. H. EVANS, Gen. Mgr. Consolidated Gold Mines of Cal., Ltd., an English corporation operating in Butte, Cal., returned this week from London.

CAPTAIN W. R. ABERCROMBIE, U. S. A., in charge of the Government survey of Copper river, Alaska, left this week on the steamer Protection with a pack train of fifty horses.

MAYOR MORGAN of Auburn, Cal., has appointed the following delegates to the Mining Congress at Salt Lake City: B. F. Hartley, J. L. Rollins, W. R. Monahan, W. S. Davis, W. B. Fisher.

H. WOLLERMAN, of the importing firm of H. Wollerman & Co. of Wellington, New Zealand, is visiting the United States to buy mining machinery and other American products for shipment to New Zealand.

THE following is from the Spokane, Wash., Review: "John C. Davenport has gone to Siskiyou county, Cal., to superintend work on a copper property recently acquired by H. Mac Rae of Rossland, J. M. Price, L. Harris of London and J. R. Reavis of Spokane. A tunnel is to be run and other improvements undertaken."

Obituary.

ROBERT MCMURRAY, a pioneer miner and one of the best known men in California, died last Monday at Graniteville, Nevada Co. For many years he operated large hydraulic mines in that part of the State. He was a prominent member of the California State Miners' Association, a typical miner, enterprising and generous, always ready to aid others or work for the public good, and his memory will long be held in affectionate remembrance in the community where he passed so many active, prosperous years.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JUNE 21, 1898.

606,113.—STEAM BEER GOVERNOR—S. H. Atchison, S. F.
605,839.—BOX FASTENER—S. F. Baker, Santa Barbara, Cal.
605,999.—CAMP STOVE—F. B. Charroin, Fairhaven, Wash.
605,947.—NECKTIE—C. W. T. Davies, S. F.
606,001.—SIDEHILL PLOW—M. C. Dethiefs, Willow, Cal.
606,149.—ASSAY FURNACE—J. G. Iis, S. F.
606,073.—RAILWAY BICYCLE—C. E. Nichols, Milan, Wash.
606,023.—BICYCLE PUMP—L. A. Payne, San Jose, Cal.
606,155.—ROUTING MACHINE—W. S. Richards, Albany, Or.
606,091.—MUD GUARD—C. I. and A. L. Seaguest, Portland, Or.
606,100.—PAINT BUCKET—H. G. Thompson, Hollister, Cal.
605,973.—STATION INDICATOR—H. C. Turner, S. F.
606,179.—STRINGING PIANOS—C. S. Weber, San Jose, Cal.
29,897.—DESIGN—ICE MACHINE FRAME—R. D. Holabird, Oakland, Cal.
24,888.—DESIGN—RING TWINE CUTTER—W. E. Rosebro, Elmhurst, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BICYCLE PUMP ATTACHMENT.—L. A. Payne, San Jose, Cal.; assignor of one-half to M. V. Davis of same place. No. 606,023. Dated June 21, 1898. This invention relates to a pump attachment for bicycles, which is adapted to be so adjusted as to be operated from the seat post and is provided with connections by which air can be introduced to the pneumatic tires of either of the wheels without the use of a supplemental pump. It consists essentially in the combination with the seat post standard of a bicycle frame, of a vertically adjustable tubular seat post, a clamp by which it may be held at any desired point, a supplemental interior tube having the upper end fitted to receive and hold the saddle and the lower end provided with an air-forcing plunger so that by reciprocating this tube it will compress the air within the seat post standard. A tubular connection with this standard curves around the crank hanger bearing and has a connecting nipple, and a flexible tube is adapted to connect this nipple with the inlet valve of either of the wheel tires. After this connection is made it is only necessary to reciprocate the saddle post tube to fill the tires with air to any degree of compression.

THREAD AND TWINE CUTTER.—Walter E. Rosebro, Elmhurst, Cal. No. 23,888. Dated June 21, 1898. This invention consists of a ring having a triangular shank extending outwardly from one side, and this shank is made with concave sides, the meeting edges of which are drawn down thin and made sufficiently sharp to readily cut a thread or string which is drawn across them. Upon the outer end of this shank is fitted an ornamental button which covers the end of the shank and prevents any contact with the edges of the cutting knives, except when the string or thread is drawn beneath the head and against these edges.

Recent California Mining Incorporations.

Gold Channel Gravel M. Co., Grass Valley, to operate in Placer county; G. Mainhart, R. Scanlon, W. L. Baker, J. W. Hyatt, G. Gehrig.

Sheep Ranch G. M. Co., San Francisco; capital stock, \$600,000; W. H. Clary, B. F. Langford, G. R. Fletcher, G. F. Voltz, C. A. Kern, L. Schumacher, C. L. Feuser.

Greek Mine Co., San Andreas; capital stock, \$100,000; subscribed, \$6; M. S. Feinberg, F. J. Solinsky, J. Raggio, A. J. Smith, F. E. Logan.

Golden Sheaf M. Co., San Jose; capital stock, \$250,000; subscribed, \$36,000; C. H. Fuller, J. D. Mackenzie, C. Wehner, J. W. Dea, R. C. Long.

White Oak M. Co., San Francisco; capital stock, \$20,000; subscribed, \$10,000; S. J. Conger, W. S. Peters, H. A. Melvin, J. Hanshaw, F. F. Baker.

McGillivray M. & D. Co., San Francisco; capital stock, \$3000, all subscribed; F. Peterson, J. McGillivray, J. H. Hanson, G. McGillivray, H. Trevor.

Montezuma G. M. Co., San Francisco; capital stock \$50,000, subscribed \$212; W. F. Stevens, J. Kahn, G. A. Helmore, W. H. Porter, A. O. McGrew.

Pine Hill G. M. Co.; capital stock \$1,000,000, subscribed \$250; C. Rosenthal, F. C. Castleman, J. R. Mahone, T. Fox.

Recently Declared Mining Dividends.

Reward G. M. Co., California, 2½ cents per share; July 1.

Homestake, South Dakota, 50 cents per share, \$62,500; payable July 25.

Lillie, Colorado, 1 cent per share, \$10,000; July 1.

Smuggler, Colorado, \$10,000; payable immediately.

Wildman-Mahoney, California, 10 cents a share; payable immediately.

Horn Silver, Utah, 5 cents per share, \$20,000; June 30.

Boston & Colorado Smelting Co., 1½ cents per share; June 30.

Method of Determining Distances.

TO THE EDITOR:—For the benefit of surveyors throughout the country and in the interests of better workmanship and to the end that surveys made in a rough country by different surveyors may be more uniform in results and accuracy, I herewith give a method of determining distances either on hilly ground or a level plain that has been used by me for several years past with very good results.

This method has many advantages over the usual way of determining distances by right angled triangulation, both in expediency and accuracy; the possible introduction of instrumental and mechanical errors are, by this method, as nearly eliminated from the operation as can be.

Stadia measurements are objectionable on account of the necessarily short base and the necessity of considering angles of elevation and depression as well as the inclination of the rod. In the method here given the instrument itself takes care of all angles and you have always at hand the necessary tools with which to do the work; even a plumb bob can be dispensed with, as but one angle is taken.

In running a line select a place on the slope or top of a hill to which you can get a backsight; set off a base at a right angle to the line being run and mark its extremities by stakes or otherwise, as the case may require, or, if there is suitable ground some distance ahead, on or near the line; send your chainmen in advance and if the distance does not greatly exceed a quarter of a mile, let one of them set a marking pin firmly in the ground in line if possible and hold the end of the chain against it while the other draws the chain at a right angle to the line of sight; then with the chain or tape tightly stretched, let the one at the movable end proceed to describe an arc of a circle beginning at the point as near to a right angle from the line as can be determined by the eye and move in the direction of the transitman, he having adjusted his zeros and centered the telescope on the marking pin, unclamps the plates and turns the instrument to the extremity of the chain; clamp and follow the chain as it describes the arc by using the tangent screw so long as the included angle is increasing. Then we have, to illustrate, say, a 100-foot chain with 4° as the included angle — cotangent of $4^\circ = 14.3007 \times 100' = 1430.07$ ft. \times secant of 4° or $1.00244 = 1433.58$ feet, the distance. If you backsight to a right angled base, as previously mentioned, the secant does not enter into the calculation. By having the chainman drop a pin from the elevated end of the chain at a point as near to a right angle as he can judge by the eye, then going forward, set over the first pin; take the angle between the position of the pin let fall and the point at a right angle and multiply the cosine of the angle by the length of chain and obtain the exact length of the base to be used in calculating the distance by cotangents. With experienced chainmen the cotangents alone are all that is needed and the work can be done quickly and very accurately. In the field other expedients can be adopted such as holding one end of the chain against a tree where there is low underbrush, setting off your base to one side of the line on open ground.

W. B. SWANK.

It is now thought that "wireless telegraphy" cannot become practicable for long distances until the energy, now scattered profusely in all directions, can be concentrated in one narrow path. Eventually, though probably not at once, it may become possible to focus the electro-magnetic waves, like the rays of a searchlight, upon a point a great distance away. Under present conditions, it is calculated that at a distance of one mile the fraction of the total energy received on one square foot is less than 1-350,000,000 of the total energy radiated.

A LOCAL magnetic pole—a point where a dipping needle stands vertical

—is reported by Prof. Leist to exist at Kotchetovka, in the Russian province of Kursk. It is necessary to move twenty yards from this spot to change the direction of the needle one degree. At the point of this interesting anomaly, the ordinary compass needle swings freely, stopping indifferently in any direction.

Water Inches.

Irrigation water is measured generally by the cubic foot, by the gallon, or by the miner's inches. The miner's inch is a variable quantity, depending upon the head above the 1-inch orifice of discharge. It varies from a 4-inch head to a 6-inch head, and is not a uniform unit of measure. Thus, there are 50 miner's inches to a cubic foot per second, California measurement, and about 40 miner's inches, Colorado measurement. One cubic foot contains 7½ United States gallons of 231 inches.

CUBIC.

1 cubic foot per second equals:
2 acre feet in twenty-four hours.
60 acre feet in thirty days.
180 acre feet in three months.
720 acre feet in one year.
7.5 gallons per second.
50 California inches.
28.04 Colorado inches.

CALIFORNIA INCHES.

100 California inches equal:
4 acre feet in twenty-four hours.
1 acre foot in six hours.
120 acre feet in one month.
320 acre feet in three months.
440 acre feet in one year.
15 gallons per second.
900 gallons per minute.
77 Colorado inches.
2 cubic feet per second.

COLORADO INCHES.

100 Colorado inches equal:
5½ acre feet in twenty-four hours.
1 acre foot in 4.2 hours.
155 acre feet in one month.
465 acre feet in three months.
1860 acre feet in one year.
19.50 gallons per second.
1170 gallons per minute.
2.6 cubic feet per second.
130 California inches.

The term as applied to wells, such as "artesian positive," means one from which the water rises above the surface. "Artesian negative" is one in which the water does not rise to or flow above the surface.

"Phreatic water" is that nearer the surface and derived from absorption, and is a name given in a general way to all species of wells that are supplied from under ground water.

Will be the Largest Flag in the World.

The stars and stripes in the shape of the largest flag in the world will float over Morro Castle, Havana, when Blanco surrenders. The immense flag designed for this duty is already prepared by a patriotic Wall-street man. It measures 120 feet in length and 43½ feet in width, and it is believed that it breaks the record for size. It is so big that special bunting was made for it in Boston. The bunting measures 42 inches across in the rough. Made up in the flag, allowing for seams, each stripe measures 40 inches. It took a full piece of forty yards for each stripe except where they run into the jack. The jack measures 40 feet in length and covers the space of seven stripes. The stars are not very large. From point to point each star measures 14 inches. They are arranged in alternating rows of seven and eight, according to army regulations. The flag will cost \$290. Big as it is, it can be packed in a large traveling trunk and will not weigh more than 200 or 250 pounds.

THE spring of carboic acid in Sondra, supposed to be a result of ancient volcanic action in the region of the Thuringian forest, seems to be inexhaustible, a pressure of seventeen atmospheres at the mouth having continued without diminution. The yield is about 1000 cubic yards of gas per hour. Over ten tons of liquefied carbonic acid per day is produced from this supply, the gas being kept confined as it issues from the earth and used under pressure for power for the liquefying machinery and for a lighting plant.

Something New in Telephones.

W. F. Smith of San Francisco has invented an automatic telephone attachment, calculated to be more satisfactory than the present manner of communicating.

The telephone is the same as now used on present systems, only having a plate on the lower box, or, in case of hand telephones on standard, fitted with eleven buttons, and a proving slot to show that one has called up the right number. These buttons are numbered from 1 to 0, inclusive, and one disconnecting button, and are pushed down a short space in slots. To call up a number, the buttons are pushed down in rotation to make up that number. For instance, your number is 3429; you wish to call up 2685. Push down button marked 2 to bottom of slot, and let go; it immediately flies back. Push down button 6, let go, then button 8, let go, then button 5; immediately in front at proving slot shows 2685, and at central station, in a similar slot on switchboard, will appear the same number, under 3429, the number of your telephone, and your telephone is immediately connected with the one desired. When conversation is ended you hang up the receiver, push down disconnecting button; when all numbers disappear the connecting plug is thrown out, and any number you may desire to ring up can be gotten immediately, without waiting for central office, often at present ten minutes or more. Should it happen the number you wish is busy, the operator at central switches on the phonograph, and so informs you. If you wish to wait, leave the telephone, and the number, being exposed, shows operator you are waiting, and you will be plugged and connected as soon as the line is clear. Should you prefer to ring up another number, push down disconnecting number and proceed as before. The subscriber is thus in an independent position in regard to cutting and disconnecting, and the operator, who simply puts in plugs, can do more work.

Warships and Cruisers.

A battleship is primarily a vessel designed to bear the brunt of battle with the most powerful ships of an enemy's fleet. Hence, in a battleship great speed must be sacrificed, because the machinery necessary to operate the big guns, the complicated framework needed to give the vessel strength, and the thickness of her armor render it impossible to give her sufficiently large engines and coal capacity to produce the speed. Furthermore, a battleship, being so limited in her coal capacity, is not expected to make long cruises. Her business is to fight and not to run about. A cruiser, on the contrary, is expected to do a great deal of travelling. She makes long voyages and does duty on foreign stations in time of peace. In war she dashes up and down a coast watching for the enemy, or performs scouting duty ahead of a squadron. She must be able to carry coal enough for her long voyages, and she must have speed enough to run away from the enemy's battleships or to catch merchant vessels. Hence she sacrifices weight of battery and armor to speed. A protected cruiser is one which has a curved deck of steel over her engines and boilers, and has her coal bunkers arranged so that they give additional protection, two feet of coal being regarded as equal to an inch of armor. An armored cruiser is one which is further protected by light armor, not of sufficient bulk or weight to compel a sacrifice of speed. Our fleetest cruisers are the Columbia and Minneapolis, which can go from twenty-two to twenty-three knots an hour, but they have no armor and they carry only one 8-inch gun each and several smaller ones. The Massachusetts, which is a battleship, has nearly a foot and a half of Harvey-ized steel armor and carries four 13-inch, eight 8-inch and four 6-inch guns

in her main battery, but has a speed of only sixteen knots an hour. The Maine was not a cruiser, because in her construction, speed and coal endurance were in a measure sacrificed to armor and battery.

Physical Condition of Volunteers.

The numerous discussions bearing on the physical degeneration of the average up-to-date American citizen have recently had a very practical demonstration of fact in the number of rejections for unfitness for military service, as the result of test examinations of recruits.

Lieutenant-Colonel Mans, U. S. A., who has charge of the enlisting bureau, found that it was necessary to examine 17,000 applicants in order to obtain 12,000 who were fit for field duty. The results show in the main that the ordinary militiaman who represents the average metropolitan is by no means up to the requirements of a first-class soldier. In other words, it would appear that the best is done with the material at hand. The influences of city life in causing a lack of physical development and vital power are plainly manifested in contrasting the number of acceptances from country regiments as compared with those from the large cities.

It has long been admitted that the best blood comes to us from the rural districts, where healthful surroundings, outdoor life, and moderate living make the sum and substance of that vital resistance to degenerative influences which is capable of meeting all the ordinary strains of modern civilization. This is one reason why the country lad makes his mark and succeeds where the city-bred youngster fails. In a generation or two the enervating influences of city life tell in an unmistakable way upon the physical development of the sturdy yeoman, who then becomes narrow chested, weak kneed, short sighted, and is no longer in the fore in the race. This fact is strikingly exemplified in the alarming proportion of rejections in city regiments, to which reference has been made. From such a point of view, it is quite evident that the city man is losing his physical grip, for reasons obvious to all who study his habits and note the ultimately pernicious influences of his depressing environment.—Medical Record.

STATISTICS recently published by the Interior Department show that the Government still has over 600,000,000 acres unoccupied. This is enough to give each of the 73,000,000 people in the country a homestead of eight acres and still have 16,000,000 acres left. The land is distributed among twenty-six States and Territories. The largest amount is located in Alaska, where there are 369,572,600 acres. Most of this land will never be available for homestead purposes, of course, but its mineral value may be more than if the whole vast tract was available for grazing and farming purposes. The remainder of the land lies in productive States, but much of it is barren and arid or mountainous.

CAST-IRON PIPES are given extra strength by winding with wire, and the wire-wound pipes can be made of unusual lightness. This is the idea of a French iron master—M. Jacquemart—who makes the castings with projecting rings or bands to hold the wire in place. Annealed steel wire is used, and this is wound around the pipe in a lathe, the whole being then painted or dipped in asphalt. A pipe 6½ feet in diameter, cast in lengths of 13 feet, has been satisfactorily tested, the result showing the wired pipe to be capable of withstanding pressures much beyond those for which the unstrengthened cast iron is safe.

A NEW GAS, "crypton," has been discovered by Messrs. Ramsay and Travers. It is heavier than argon—till recently the latest discovered gas—and is present in the atmosphere in the proportion of 1 part in 20,000.

Mining Summary.

CALIFORNIA.

Amador.

Ledger: Liens have been filed for labor against the Summit mine at Sutter Creek, the property of the Central Eureka M. Co., for \$1047.50.—The Union Consolidated at Clinton has been shut down, and so far as known it is not the intention to reopen it until the proceeds of a recent assessment are in the treasury of the company.—The owners of the Butte Mountain mine at Jackson have leased it to tributaries for one month.—D. Fisher has secured an option on the Spagnoli at Clinton and will reopen the old shaft.—The Ivanhoe mine near Plymouth is expected to begin work with a 20-stamp mill.

Republican: Sinking continues at the Anita mine, Jackson.—At the Bellwether, Jackson, the water is kept out and the general impression is that the mine will soon be under new management.

Record: At the Onelda mine near Jackson they are said to have 15 feet of quartz at the 1500-foot level.—The Emmerson shaft at the Wildman-Mahoney mine, Sutter Creek, is down 160 feet and work is going ahead as rapidly as possible.—At the Potazuba mine the north drift at the 500-foot level is in 370 feet. They are in 4 or 5 feet of quartz; the flow of water is large.—The hoisting machinery at the Lincoln mine is nearly completed. Supt. Voorheis says that the engines will be ready to run July 1st. The shaft has been cleaned out and timbered to a depth of 98 feet.

Butte.

The Consolidated Gold Mines of Cal., Ltd., operating in Butte Co., Cal., has been reorganized or reconstructed under a scheme embracing a liability of 62½ cents on each of the 250,000 shares; the company's liabilities of \$87,500 are to be liquidated, leaving about \$117,500 to carry on the proposed work.

The Banner mine resumes operation next Monday. The mill will begin crushing July 15th.

Six miles of ditch has been completed by the West Bros. to convey water to their gravel mine near Lovelocks.—Good pay dirt has been struck in the Butte Queen mine near Inskip.

Calaveras.

W. D. Burton bought the Green Mountain mine at Chili Gulch for \$5500. This is the property that produced the large crystals, a carload of which were shipped to New York.

Echo: Considerable gold has been taken from the Harris mine, near Angels, recently.—The Bovee mill has been crushing rock for a week from the Hog Pen mine. The ore averages well.

Citizen: P. L. Shuman has sold to the North Star Con. G. M. Co., for \$200,000 in shares of the purchaser's capital and \$20,000 cash, the Original North Star mine, the Three Ball placer mine, the Shuman placer mine, the New Combination placer mine, and mineral rights in Cornow Homestead and the Baudin tract; a 10-stamp mill on the Empire gravel mine is included. The mines are near Tuolumne Hill.—The Daupin mine, near San Andreas, has been unwatered and sinking the shaft has begun.

Prospect: Work is progressing at the San Justo, near Angels Camp, and the 40-stamp mill is running on ore from the 300-foot level. The old shaft is being cleaned out and in about a week the bottom—700 feet—will be reached and sinking begun. Forty-six men are employed. The canvas plant, operated by T. Lee, is being run as steadily as material from the mill can be furnished.—It is said that a French company will begin operations on the Whittle mine. The report is that the first work to be done will be to run a tunnel 1000 feet.—A stamp mill will be erected on the South Carolina mine, near Robinson's Ferry. They have a 30-foot ledge of \$8 rock. A tunnel is being run from the Stanislaus river to crosscut the ledge. This will be run 1200 feet, at which point it will tap the ledge at a perpendicular depth of 1000 feet and drain the mine of all water.—The Great Western, which was shut down for a short time, resumed operations.—The hoist and all the surface equipments at the Lightner are completed and the mill is running day and night.

El Dorado.

(Special Correspondence).—Work has resumed at the Unity mine near Granite Hill. The shaft will be unwatered and retimbered, and drifts will be run from the 300 level. The property is owned by San Francisco people.

The Big Canyon mine, operated by Hayward & Lane, because of lack of water, has ceased working the power drills and is operating only twenty stamps. The mill will probably close for the season within a few weeks.

At the Houx mine, near Shingle Springs, the shaft has reached 115 feet, and a ledge 3 feet wide of good ore has been discovered.

At the Rose Kimberly, near Rescue, a drift on the ledge is being run at the 150-foot level. The company will put in an air compressor.

At the Alta Vista mine, near Gold Hill, development continues with success. They have a 20-inch ledge that yields \$20 a ton by mill tests.

The cyanide plant at the Gentle Annie mine near Placerville gives satisfactory returns. This is a new venture in this section, and the results are carefully noted by mining men. A similar plant is in operation at the old Vandalia mine, fifteen miles west of Placerville, and it is said that it is worked with fair profits on the low grade ore of this long-abandoned property.

Work at the Hall mine, near Placerville, is progressing, and the results are encouraging to the investors. The mill tests of the ore yield good values.

The Dench & Craddock property gives a good yield through the 2-stamp prospect mill. The Limpensel, Hall, Skinner, Lemon, Crad-

dock and Morrow properties are practically new prospects, though work has been done upon them in a desultory way and in pocket-hunting years ago with some success. The systematic development of these mines, and seeking depth, is not only bringing about profitable results to the owners, but puts a new phase upon the undeveloped mining resources of the county. They are all within twenty minutes' walk from the courthouse, and, together with the Gentle Annie and Joe White mines—the latter an old-time property upon which work was recently resumed—form a continuous line from the town to the American river, a distance of two and a half miles.

The Gold Bug and Ida Mitchell, in the opposite direction, beginning in the center of town, will soon resume work under the auspices of a company organized in Fresno. They expect to push work on a large scale, backed by strong capital.

Placerville, June 20th, '98.

The Ohio mine at Greenwood is running with a full force. The ore body at 350 feet depth is of good value.—The Limpensel property at Placerville is productive of good ore at 250 feet depth. A mill run will be made on 100 tons of ore for a test.—The Hall Con., on the mother lode, in line with the Gentle Annie and Limpensel, is in good ore. The tunnel is being driven with power drills.

The mill at the Eagle King mine near Grizzly Flats has shut down owing to scarcity of water. Development work will be continued.

Nugget: G. W. Cummings is opening his slate quarry near Placerville. Five men are employed.—The Rose Kimberly, in Jay Hawk district, is crosscutting from the 100-foot level.—Work has been suspended for the season at the Hodgkins placer claim at Gray's Flat. It is said that rich gravel was found.

Kern.

Randsburg Miner: The Yellow Aster Co. has shut down the Visalia mill at Garlock and suspended all operations there. The last milling consisted of about sixty-six tons, which produced more than \$100 per ton.—About seventy tons of ore averaging about \$85 per ton have been run at the Johannesburg mill.

—Another strike has been won in Triby No. 2, and over \$3000 was taken out in one day.—Ore is being shipped to the Barstow mill, each car being loaded with twenty-five tons; a watchman accompanies each car. Thirty stamps of the new mill are dropping on this ore.

At the wells work is going forward in a satisfactory manner and the present supply amounts to about 30,000 gallons every twenty-four hours. It is the intention of the company to tunnel in from the bottom of the Skillings well, where they are now at work at a depth of 205 feet for a sufficient distance to get what water they want. Estimates are being made on putting in a 5-inch pipe line, a larger pumping plant and a 100,000-gallon tank.

Rand: Near Salt Wells much development work has been done by the Colo. & Cal. M. D. Co. Fully 300 miles of ditches have been plowed in looking for ledges and a dozen wells have been sunk. Shafts are plenty and prospect holes puncture the great flat in all directions. Water and fuel are plenty. The gold-bearing rock is of a refractory nature that cyanide will work. A phosphate ledge has been opened in the Salt Wells country that will prove valuable for fertilizer. It assays similar to the phosphate mines in South Carolina, and only needs slight treatment to be ready for fertilizing the soil.

Madera.

(Special Correspondence).—The Contentment mine, adjoining the Standard, near Central Station, is reported to have been sold to Eastern parties for \$10,000. Representatives of the purchasers are on the ground making estimates for required machinery. The former owners of this mine were Lindsay, Schroeder, Keller & Patton. It has been worked for many years, though no great depth has been attained.

Reed & Harris recently put up a 2-stamp mill at their mine near the junction of Pine Gold with the San Joaquin. They have heretofore worked their ore by means of an arrastra with satisfactory results. The ore is cheaply extracted by means of a tunnel run on the vein.

Gold, June 26th, '98.

Mariposa.

Boston News Bureau: There is no truth in the report that Merced is likely to call a \$3 assessment in a few weeks. It will be many weeks before Merced calls any further assessment, if indeed any is called at all.

Mono.

At the cyanide plant of Cain & Co. at Lundy seventeen men are at work.

Bridgeport Chronicle: On the 1st of June the Standard Con. Co., Bodie, had on hand \$52,162.53, and the Syndicate \$971.02. Standard Con. stock is quoted at \$1.50 a share, the highest mining stock on the market.

Nevada.

The Odin M. Co. will sink a shaft on the Wait for the Wagon claim, near Nevada City, to a depth of 500 feet.

A new hoisting plant capable of 1500 feet depth is in course of construction on the old Telegraph mine, adjoining the W. Y. O. D. The galloways frame will be 70 feet high, and a self-dumping skid weighing a ton and a half will be used. The Telegraph was worked for some time by a local company, but was hampered by litigation. The property was since purchased by the W. Y. O. D., who are developing it.

The Polar Star mine at Dutch Flat has closed for the season for lack of water. The yield for the short mining season has been very satisfactory.

Work has begun on the Metropolitan mine at Moore's Flat.

Herald: The owners of the La Belle mine

near Nevada City contemplate putting in an air compressor.—The St. Gotbard Co. is preparing to build a mill on the Delbi mine at North Columbia.

Union: The new 10-stamp mill at the Red-dick gravel mine, near Nevada City, will probably be in running order by the 4th of July.—Opie, Hart & Garland have arranged with the owners to extract 300 tons of ore from the old Peabody mine near Grass Valley.

—The Stanford mine, near Nevada City, is yielding some high-grade ore. The property is bonded from Judge Caldwell by J. H. Neff and associates.—The Spanish Ranch mine, near Nevada City, has a ledge 25 feet wide and the ore assays \$7.50 per ton.

Placer.

The superintendent of the Pioneer gold mine says that a vein in the north tunnel recently opened in the 50-foot drift from the winze, 12 inches wide, has widened to 18 inches.

Sentinel: Development work is still in progress at the Bellevue quartz mine in Ophir district. The shaft is down 150 feet and drifts have been run. The ledge is increasing in width. Six men are engaged. Twenty tons of ore will be crushed at a custom mill. Little work has been done on this property, except the sinking of the shaft and some small prospect drifts, yet the gold taken out has reached the sum of \$10,354.26.—The French Co., which bonded the W. C. Ralston mining property at Long Canyon, has thirty men at work. The company has about twelve miles of channel, which they will work on a large scale.—In the Jubilee quartz mine near Auburn the ledge averages about 2 feet. The shaft is down 100 feet. Ten tons of ore yielded over \$300.

San Bernardino.

Tracy N. Stebbins, near Victor, made a cleanup of \$600 in two weeks with an arrastra.

San Diego.

The Credit Commutation Co. of Sioux City, Iowa, claims to be the owner of 186 notes made by D. T. Hedges of the Golden Cross M. & M. Co. for amounts aggregating \$873,500, and alleges that Hedges is a three-fifths owner of the properties of the Golden Cross M. Co., worth \$1,000,000; that an interest in the properties in question has been sold to the Free Gold M. Co. of Nevada, and that they are about to pay for them, thus enabling Hedges to prevent its being applied to the payment of the notes in question. Plaintiff asks judgment for 68 per cent of \$873,500, with interest on the whole amount.

Shasta.

T. F. McAvoy has bought the Price quartz mine, near Middletown. The property has a ledge 15 inches wide of good values and a 5-stamp mill.—The Slatonis & McCall quartz mines in Dog Creek district were sold to Kirk & Co. for \$3500.—P. Schmitzer, in a recent cleanup in his placer mine near French Gulch, found a piece of gold weighing \$117.—Pennsylvania capitalists have leased 300 acres of land near Delta upon which they are opening a slate quarry. The Shasta County Democrat says they will employ 300 men.—Devinney & Gray, near Whiskeytown, are running a steam arrastra on ore from their Kanaka mine.

Courier: The new 10-stamp mill at the Spanish mine, near Shasta, is approaching completion. The ledges are opened by tunnels, and the ore is of good grade.

Sierra.

(Special Correspondence).—Gravel mining in this section continues in a measure, but is hampered by the scarcity of water. The companies operating on a large scale are taking out gravel and storing it, awaiting the next season's rain and snows.

The Bald Mountain Con., formerly the South Fork gravel mine, at Forest City, comprises 800 acres. The tunnel has reached nearly 3000 feet, tapping the channel at 2400. The gravel is brought in a train of twelve cars drawn by a locomotive. The amount of gravel stored begins to assume the appearance of a small mountain.

The Hanley drift gravel mine, near Alleghany, is outputting gravel in quantity, but has no facility for washing it the present season. This mine has a main tunnel 2400 feet long, with additional tunnels and drifts amounting to 2500 feet. The channel is tapped at 1500 feet. The average pay streak is about 3 feet depth, across the width of the channel.

The Crueses G. M. Co. are preparing to put in an air compressor. Their purchase of the Hope mine recently makes their holdings quite extensive. They will work the Hope from the Plumbago mine and abandon for the present at the least the extensive tunnels run on the Alleghany side of the ridge by the Howard Co.

The Rock Placer, Mabel Mertz, Meehan and Tangway properties are producing good gravel and storing it.

The Kenton quartz mine, an abandoned property, upon which work was resumed a few months ago, is making good progress. The old works have been cleaned and retimbered and the tunnel is being driven rapidly.

At the old Gold Bluff mine, near Downieville, an Eastern company is pushing work under the supervision of J. W. Copeland.

The resumption of work on old time quartz properties and the successful working of ancient river channels has taken goodly proportions in this county, and the year would be quite prosperous were it not for the scarcity of water, which necessitates a long wait for returns from capital invested as work continues.

Downieville, June 27th, '98.

Enterprise: The Gold Bluff mine, near Downieville, has received the first load of machinery of the new air compressor plant. The Gold Bluff mine has a good record as a gold producer, having followed the pay chute

down from the croppings over 1000 feet with good rock all the way.

Slakiyon.

Building ditch and flumes at the Aromas mine on Salmon river is progressing.

The American Bar Co. at Klamath river has thirty-eight men employed.—The Greenhorn blue gravel mine continues to yield good pay, with plenty of water pumped from bed-rock for washing. The company has a payroll of over \$3000 a month.—The Yreka Co., running a tunnel near Yreka, has reached 420 feet.

The Pacific mine, at mouth of Humburg creek, Klamath river, has been unwatered.

The San Francisco Co., working the old Eastlick and Wright hydraulic claims at Oro Fino, is making a clean-up; the claim has been worked with improved elevators.

Journal: Jilison & Co. are meeting with success in their quartz mine near Henley. With their 5-stamp mill they clean up from \$1200 to \$1500 every two days; they blasted a bunch of quartz that contained \$3400. They are putting in five more stamps.

Reporter: Mining men from Oakland are examining the old Cummings ledge near Calistobans. They will sink a shaft and, if favorable, they will erect a 10-stamp mill.—On the Bouvier mine on Slide creek the improvements are being rushed to completion.—On the Hazel G. M. Co.'s property near Hornbrook, comprising five claims, fifty men are employed.—The Badger M. Co. has a tunnel 100 feet on the ledge, which is 2 feet wide. Ten men are employed. Steam is being substituted for water power.

News: The Blue Jay mine near Yreka is bonded for \$3500 by a Portland company. The development work consists of two tunnels, the lower one tapping the vein at a depth of 250 feet.—It is reported that the California Queen mine in Cottonwood district, has made another rich strike.

Trinity.

The Postlethwaite dredger at Poker Bar, Trinity river, will shortly be ready for operation. It has a capacity of 105 cubic yards per hour, and was built by the Risdon Iron Works of San Francisco.

The Altona mine at Cinnabar shipped 100 flasks of quicksilver.

R. Curin, representing the Pioneer M. Co. of Montana, will prospect the river bed in the vicinity of the Given ranch, near Weaver-ville, with a view of putting in a dredger. The company have already located a good many acres of the river bed.—The Bighouse mine, near Trinity Center, is pushing development work on a ledge of fair value.—C. A. Hamilton, representing Col. Dan Burns, has been examining property at New River. He has secured an option on the Mountain Boomer mine and will begin operations on it.—The Sherwood mine is taking out ore.

Journal: The company that purchased the Chloride mines, near Dedrick, have made their second payment on the property. They will build a mill.

Tuolumne.

At the Trio mine near Tuttle-town one shaft is down 200 and the other 550 feet. Drifts and crosscuts have been run 586 feet. There are three claims in the group.—At the Rawhide near Sonora the forty stamps and obliteration works are in constant operation. The depth of the mine is 1400 feet.—The Rappahannock has reached a depth of 1100 feet. The Alameda at Table mountain is driving to 800 feet depth. The ore body is said to be 140 to 160 feet wide. There are over 5000 tons of ore on the dump. The new 20-stamp mill will be ready to start about the middle of August.

—The Bawn mine near Robinson's Ferry has reached 300 feet depth. The shaft will be sunk 1000 feet.

Union-Democrat: Many improvements are being made at the Confidence mine at Confidence, and the twenty stamps are running on a good quality of ore.—The men working the Wainwright claim on Bald mountain in seven weeks have taken out \$7000, an average of a \$1000 pocket per week.—The shaft at the Bown mine near Robinson's Ferry is down 285 feet.—A company headed by J. W. Richards has commenced to develop the Uncle Sam mine near Quartz. It is proposed to drive a shaft on the vein at least 200 feet.

At the Dreisam the shaft is down 280 feet, with 3 feet of high grade ore in the bottom. The percentage of sulphurets grows heavier with depth and much of the concentrates assay over \$2000 per ton. The new mill is running.—In the Hope mine near Sonora work is confined to stoping from the 280-foot level. The rock is good grade.—The crosscut tunnel on La Estrella has been driven 310 feet.

Independent: In the Bell mine at Tuttle-town the shaft is down 400 feet and a drift has been run 80 feet. The ledge has been crosscut, showing nearly 60 feet of vein matter, but no hanging wall was found. The object was to run the level 400 feet.—At the Tarrula mine, Table mountain, the shaft is 350 feet deep. An extensive ore body is discovered. Eighteen men are employed.

Mother Lode: Good sulphurets ore is taken from the Pine Tree mine near Jamestown.—The Kendall mine near Stent is being examined by capitalists from Philadelphia to get it on bond. The ledge in the shaft is about 11 feet wide, charged with sulphurets.

Yuba.

The Abbie M. Co. of Rackerby have purchased the Johnson or Abbie mine. They had it bonded and have been developing it for over a year.

NEVADA.

The De Lamar mine is said to yield a profit of \$300,000 a month.—The mills at Cherry Creek are supplying the smelter with 500 tons of concentrates each month, and at present 100 tons of copper matte are being sent monthly to the refinery at Chicago.

Six teams are hauling sulphur for the Humboldt Sulphur Co. from their mines at Rabbit

Hole to Humboldt station. — M. Cutting brought from his mine in Silver Star district, Esmeralda county, seventeen ounces of gold worth \$13 per ounce. This represents the output from seven tons of ore.

The gross earnings of the Dexter gold mine at Tuscara for June is figured at \$28,000.

At Austin the Austin M. Co. started its mill last week on ores from its mines there.

Work has been temporarily suspended on the Comstock and Brunswick lodes, the Con. Cal. & Virginia, Ophir, Mexican, Utah Con., Best & Belcher, Gould & Curry and Savage. The shut down is said to be for economical reasons and to devise plans for the future. Efforts are being made tending to the adoption of a plan to drain the lower levels of the Comstock and resume deep mining.

Official letters report in the Savage during the past week the main west drift on the 130-foot level was cleaned out and repaired a distance of 10 feet; total length 607 feet. Brunswick lode.—The joint north drift on the Sutor tunnel level has been cleaned out to the face, a distance of 14 feet, and advanced 9 feet; total length 152 feet; face in hard porphyry.

In the Belcher mine, on the 1000-foot level, the east crosscut from the main north lateral drift is now out 155 feet, 10 feet having been made during the week; the face shows porphyry. There have been hoisted and stored in the ore house at the mine during the week twenty-three mining carloads of ore, the average top car sample of which shows an assay value of \$18.92 per ton. The gross yield in bullion from the 281 tons and 630 pounds of ore worked by the Brunswick mill during the week was \$3290.28, the average battery sample of the same being \$17.55 per ton.

The yield of the Overman mine for the week ending June 25 amounted to nine carloads of ore, valued at \$28.36 per ton. They have shipped 69 tons and 1490 pounds of accumulated ore to the Brunswick mill for reduction. The ore extracted during the week was taken from the workings above the north drift on the 900-foot level.

In the Potosi mine, the west crosscut on the south line, tunnel level, has been advanced during the week and is now out 178 feet; the face shows porphyry and low grade quartz. In the croppings on the 40-foot level they are raising on the pay streak of ore. Have shipped to the Nevada mill during the week 17 tons and 1000 pounds of ore, the wagon samples assaying as follows: Gold, \$13.75, and 13.37 ounces silver per ton.

Lyons County Times: M. & J. King deposited in the Carson Mint 101 ounces of gold, the proceeds from their Dayton mine during the first three weeks in June. —Williams & Armstrong, of Silver City had a crushing of forty tons of ore from the Vivian mine which gave them between \$25 and \$30 per ton. —The Nevada G. M. Co., operating at Lone, employs 250 men. —The Dexter M. Co. of Tuscara made a shipment of gold bars and auro-cyanides. It is estimated that the gross earning for June will reach \$30,000.

OREGON.

In the Red Boy mine near Baker City the tunnel has reached 1300 feet. It cuts two ledges, one 12 and the other 90 feet wide. There are 1200 tons of ore on the dump.

At the Baisley-Elkhorn, near Baker City, sinking continues and the mill products are satisfactory.

The ditch of the Steam Beer mine, near Leland, is finished. It will carry 3000 inches of water and will enable the company to run their mine for six months in the year.

L. C. Basye of Missouri Flat district, near Jacksonville, unearthed a pocket from which he obtained \$600.

Baker City Democrat: Near Malheur City three men took out \$1600 with hand mortars in twelve days. The ledge upon which they are working is 2 feet wide.

WASHINGTON.

The '97 product of gold and silver in the State of Washington was 21,752,504 ounces of gold and 242,720.15 ounces of silver, valued at \$449,664.15 and \$313,898.46 respectively.

The Deer Trail mine, at Cedar Canyon, is shipping thirty tons per day. —Fifty teams are reported engaged in hauling ore from the Legal Tender and Deer Trail No. 2 to Davenport. —The Blue Grouse, a copper property, will start up as soon as the wagon road from Springdale to Cedar Canyon is completed.

The Chloride & Rattler, near Fruitlands, has begun work. It is a silver-lead property and yields \$27.50 in gold. —The War Eagle mine at Meyers creek, on the reservation, has a vein 10 feet wide, with a 2-foot pay streak, which assays \$50.90 in gold, silver and lead. The ore outside of the pay streak is said to assay \$3.50 in all values.

Near Springdale the Copper G. Co. has discovered a vein of good grade copper and gold ore. —Cottrell & Co. are developing a 30-inch wide ledge that assays \$16.85 in gold.

The tunnel in the San Poil at Republic has reached 290 feet. A ledge of fair grade ore has been found. An air compressor has been installed and work is pushed. —The Black Tail has found a good ore body and is driving development work day and night. —In the Tenderfoot the tunnel has reached 100 feet.

—The Bonanza mine, near Bossburg, is shipping sixty carloads of ore per month. A vein over 20 feet wide is exposed in the 400-foot level of the Bonanza. It averages about 35 per cent lead, 30 per cent iron and from 10 to 15 ounces in silver.

BRITISH COLUMBIA.

At Spokane G. Turner has secured a temporary injunction restraining the sale of Le Roi mine at Rossland, recently sold to the British American corporation for \$3,000,000 by a majority of the American board of directors. Turner claims the pooling agreement existing between certain large stockholders was violated by the action of the trustees, whose acts, he claims, were without authority.

C. H. Macintosh, the British Columbian managing director of the purchasing company,

says such action will not succeed in invalidating the purchase. He further says: "Had we been eager first to buy the Le Roi, we should have found it necessary to give most, if not all, of the \$5,000,000 originally asked by the vendors, instead of the \$3,000,000 at which we purchased, and, after buying the Le Roi, have found the prices of surrounding properties which we have since bought heavily raised against us, certainly to much higher figures than those at which we obtained them in the end, the vendors knowing as we know, or that several such properties can be worked best and most cheaply in conjunction with the Le Roi."

A Seattle, Wash., dispatch dated June 28th says: "The sale of the Le Roi gold mine for \$3,000,000 to a British syndicate has been successfully blocked by Senator Turner."

Probably there is not a section in the mineral act of British Columbia that is so often misinterpreted as is Section 16. It relates to the staking of claims, and has been generally interpreted as meaning that, where there is no timber and posts are hard to get, the locator may use stone monuments to mark the boundary lines of his claim. Such is not the case; and as this is a most important point, it might be well to refer to the act itself. Section 16 says: "A mineral claim shall be marked by two legal posts. * * * The locator shall also place a legal post at the point where he has found rock in place." Then follows the paragraph relating to stone monuments, but it refers only to the case of running the blaze line, and makes no allowance whatever for the same to be used as legal posts. It reads: "When a claim has been located the holder shall immediately mark the line between posts Nos. 1 and 2 so that it can be distinctly seen; by blazing trees and cutting underbrush and in a locality where there is neither timber nor underbrush he shall set legal posts or erect monuments of earth or rock not less than 3 feet high and 2 feet in diameter at base, so that such line can be distinctly seen."

The War Eagle, at Rossland, which has been shipping 105 tons per day to the smelter, announces that it will increase its shipments to 200 tons per day.

M. Willis, managing director of the Channe M. Co., at Fairview, closed a deal with an English company for some of the company's property for \$130,000. —A shipment of ore from the Providence mine to the smelter went \$51.89 to the ton.

At the Second Relief mine, near Erie, there are 400 tons of ore ready for shipment as soon as the road is completed to Erie. This has been taken out in the ordinary process of development, and there are large bodies of ore blocked out ready for stoping.

The Whitewater mine at Whitewater has started another tunnel. The owners have ordered a concentrator of 100 tons capacity. About sixty men are working in the mine. In a few months they will probably employ 300 men. The company is shipping three or four cars a week.

The B. C. mine, near Grand Forks, has from 3000 to 4000 tons of shipping ore on the dump. The B. C. is at present shut down for the purpose of installing a 10-drill compressor plant to replace a 3-drill plant that was found to be too small. —The Ardelston has just installed a 7 drill plant on its copper property.

—The Old Ironsides in the Wellington camp is to put in a 7-drill compressor and the Stem-winder a like plant.

The Joint group near Nelson has a 5-foot ledge of galena, and assays run \$120 in gold and silver to the ton. The owners have given Eastern capitalists an option on the Joint for \$55,000. —The last car of ore shipped from the Vancouver mine, Slocan, went 263 ounces silver per ton and 55.9 per cent lead, giving returns of \$4724.52 for the car. Over eighty men are employed in the mine. —During May there were cleared at the Kaslo custom house 1,860,857 pounds of ore, valued at \$67,735, containing 696,086 pounds of lead and 94,052 ounces of silver.

The recent tests indicate that the average proportion of iron and silica all over the mine is almost precisely equal, or, to be exact, each ordinarily runs about 28 per cent. As is needless to point out, this makes an admirable smelting ore, although in the case of the War Eagle the excess of iron and silica is just now of great importance, as it has a flat rate for the treatment of its ores at Trail, whether the iron runs in excess or in the minority.

In pursuing the tests as to the character of the ore, a sample was taken at the 625-foot level, across the full width of the vein, which at that time measured 6½ feet, although it has since gained a foot in width. This sample returned the following results: Gold, 98 oz.; silver, 2.9 oz.; copper, 4.3 per cent; iron, 34.5 per cent; silica, 22.5 per cent. The remainder of the ore was made up of sulphur and iron carbonates. This sample, showing as it does an excess of 12 per cent in iron, might be taken as indicating that the iron proportion increases with depth, but J. B. Hastings, the Mgr. of the mine, recalls the fact that a recent shipment of ore from the very grass roots gave an iron excess of 24 per cent, so that he does not place any particular faith in the high excess obtained from the recent sample taken from the 625-foot level, which is at present the deepest working in the property, and he inclines to the belief that the question of depth will be of no importance with reference to the silicious nature of the ores of the camp.

Beaton Bros. sold the Jenny Lind and Golden Gate claims at Ymir to McMillen & Merced, who represent English capital, for \$7000 cash. The ore runs high in gold and copper. Beaton Bros. have done considerable development work on it.

Rossland Miner: Timbering the shaft of the Le Roi mine, Rossland, between the 600-foot and 700-foot levels will be finished within a week. Re-timbering the shaft between the 500-foot and 600-foot levels is also under way. The installation of the trackway to the 700 will be completed in a fortnight, when com-

munication will be established to the bottom of the mine. It is expected that the whole property will be in shape for the resumption of active operations by the last of July or the first of August. The 350-foot level is being extended and some good ore is met. The 600 is now 666 feet west of the main shaft. The ore there continues good. —The Nickel Plate and the Great Western are putting in a 12-drill compressor. This is the largest straight-line machine in camp. —The War Eagle shipments last week amounted to 1688 tons, of which all but 208 tons went to Trail. Work is under way preparing the surface for the big galloways frame to be installed, and the timbering of the shaft is rapidly nearing completion.

Kootenaiian: The Payne mine at Kaslo closed down completely last week, and rumor has it that when operations are resumed again it will be in the hands of an entirely new crew. Mgr. McDonald returned from San Francisco, and it is said found the mine running in anything but a satisfactory manner. He at once decided upon an entire change of force.

Miner: The War Eagle at Rossland has decided to increase its shipments to 200 tons daily. —The Hall Mines, through Supt. M. S. Davys, has taken a \$65,000 bond on the True Blue, the copper proposition discovered near Kaslo. The ore showings assay an average value of 15 per cent copper and some gold and silver.

Rossland Miner: The mooted question as to whether or not Rossland ores become with depth more silicious and consequently harder to melt, seems to have been answered by the tests of the War Eagle rock recently made at the Trail smelter. The analyses indicate that while of course individual lots vary widely in the proportionate amount of iron and silica, yet on the whole there is practically no difference in the silicious percentage, whether the sample comes from the grass roots or from the 625-foot level, which at present is the deepest working in the mine.

ALASKA.

(Special Correspondence). —The American G. M. Co. has bought all the Nowell G. M. Co.'s property, including the Basin gravel mine and Sheep Creek quartz mines. At Sheep Creek in a short time the mills will be running.

The Berners Bay mines are not yet in operation. Supt. Willis Nowell has gone to the mines and states that he will start up at once.

The Jualin is running steadily on good ore. Schneider & Danow are opening up a good prospect near the Jualin. Fifty tons of machinery is now on the ground.

Mullin M. & Mfg. Co. are running a cross-cut to tap the Ivahoe. They will put up a tram and mill as soon as the ledge is struck.

Prospectors have brought in some rich gold ore from the head of Eagle river. The extent of the discovery is not yet known.

W. H. Hile is running an 1800-foot tunnel to open up the Last Chance gravel basin above Juneau. A four-drill compressor has been set up and will be in operation this week.

Treadwell is busy putting up buildings for the additional 500 stamps.

A report came out yesterday that in all probability no boats would be able to get up the Yukon this season; the water is very low. The winter has been mild all over this country.

Three flat-bottom stern-wheel steamers are at the dock. They intend going to St. Michaels.

Two thousand head of cattle have been sent into Dawson over the Dalton trail by way of Pyramid Harbor.

Juneau, June 13th, '98.

A recent arrival at Dyea from Dawson, sent out by one of the trading companies, says that in consequence of the low water in the Yukon river it is doubtful that any river steamers will be able to reach Dawson this year.

Upon the strength of this report the Canadian authorities have placed in force an order making it compulsory that all persons going down the river shall have 600 pounds of provisions, otherwise they will not be allowed to proceed.

L. S. Smith, returning from Bennett, says that real estate in the coast cities has dropped fully 75 per cent in value. About four miles of the Skaguay-Lake Bennett railway were completed, and grading for five miles beyond was ready for the rails. About 500 men are at work on the road. Wages are from \$2.50 to \$3.50 per day. It is expected that the road will be completed to Lake Bennett by the end of July. The builders intend to continue the road to Dawson.

THE KLONDIKE.

A passenger returning from Dawson says not in five years has there been so light a snowfall in the interior of Alaska as last winter. Mountain peaks which are usually covered with snow are bare. Melted snow and ice make the greater volume of the water of the Yukon river, and this year it is lower than it has been in a long time, and the amount of snow will not produce water enough to raise it more than a few inches at most. Bars and points jutting from the shore at the bends of the river are far out of water. At the present stage of the water none of the boats at St. Michael can come up the river. They would never get over the flats. The exceptionally mild winter accounts for the light snowfall. Prospectors who have been in the Yukon basin for years say they have never seen the river so low at this time of year and so little snow. There is a good deal of uneasiness on this account in Dawson and up in the mining camps. There is said to be disappointment among claim holders generally in regard to the clean-up. The amount is less than was anticipated; and while some hope it may reach \$20,000,000, many will be surprised if the total clean-up exceeds \$5,000,000. There is not a man in the Klondike region who owns a claim that does not want to sell. Thousands

of men are going into the Yukon country who have nothing but the bitterest disappointment ahead of them.

Alaska Miner: The amalgamation of the three tramway companies at Chilkoot pass is an important event in the stirring incidents of the Klondike rush. The entire complexion of travel over the pass was changed when these aerial roads were built. For years past the miners and Indians laboriously climbed the precipitous heights of Chilkoot, each carrying upon his back a heavy load; but this year a great change occurred, making that mode of travel quite unnecessary. So cheaply and expeditiously was the freight carried, that prices in force last year were reduced to a point within the bounds of reason. Now all three companies will be operated under one management, reducing expenses very considerably. Amalgamation leads to economy in the working and establishes a community of interest and prevents friction. The service on the Chilkoot will be better than ever.

IDAHO.

(Special Correspondence). —The following figures show the tonnage of concentrates per month shipped from the various silver-lead mines of the Coeur d'Alenes, Idaho, being in round numbers:

| | Tons. |
|--------------------------|-------|
| Bunker Hill and Sullivan | 2400 |
| Last Chance | 600 |
| Mammoth | 500 |
| Helena and Frisco | 1500 |
| Con. Tiger and Poorman | 1800 |
| Standard | 1200 |

The ores are concentrated in the ratio of three to six tons into one, the concentrates running from 55% to 60% lead and from 15 ozs. to 90 ozs. silver.

The Bunker Hill & Sullivan and the Last Chance are at Wardner. The Mammoth, Helena & Frisco, Tiger & Poorman and Standard are along the canyon from Wallace up to Burke.

The Morning and You Like group is at Mulan. This property, which lost its mill by fire last April, has a new 700-ton concentrating mill almost complete. It is equipped with heavy crushers, rolls, jigs, round tables and vanners. The new mill involves an expenditure of \$100,000. The power is water, under 900 feet pressure. A railroad runs from the mill to the mine, three miles distant. This property belongs to Larson & Greenough, and it is estimated they will ship about 2700 tons of concentrates per month when the mill starts.

The Con. Tiger & Poorman shipped 19,700 tons of concentrates in 1897. Their present mining is through a 1400-foot shaft at the 1300-foot level. The mill has a capacity of 600 tons per day. The company is putting in a new 20x60 direct-acting hoist, which will be in operation by Aug. 1st, and will materially increase their hoisting facilities.

Work in the Helena & Frisco proceeds through a 1200-foot tunnel, from which a 1000-foot shaft has been sunk. The breast of the tunnel is 600 feet from the surface in a vertical line.

The Bunker Hill & Sullivan management is driving a tunnel from the mill, near the railroad, to the mine, a distance of about two miles, which, when complete, will displace the wire-rope tramway now in use.

WASCOTT.

Wallace, Idaho, June 24th, '98.

The Pierce district, near Kendrick, has a revival in mining as a result of attention turned towards ledge work. The water supply, too, has been abundant this spring, and the placer miners are profiting by it; during the next thirty days clean-ups will be frequent. —The stamp mill of the Mascot M. & M. Co. is being taken to the old Blanket mine on Gold creek. This company has taken a bond on this mine and will begin work.

The De Lamar in May leached 2796 tons; the bullion produced from cyanide treatment was \$22,000; total product for the month, \$29,099; total expenses, \$24,063.

Boise Statesman: The New England Dredge Co. has launched its dredge on More creek at Idaho City. —The Bingham Placer Co. has begun sluicing gravel at Gibbonsville; 1800 cubic yards go through the boxes daily. —The Croesus mill at Hailey is running five stamps on an ore test. —The Checkmate Co. at Pearl has been shipping ore four months, averaging one car per week, that returned \$100 per ton in gold.

Idaho World: The case of G. W. Grayson against the heirs of T. Mootry, who was at the time of his death one of the owners of the Gold Hill mine at Quartzburg, is in court. The property was purchased by Grayson at a sale ordered by the court, and the litigation grew out of the sale. When this is settled, Mr. Grayson will begin extensive developments on the mine. It is his purpose to expend \$100,000 in development work alone. His machinery on the Virtue mine, in Baker Co., Oregon, will be moved to the Gold Hill.

UTAH.

A crosscut obliquely made on the 1100-foot level of the Silver King mine at Park City continued 400 feet in ore all the way. The opinion is that diagonally the chute is no less than 150 feet between walls. In this distance several varieties of ore are found.

The tankage capacity of the De Lamar mill at Mercur is to be doubled. So is that of the roasting plant. At present the mill has a capacity of 3500 tons. —The first payment of \$10,000 on the sale of the Argentine group of five claims at Bingham to the Boston S. Co. of Massachusetts has been made.

The Winnemucca mine at Alta at a depth of 125 feet has a 30-inch vein of galena that assays thirty ounce in silver and 50 per cent lead. —Thirty-six cars of ore were shipped from Silver City. —The Quartzite mine, near Frisco, shipped 125 sacks of ore that averaged 30 per cent copper and \$5 in gold. They have 100 tons of dump that assays 20 per cent copper, \$1 to \$5 gold and 10 ounces silver. —The Ben Harrison encountered

quartz assaying 4 per cent copper, five ounces silver and \$19.63 gold. The streak is about 13 inches thick.

The burning of the Crescent mill at Park City leaves several thousand tons of ore, belonging to the Crescent lessees, on the dump. The fire has not disturbed its metallic contents.

The Bingham Bulletin says that within a month the Julia Dean, Fortune, Conger, Weasel, Cuba, Washington and Erie mines have reported finding ore running from 10 to 40 per cent copper.

Tintic Miner: At the Centennial-Eureka the force of the mine is over 100 men. Shipments from the district for the week were eighty-three cars of ore. Seven cars of concentrates, six bars of bullion.

Mercur Mercury: Last week the first gold bars produced in the district were shipped from the Golden Gate mill. It amounted to \$43,000. Now that the experimental stage has been passed, and the method of obtaining the best results established, the mill will be run to its full capacity. Additional tanks will be put in and an addition made to the roasting plant. The mill is treating about 400 tons per day. A shipment of cyanides by the Mercur amounted to \$20,000. The Sacramento made a shipment of \$9000 worth of cyanides.

MONTANA.

A peculiar natural mineral exhibit is in the Garnet district in the Stone and Loomis placer, 300 acres on the pinnacle of a mountain 6000 feet high. A decomposed reddish material about 12 feet in depth, resting on a bedrock of granite and lime, carries about \$1 in gold to the cubic yard. A steam rocker and a steam crusher have been put in with excellent results. A steam pump will raise the water from Deep creek, enabling the work to proceed on a much larger scale. Placer deposits of this character on mountain tops are very rare, and it is thought very valuable gold quartz deposits will be found when the bedrock is thoroughly prospected.

The Colorado Co. commenced to take ore again from the lower levels of the Gagnon mine at Butte last week. It was necessary to stop work for some time on the lower levels in order to allow the retimbering of the shaft which was needed 160 feet below the 900-foot level. The timbers which had to be removed had been in place over nine years and had rotted. The work of retimbering is completed and the regular quantity of ore—nearly 500 tons daily—is hoisted and shipped to the smelter. The Gagnon is one of the old and deep mines of Butte, being over 1600 feet deep. It has been a steady producer for many years. At Clancy, in the Liverpool mine the shaft is being sunk to 600 feet depth. A 12-inch ledge of high-grade ore has been opened.

The Nugget group of mines near Twin Bridges has been sold to a Chicago company. The group consists of 210 acres, ten claims, four of which are producers. It is stated that \$14,000 worth of ore has been taken out of the Diamond Hitch, the best developed of the group. The ore is principally lead, having an assay value of from 65 to 77 per cent, but carries gold and silver. The company will build a concentrator.

The Silver Queen Fraction has been purchased by the Boston & Montana Co. for \$5000.

Bordeaux and associates are again sinking on one of the claims on the Meaderville flat. Negotiations are pending toward a sale of the G. & B. mine on the Warm Springs for \$50,000.

In his annual report President Hale relates why the Iron Mountain mine was closed down. "For many reasons we were compelled to shut down last October, having reached the limit of the capacity of our machinery for deeper working, and the directors did not think it advisable to equip the mine for deeper working, say 3000 feet, with the limited amount of cash on hand, and the many disadvantages in working at this point, and the low price of silver and lead, together with the great cost, estimated at not less than \$150,000. Besides, we would have been compelled to sink a new shaft of 1100 feet to comply with the new law requiring two escapes from mines, in case of accident, which would have required at least from four to six months, and cost not less than \$50,000." The Mayflower mine is looking better than at any period in its history. The workings are over 500 feet from the surface. Ore is being taken from two veins, both together having 10 feet of high grade ore. The average ore taken from the Mayflower this year has given returns of eight ounces gold to the ton. The Copper Jack near Clancy will, in all probability, continue sinking the shaft which was showing well when operations were suspended a few weeks ago.

Philipsburg Mail: The Con. Granite-Bi-Metallic Co. has started fifty stamps in the Bi-Metallic mill.

Butte Weekly Miner: In the large mines of Butte the regular production continues and in nearly all the properties more or less development work is going on. At the Alice group in Walkerville the output has varied very little for the past year. The low price of silver has threatened the properties several times with a shut down, but by good management and working some of the mines on the tribute system, dividends have been paid during the year. M. Finlen is producing copper ore from the Ramsdel-Parrot mine which he has under lease from the Anaconda Co. The Montana O. P. Co., is producing several hundred tons of ore daily from the Karus mine and a force working on developments at the Cora, the Parnell, the Nippur and the Big Bonanza near Walkerville.

Sinking is going on at the East Gray Rock with machines. Great difficulty is experienced from water, which has retarded the work. At the 1400 drifting is being done by machine and a raise put through to 1200. Sinking has begun at the Leonard shaft. At the West Colusa sinking has been discontinued tempo-

rarily. Two raises are being put through from 400 to 300, with machines. The Mountain View has reached the 1400 level and crosscutting begun.

SOUTH DAKOTA.

Gibbs & Cook have bonded thirty-three claims in the Ruby Basin district, near Deadwood, and commenced development.

WYOMING.

At Grand Encampment the Kurtz & Chatterton mine has a 1300-foot tunnel that cuts four veins at from 250 to 400 feet depth. It is low-grade ore and requires a reduction plant. The Golden Eagle is operated by an English company who contemplate building a mill. The Sandstone mine is a productive property and handles twenty tons of ore daily with a fair profit.

One hundred pounds of ore sent to Denver as a sample from the Jones & Williams mine at Grand Encampment gave returns of \$55 per ton.

MISSOURI.

The Age of Steel reports "a mining boom" in the zinc mining districts of Missouri. "Companies old and new are rejoicing in rich finds and advancing prices. Old properties, once abandoned for sundry reasons, are being reworked, and the outlook for the mining interests of the State is brighter than for some time. It is stated that during the last twenty-two weeks there has been a heavy excess running into the millions of tons of zinc ore output than during the corresponding period of last year. Those best competent to speak of the situation are jubilant over its prospects. Ore deposits are in rich and paying quantities and exhaustion is practically out of sight."

MICHIGAN.

It is stated that every cent difference in the price of refined copper means nearly \$1,000,000 per annum to the Calumet & Hecla Co. The calendar year's productions of this company in pounds of refined copper have been as follows: 1892, 56,495,211; 1893, 60,427,913; 1894, 73,944,889; 1895, 79,485,599; 1896, 85,552,756; 1897, 86,809,206. The 1898 product should be 90,000,000 pounds, and before the end of the century this company should be making 100,000,000 pounds of refined copper per annum.

The three shafts on the Osceola lode look promising, but the company will probably not begin production from them for a long time to come. The Black Hills shaft, in the southernmost part of the mine, is now over 3000 feet in depth on the incline of the lode. It does not yet pay for itself. It is within a few feet of the Osceola line, and developments in it are not favorable to the hopes that Osceola yet may find good ground on the Calumet lode.

Copper shares are not largely held abroad, as is the general impression. But a few hundred shares of Calumet & Hecla are held in Europe. The other mining companies have practically no stock owned in Europe. The Canadian holdings of the leading copper shares amount at present market values to between \$1,000,000 and \$2,000,000, the larger part being held in Montreal. In this country 70 per cent of the total holdings are in New England, Boston and its suburbs having fully 60 per cent of the entire American equity. New York has several millions invested in lake coppers, although scarcely as much as might be expected. Detroit has several millions invested and is rapidly increasing its holdings, particularly in the newer properties. Houghton county, Mich., has \$10,000,000 to \$12,000,000 invested in the local mines.

COLORADO.

On July 1st the cost of ore treatment was advanced from 50 cents to \$3 per ton on all smelting ores, according to character of ore. The result will undoubtedly be the suspension of work on many low grade properties that are working on close margins. It is unfortunate this raise should occur at a time when miners are feeling the effect of the depressed condition of the industry.

BOULDER COUNTY.

The Enterprise mine at Eldora made a shipment of a carload of high grade ore. The Ironsides has about thirty tons of good shipping ore. The Revenge is in a vein 4 feet wide, which runs \$36 to the ton, and a streak running eighteen ounces of gold. The Antietam has 120 tons of ore ready for shipment. The Independent has considerable ore to be shipped. The vein is 9 feet wide, about 5 feet of smelting ore that will run from \$25 to \$50 per ton, and 4 feet of mill dirt that will run from \$8 to \$10 per ton.

DOLORES COUNTY.

C. Smith is shipping iron ore from the Magnet, near Rico.

EL PASO COUNTY.

Telegraph: The Portland, Cripple Creek, sent a greater tonnage to the mills and smelters in June than any month of the year. The production is running about 125 tons per day. The Parsons lease on the Shurtleff at a depth of 60 feet has a 5-foot vein that will average two and a half ounces. Ten tons of ore were sent out from the Scott lease. W. S. Stratton's Summit stamp mill at Gillett has been leased, after having been closed down several months. The company that has taken the plant claims to have a new method for the treatment of low grade ores that will reduce stamp mill charges in the Cripple Creek district. The lease on the Mary McKinney Co.'s Republic shipped forty tons of ore averaging between three and four ounces to the ton. Since the first day of this month the output has been a little over 500 tons. A carload of two-ounce ore was sent from the Little May mine. It has a daily output of from twelve to fifteen tons. The Britannia tunnel at 196 feet struck a phonolite dyke which had values of \$23 per ton. The tunnel has 460 feet depth and will have 1500 feet when completed. The dyke is said

to be between 500 and 600 feet wide. The Ironclad mine is producing forty tons of ore a week. At the Lillie the screenings carry from six to eleven ounces, while the ore classed as medium grade runs \$85. The low grade returns from \$17.50 to \$30. The lessees of the Pinto are producing about eighty tons of ore weekly. The Bock lease on the Vindicator is producing three cars per week. Whiteside & Stark are sending out a similar amount from the Anna J. claim of the Vindicator Co. The Keith lease on the Wallace, another Vindicator property, is shipping \$60 ore.

EAGLE COUNTY.

The dumps of the Black Iron mine at Gilman, are being worked by F. F. Harrington. The ore is oxide and sulphide and there is enough in sight to keep work going for years.

GUNNISON COUNTY.

The first carload of ore has been shipped from the Sylvanite, and four or five more carloads are ready for shipment.

HINSDALE COUNTY.

The Golden Fleece M. Co. is about ready to push the big tunnel into Hotchkiss mountain. It is a development, transportation and drainage tunnel and will open at depth and drain some of the leads that have been located at the surface.

LAKE COUNTY.

The Small Hopes Mining Co., Leadville, is shipping 250 tons daily of iron sulphide. This tonnage comes from the deepest workings in the district. The Cyclops and Marion lease outputs are divided between the home and valley smelters. Two hundred and thirty men on the payroll. After five years of idleness work will resume in the A. Y. and Minnie mine at Leadville. The mine will be unwatered and necessary repairs made before putting the miners to work. The company owns a 100-ton concentrating mill. The deepest workings are about 400 feet. The Vindicator Mining Co. are shipping two carloads of gold ore daily from the Golden Eagle.

The Penn M. & L. Co., at Leadville, are daily shipping eight wagon loads of gold quartz to the sampler. There are three shafts on the property. Operations have begun by the Home M. Co. to complete arrangements at the Bon Air and the Penrose mines so that this company will be able to start its pumps the first of July and in conjunction with the Leadville Pumping Association assist in draining the downtown territory, known as the Leadville basin. The Resurrection is shipping over 3500 tons of ore per month. Lessees on the Maid of Erin are shipping 2000 tons per month. The Penn M. Co. is shipping 1700 tons a month.

GILPIN COUNTY.

Ore from the Pearce mine, Central City, plated \$10 to \$12.50 per ton and gave \$10 in concentrates. The smelter ore paid from \$50 to \$80 per ton. The vein is 12 feet wide.

The last shipments of ore from Black Hawk were twenty-four cars—nearly 400 tons. The Geiger continues to make a daily shipment of five tons of ore. The ore body is 7 feet wide. The Seventy-six G. M. & M. Co., operating the First Centennial property in Chase gulch, shipped 2085 tons of mill ore during May. At a depth of 325 feet in the Dike mine, levels are being run on ore which will average in mill lots about \$10 per ton.

SAGUACHE COUNTY.

The Creede Co-operative Co.'s mill at Creede is to be enlarged to double its present capacity. The sulphur mines at Creede are in operation. The sulphur mines on Trout creek have been bonded to J. H. Frambach for \$10,000. L. J. Chapman has charge and has a number of men at work. O. Soward is working a force on his sulphur claims.

SAN JUAN COUNTY.

A new ore chute has been found in the Ridgway mine, near Silverton, that assays \$180 in gold and \$350 in silver. The old workings continue to output high-grade ore.

SAN MIGUEL COUNTY.

The Belle-Champion mine, in the Saw Pit district, is shipping a carload of ore daily and receiving satisfactory returns. The Smuggler-Union is working on ore accumulated last winter. They are shipping their smelting ore, besides treating 200 tons of milling ore per day in the company mill. The Alta, in Gold King basin, is daily shipping ore to the mill at Ophir, besides shipping four carloads of smelting ore per week. The output of the mine is giving satisfactory returns.

The Hector Tunnel and Construction Co., near Telluride, is still driving the Ophir tunnel in Middle basin. This tunnel has been in course of construction for almost two years, and has reached a distance of about 2500 feet.

NEW MEXICO.

New Mexican: Lime rock and iron ore are received by the North smelter at Cerrillos. The Ortiz mine at Dolores has cut the wages of employees from 12 to 20 per cent. The Rosedale stamp mill at San Marcial has started up again. The Santa Fe branch from San Jose to Santa Rita is completed and ore is being shipped over the new line.

Silver City Enterprise: At the Atlantic mine, Pinos Altos, the shaft has been retimbered. It is down 450 feet. Sinking will be resumed. On the fourth level there is considerable ore; the fifth level has ore ready for extraction. The shaft will probably be carried to a depth of 800 feet and levels run, before arrangements are made for reduction of ore.

Davidson & Bell, lessees of the Golden Giant mine and mill, have thirty men employed. Drifting and stoping is being done at a depth of 450 feet. Enough ore is being extracted to keep the mill running. At the Santa Rita copper mines about 1200 tons of iron ore is shipped every month. The output of copper ore last month was 610 tons; some of this ran 39 per cent copper in carload lots. The new branch of the A. T. & S. F. R. R.,

three and a half miles in length, from San Jose to Santa Rita, has been completed.

ARIZONA.

The Table Mountain mine in Pinal county has 6000 tons of copper ore on the dump, on which the smelter will be started. The company has two furnaces and employs seventy-five men. The Grand Reef mines, owned by John W. Mackay, comprise twelve claims. Development work is confined to the Grand Reef. The work in the tunnels, shafts, etc., is all done by machines, operated by compressed air. Expert machine men are employed and are paid from \$3 to \$5 a day and the shift is ten hours. There are about forty men at work. A tunnel has been run 800 feet, at the end of which is a shaft 400 feet deep.

Phoenix Republican: A 3-foot strike of good ore has been made in the Erie mine, Mohave county. Six 200-pound bars of bullion from the White Hills Co. of Mohave county were shipped to San Francisco. The tailings of the Mammoth mine in Pinal county have been purchased by N. Anderson. He will erect a 120-ton plant. The pumping machinery at the Bonavita placer mines is ready for the completion of the pipe line, a distance of twenty miles.

Allison & Wicks shipped from the Fresnal properties, near Tucson, sixty sacks of ore that yielded \$109 gold and 271 ounces in silver. The Trinity mine, near Wickenburg, was bought at probate sale by the Golden Wave M. Co. for \$2000.

LOWER CALIFORNIA.

The steam pump is in position at the Valladares placers and they soon expect to be scraping the bedrock of the creek. The pump is a centrifugal machine and has a capacity of 50,000 gallons of water per hour. Steam is furnished from a 25 H. P. boiler and the water will be raised anywhere between 30 and 50 feet, the depth of the gravel to bedrock not having yet been determined. There have been many attempts to work these placers, but all have failed from the fact that considerable water seeped through the sands of the Valladares and interfered to such an extent that mining was impossible. To overcome this difficulty it has been necessary to build a road sixty miles over a rough and broken country to the coast and move in heavy machinery.

At the Viznaga mine in Mexican gulch, near Alamo, the 10-stamp mill is running on good ore. Between the 200 and 300-foot levels a large body of ore has been struck. Also in the drift between the 75 and 150-foot levels a crosscut shows the ledge to be 14 feet. The Viznaga Co. is now employing forty men. The Aurora mill is running on ore from the San Vicente mine. The owners have taken out sixty tons. The Moctezuma is running three shifts and taking out good quartz.

MEXICO.

At the mine of the Colorado Ures Co., in the Ures district, Sonora, a body of gold ore has been found. There are about 150 men employed and the cyanide plant is in operation, with good results.

The Reina mine, near Cusihuiaichic, has 400 miners at work. In the last year it produced \$500,000 silver and has an equal amount in ore on the dump. The Santa Elena, in the same district, ships from forty to seventy-five cars of ore daily.

H. C. Bacora in charge of the mill on the Mines of Gold at Bachochi writes that the plant is about to close down. The Parisian owners are said to have expended \$300,000 on the property. The San Jose de Garcia Co. at Sinaloa is crushing ore that yield \$30 per ton in gold. The mines of the State of San Luis Potosi for last year produced precious metals to the value of \$4,600,000, being \$1,300,000 more than the previous year.

AUSTRALIA.

Last year the Australasian colonies increased their production of gold, as compared with 1896, by \$2,000,000, but they exported \$2,000,000 more than they produced, the exports amounting to \$13,000,000, against a production of \$11,000,000. This year the production promises to be \$13,000,000, but so far the export has been on a larger scale, for in a little over four months about \$5½ millions sterling have been shipped, inclusive of direct exports from Queensland and New Zealand.

The deepest shaft in Western Australia is on the Golden Link mine, Kalgoolie, its depth being 552 feet. It is being sunk to 600 feet.

The gold yield of Victoria for the five months ending June 1st amounted to 303,921 ounces—an increase of 5995 ounces over the corresponding period of 1897.

TASMANIA.

The total ore treated by the Mount Lyell Co. furnaces for the half year ending March 31, amount to 62,808 tons, of which 56,007 tons were taken from open faces and 6861 tons from stopes. The average assay of the ore was; Copper, 4.25 per cent; silver, 3.69 ounces; and gold, 0.177 ounce per ton of the wet weight of the ore. Six furnaces are at work. The converter plant treated 4558 tons of matte for an out-turn of 2363 tons of high grade blister copper, and it is being duplicated to provide for the output of five additional smelters that are already arranged for. The net profits for the half year were \$84,350, and two dividends of 4s each were paid out of this sum.

SOUTH AFRICA.

To visit any of the mines, says the South African Mining Journal, is most heartening. There you see work in full swing, profits being maintained only by the closest labor and the closest economy; you see new machinery, and hear of fresh plans for effecting a small saving. There is an air of cheerfulness everywhere, since from manager to drill-boy every one has little to care for save his allotted task. And yet the scrip that represents the value of these mines is depressed; directors are at a loss; bold schemes involving the investment of money are impossible; the men who depend on the industry are impoverished. Every one is cruelly pinched, and all hope is blighted by the shadow of grave emergencies.

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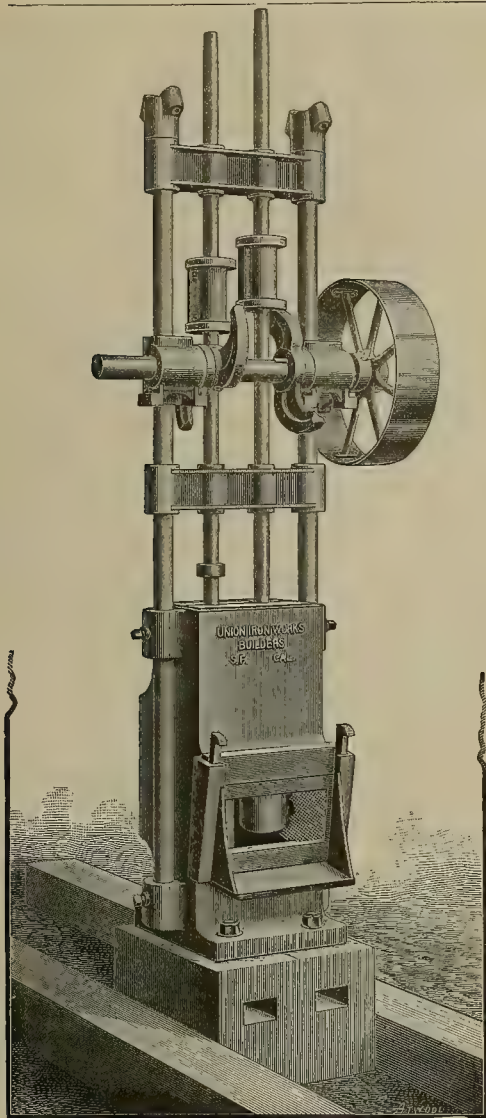
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| 1... | 2500 | 2 to 4 | 25 to 150 | 150 tons | Single operating plant |
| 2... | 5000 | 2 to 3 | 50 to 300 | 200 tons | Duplex operating plant |
| 3... | 7500 | 2 to 2½ | 75 to 450 | 300 tons | Triplex operating plant |

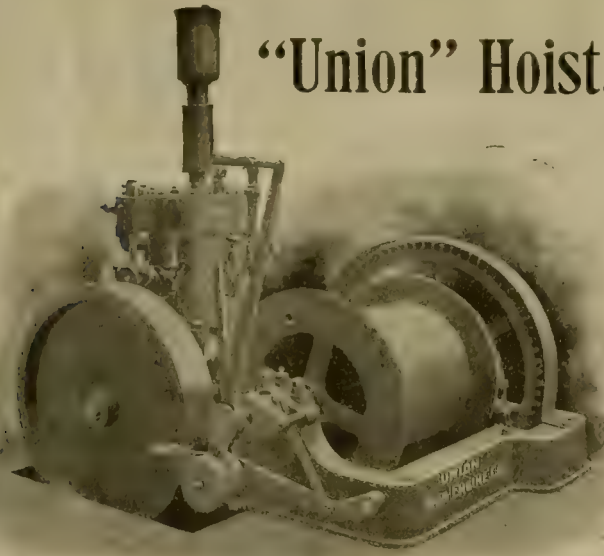
SWAMP AND RIVER-BED PLANTS.

| Number | Capacity in cubic yards of gravel per 24-hour day. | Total operating cost in cents per cubic yard of gravel. | Miners' inches water required where water is scarce or abundant. | Approximate total weight inclusive of power plants. | |
|--------|--|---|--|---|--------------------|
| 4... | 2500 | 2 to 4 | Barge | 250 tons | Single amalgamator |
| 5... | 5000 | 2 to 3 | Barge | 325 tons | Duplex amalgamator |

In general terms it may be said these plants consist of the electrically operated dredge and amalgamator, mounted either on steel barges or river-bed mining, or steel-bodied cars for "gulch," "bar" and "hill diggings," together with the necessary power plants for their operation. Several operating plants, either in close proximity or scattered over a large district, may be operated from a single power station, which may be situated at any convenient point within a radius of a few miles, at railroad depot or where water power can be utilized. The river plants, complete in themselves (each barge containing its own power), are made single or duplex; any suitable number of either can be operated on a river, each independently working its allotted section from surface to bedrock, and rim-rock to rim-rock. All these plants are built with a view to easy transportation, in "knock-down" shape over ordinary mountain roads, and, on special order, the size and weight of separate parts may be still further reduced. In the foregoing table the figure representing the smaller quantity of water required applies to cases where, for any reason, it is desirable or necessary to use the water over and over. The water required may be taken from below the placer, thus obviating the necessity of long ditches, etc. Since these plants neatly pile their debris on the cleaned-up bedrock of the ground worked, they may be said to create their own dump, and hence are enabled to successfully operate on flat ground, or where ordinary dumping facilities are lacking. This peculiarity also renders them independent of "debris laws." The wonderful perfection with which these plants extract the finest, microscopic particles, such as are held in suspension in water, or, when dry, ascend in a gentle current of air, constituting in bulk a perfectly impalpable powder (send for samples), renders them particularly valuable and indispensable in cases where, owing to the fineness of the golden particles, very rich mines are unavailable for profitable working by the hydraulic or sluice processes.

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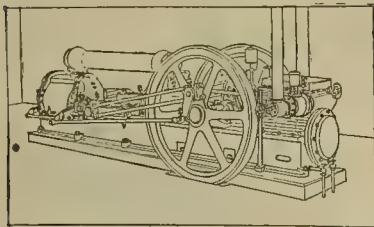
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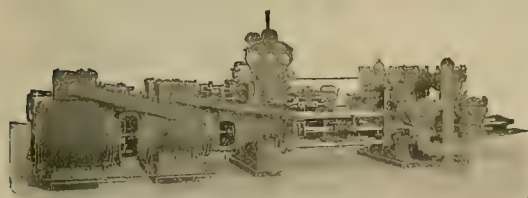
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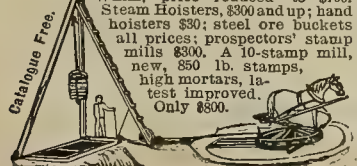


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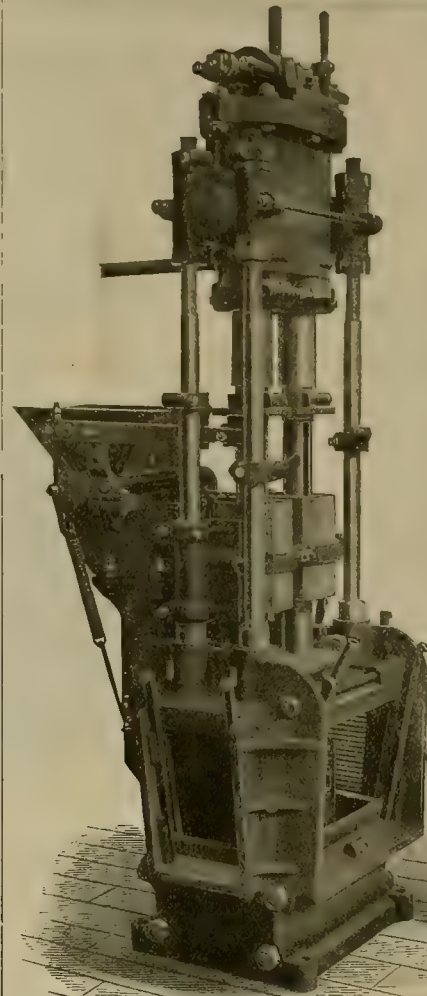
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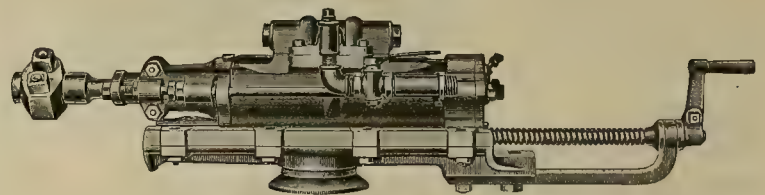
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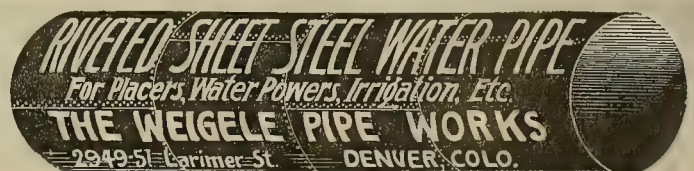
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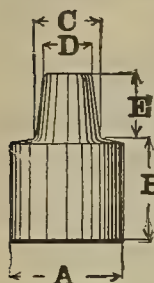
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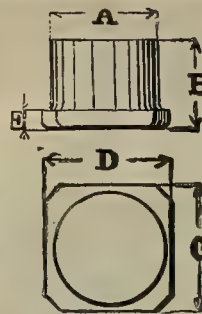
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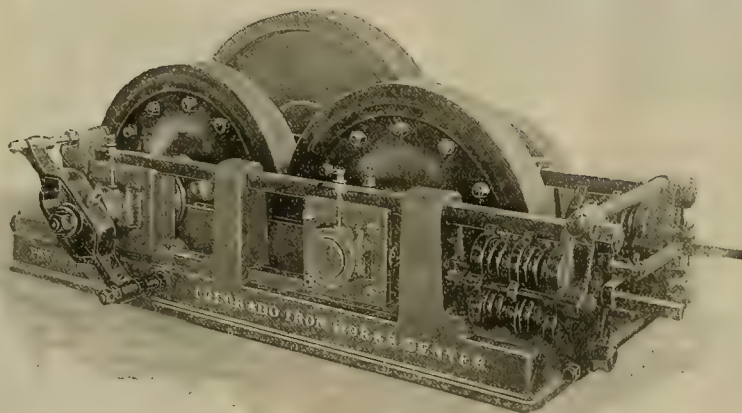
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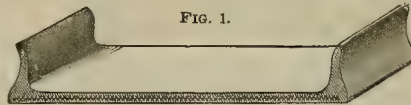


FIG. 1.

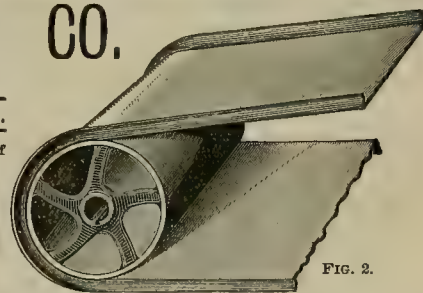


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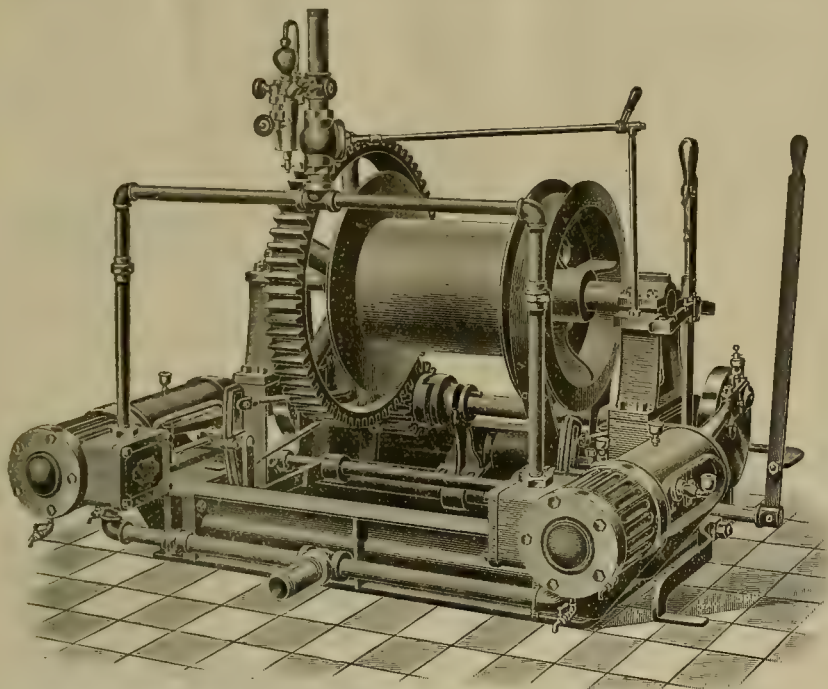
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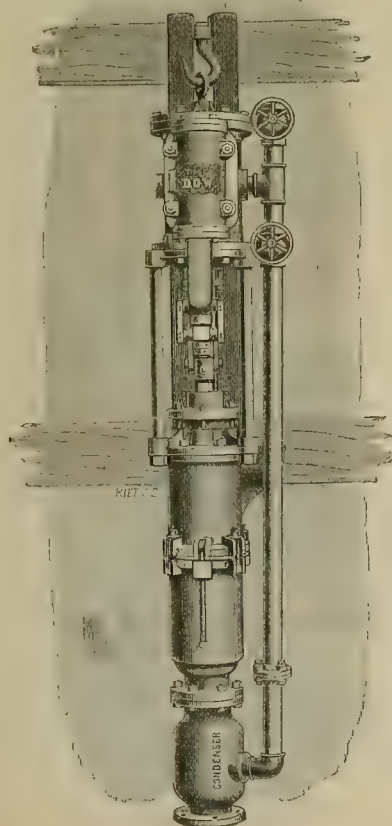
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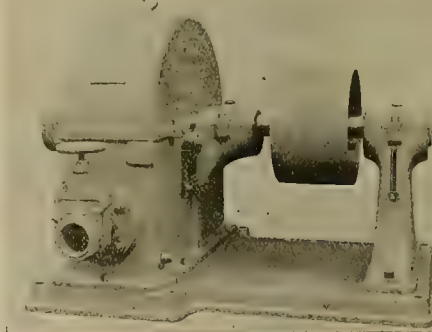
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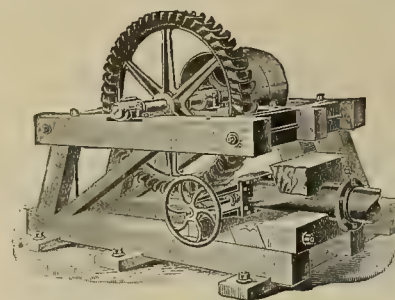
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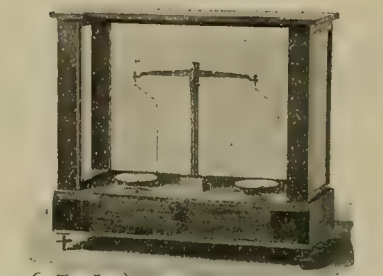
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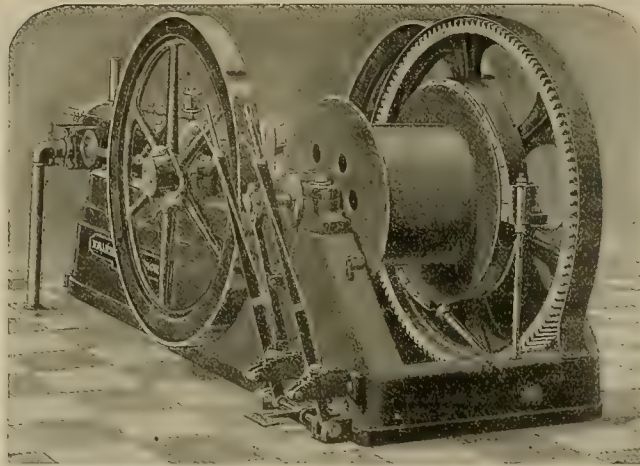
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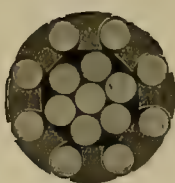
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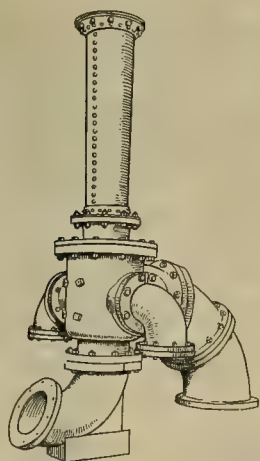
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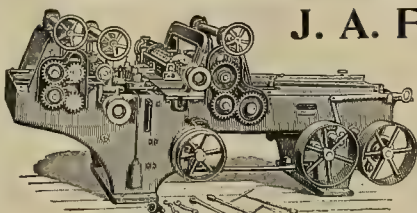
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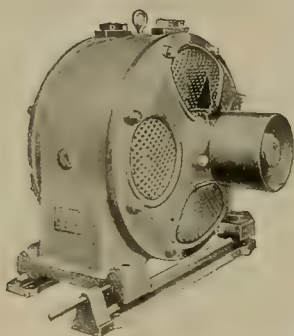
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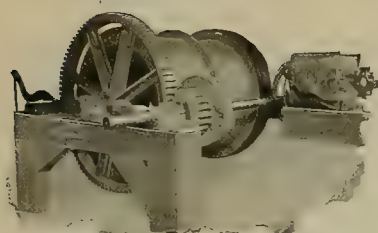
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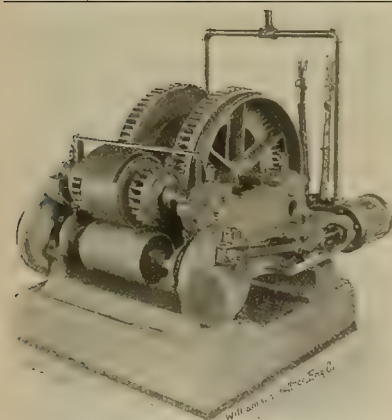
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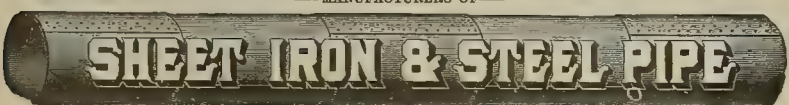
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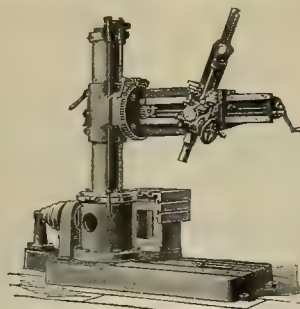
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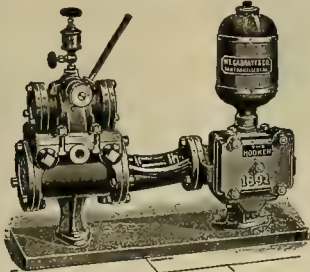
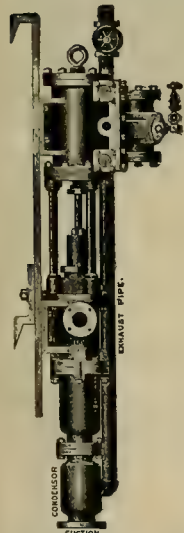
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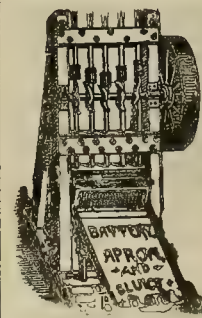
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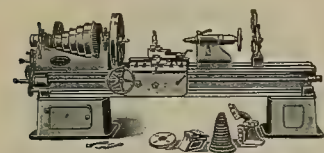
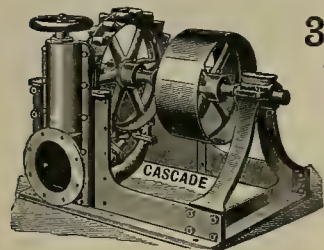
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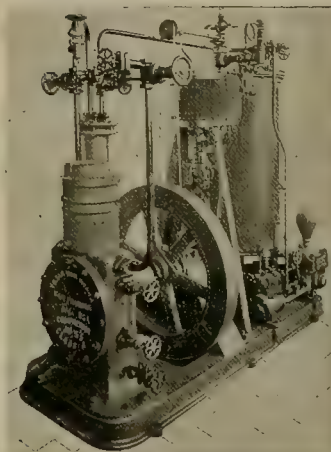
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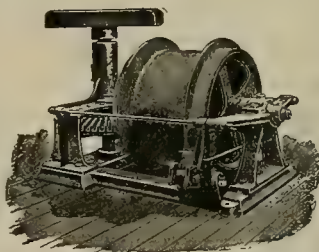
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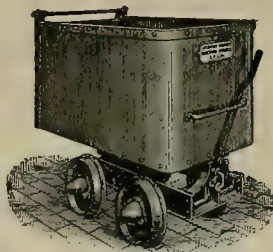
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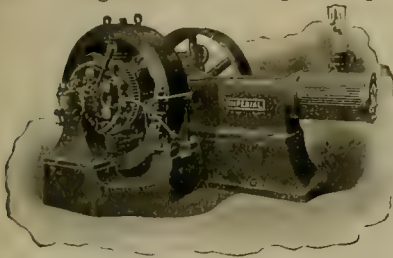
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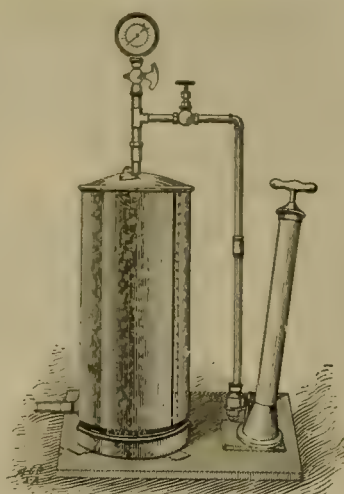
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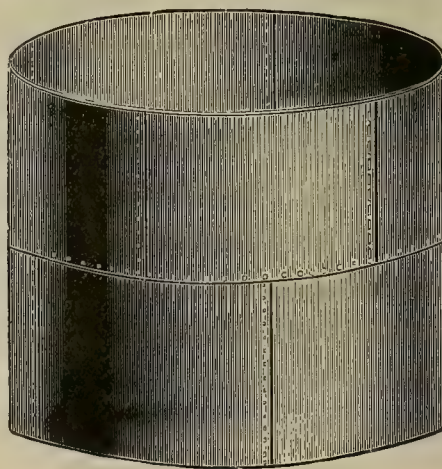
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Market Reports.

The Markets.

SAN FRANCISCO, June 30, 1898.

SILVER.—London, 27½d; New York, 59¼; San Francisco, 59¼, nominal; Mexican dollars, 46½.

COPPER.—Lake, 11¼@12. London reports say that consumers of copper still hold aloof, and transactions that take place in refined sorts are mostly of a dealing character. American electrolytic copper is offered for export at about the parity of prices ruling East. Other advices from London report that copper has been pressed for sale at a loss of about 8s 9d per ton, the lower prices, however, causing an active demand.

LEAD.—New York quotes 4.00 asked; local, pipe, 5¼@6c; sheet, 6¼@7c; pig, 5¼c.

IRON.—American, soft, \$20 and \$22 per ton. SPELTER.—5 and 5½.

TIN.—Plate, American, \$3.50; English, to arrive, \$4.25; Pig 16¼c.

ANTIMONY.—9½, 10.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.25; cut, \$2.00; 10 to 20d, wire, \$2.30; cut, \$2.05; 8d, wire, \$2.35; cut, \$2.10; 6 and 7d, wire, \$2.45; cut, \$2.20; 4 and 5d, wire, \$2.55; cut, \$2.30; 3d, wire, \$2.70; cut, \$2.45; 2d, wire, \$2.95; cut, \$2.70. In carload lots, 10c per keg less.

QUICKSILVER.—Domestic, \$42.50@43; export, \$38.

POWDER.—F. o. b., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15¼c; less than one ton, 17¼c. No. 1* 60%, carload lots, 13¼c; less than one ton, 15¼c. No. 1** 50%, carload lots, 11¼c; less than one ton, 13¼c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9¼c; less than one ton, 11¼c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8.00; Coos Bay, \$5.00; Seattle, 6.00; Southfield, 7.50.

Cargo lots, Eastern and foreign: Wallsend, \$7.50; Cumberland, \$10.25; Brynbo, 7.50; Cannel, 10.00; Pennsylvania, bd., 14.00; Welsh Anthracite, 12.50; Scotch, 8.00; Rock Springs, 7.60.

CHEMICALS.—Cyanide of potassium is quoted jobbing, 35@38¼c per lb.; carloads, 29¼c; sulphuric acid, 2c per lb. for 60%; nitric acid, 7¼c in carboys; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2¼c per lb.; blue vitriol, 4¼c per lb.; borax, refined, 5@6c per lb.; chlorate of potash, 9¼@10c.

LUMBER.—Retail: Pine, ordinary sizes, \$17@18.50; redwood, No. 1, \$18@20; No. 2, \$16@18.

Russia, Japan and India are all buying gold in the London open market; the price for bar gold has risen to 77s 10½d@77s 11d, about as high as has been paid in recent years. Russia is still steadily carrying out the preliminaries necessary to the completion of its plans for a restoration of the currency to a gold basis.

To-morrow the war revenue law goes into effect. Following are its provisions relating to blank paper, in effect July 1, 1898: Domestic items payable on sight or on demand—Bank check, draft, or certificate of deposit not drawing interest, or order for the payment of any sum of money, drawn upon or issued by any bank or trust company, or any person or persons, companies or corporations, 2 cents. Domestic items payable otherwise than at sight or on demand—Bill of exchange, draft, certificate of deposit drawing interest, or order for the payment of any sum of money, 2 cents per \$100 or fraction thereof. Promissory notes—2 cents for each \$100 or fraction thereof. Foreign items payable in the United States—Bill of exchange, or order for the payment of any sum of money, drawn in any foreign country and payable in the United States, 2 cents per \$100 or fraction thereof. Foreign items drawn in the United States, payable in foreign countries—Bill of exchange, letter of credit, telegraphic transfer, if drawn in sets of two or more, 2 cents per \$100 or fraction thereof; for each bill of the set, if drawn singly, 4 cents per \$100 or fraction thereof.

Penalties—Issuing unstamped paper: Fine up to \$200, or in some cases imprisonment up to six months, or both, and the unstamped instrument be held invalid. Accepting or paying unstamped paper: Fine up to \$200.

Note—Adhesive stamps on documents must be cancelled at time of issue by writing or stamping thereon the initials of the party affixing same, and date.

The Postoffice Department has prepared a circular directing postmasters to increase the price for money orders by a sum equal to the stamp required. This will obviate the use of 30,000,000 stamps each year.

On and after July 1 private mailing cards bearing written or printed messages, advertisements or illustrations may be sent through the domestic mails at the postage rate of one cent each, payable in stamps affixed by the sender. For private mailing cards sent to foreign countries the letter rate of two cents will be required. Postmaster Montague, in charge of the general postoffice has been notified by the Postoffice Department at Washington of the following regulations governing the use of these cards: Only the superscription, which may include the occupation of business of the person addressed, will be allowable on the face of the cards. The cards must not exceed 3¼ by 5½ inches in dimensions, and in quality must be substanti-

ally the same as the Government postal cards. Upon the addressed side the words "Private mailing card—authorized by Act of Congress of May 19, 1898," must be printed; in the upper right-hand corner there should be an oblong diagram with the words "Place a one-cent stamp here," and in the lower left-hand corner the words "This side is exclusively for the address." In color the cards may be white, cream, light gray or light buff.

Mining Share Market.

SAN FRANCISCO, June 30, 1898.

The figures of the week for "business" furnish sufficient comment on the present fortunes of the Comstock. At quoted stock prices the whole lode would sell for one-fifth of one of the old time monthly dividends of one of the mines on the famous lode. The boards have "adjourned" till after the 4th. There seems little inducement for further sessions.

This, the last day of the fiscal year, is low-water mark with the Comstock stocks. Never before in their history has so stagnant a state of affairs existed. With no war tax it would be unusually dull, but the revenue law which goes into effect to-morrow takes nearly all life out of the situation. The tax on "transfers," referred to editorially in last week's issue, is a "deadener," so far as actual transfers of stock are concerned. After to-morrow there will be a Government charge of two cents upon the stock books of a mining company, (or any other corporation) and two cents for each transfer on a par or "face" value of each \$100. This in addition to the \$50 required of the mining broker. Stocks, bonds, debentures and certificates of indebtedness issued after to-morrow will pay five cents on each \$100 of face value. In this regard it is to be noted that "face" value is interpreted to mean par value, what the certificate of stock ostensibly calls for.

San Francisco Stock Board Sales.

SAN FRANCISCO, June 30, 1898.

9:30 A. M. SESSION.

| | | |
|--------------------|---------------------|----|
| 600 Andes | 04150 Justice | 03 |
| 100 Beat & Belcher | 10500 Mexican | 06 |
| 203 Chollar | 04100 Occidental | 55 |
| 450 Con Cal & Va. | 14100 Ophir | 11 |
| 300 Confidence | 19600 Savage | 02 |
| 500 Crown Point | 03650 Sierra Nevada | 33 |
| 500 Gould & Curry | 071100 Union | 18 |
| 400 H. & N. | 48550 Yellow Jacket | 10 |

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage.

Money loaned mines.

Mining companies organized, their property experted, financed and managed.

Mines, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

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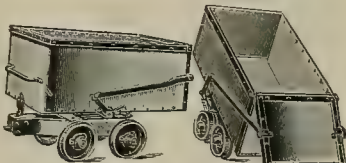
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| No. 4.—48 in. x 24 in. x 20 in. | Weight 600 lbs. | \$40 |
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Commercial Paragraphs.

F. M. SMITH contemplates building in Alameda Co., Cal., a large boric acid and sulphuric acid factory near the refinery on Alameda Point.

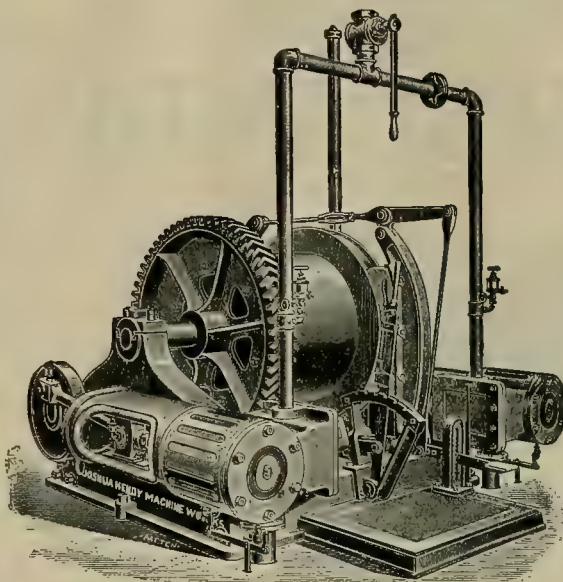
Among recent shipments the M. C. Bullock Manufacturing Co. report the following: One 4-foot, two 6-foot and one 8-foot Champion mine ventilating fans to Japan; one Detector diamond drill, with complete outfit to bore and remove cores to a depth of 2500 feet,

shipped to Montana; one Chief diamond core drill, with complete outfit for removing a 2-inch core to a depth of 1500 feet, for use in the Siberian gold mines of Russia; to the Metropolitan Iron and Land Co. of Ironwood, Michigan, a high-class first-motion hoisting plant, consisting of a pair of 24x48 Bullock-Corliss engines, with two cast iron shell drums 3 feet diameter by 9 feet face, each winding 2075 feet of 1½-inch steel wire rope. This plant is fitted with an auxiliary steam-actuated handling motion, containing all recent refinements and improvements, to insure safety and ease of manipulation.

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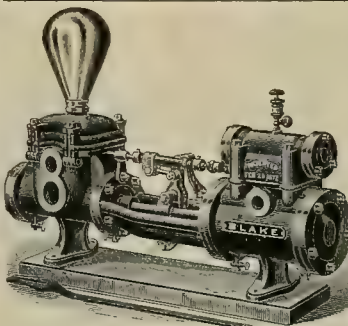
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Assessment Notices.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of June, 1898, an assessment (No. 19) of the 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 11th day of July, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 13th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CALVERT MEADE, Secretary.
Office—106 Leidesdorff street, San Francisco, Cal.

CONSOLIDATED CALIFORNIA AND VIRGINIA Mining Company.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of June, 1898, an assessment (No. 12) of 25 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 29, Nevada block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23rd day of July, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 12th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.
Office—Room 29, Nevada block, 309 Montgomery street, San Francisco, California.

CONS. ST. GOTHARD GOLD MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 9th day of June, 1898, an assessment (No. 14) of 5 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 113 Crocker building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23rd day of July, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 10th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. F. HOLLING, Secretary.
Office—113 Crocker building, San Francisco, Cal.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of June, 1898, an assessment (No. 10) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 225 Sansome street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 4th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 3rd day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMANN, Secretary.
Office—227 12th street, San Francisco, California. The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of June, 1898, an assessment (No. 4) of Two Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 14, Nevada block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

WILLIAM McPHERSON, Secretary.
Office—Room 14, Nevada block, No. 309 Montgomery street, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of June, 1898, an assessment (No. 10) of 2½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of July, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 8th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. P. FREY, Secretary.
Office—Room 44, Phelan building, San Francisco, California.

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LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 10th day of May, 1898, an assessment (No. 1) of 1½ cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 7, fifth floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors
K. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 31st, 1898, and the day of sale to MONDAY, August 8th, 1898.

K. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San Francisco, California.

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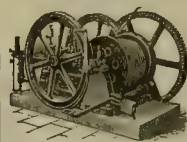
Are unequalled in places where a quick acting valve is required. The "Handy" for 75 lbs. pressure and the "Lever Throttle" for 175 lbs. The "Handy" is made in sizes ranging from ½" to 4" in brass; 2" to 8" in iron, brass mounted; 1" to 8" in all iron. The "Lever Throttle" in brass from 1" to 4"; in iron, brass mounted, 2" to 8"; in all iron, 1" to 8". Both styles in screwed ends only. Simple, practical and low priced. Specify Lunkenheimer's "Handy" or "Lever Throttle" and get the best. Supplied by dealers. Catalogue free for the asking.



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HOISTS.

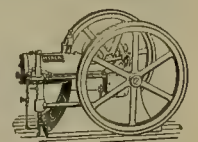


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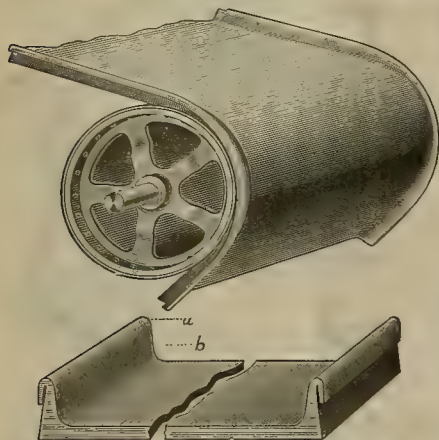
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Most of this apparatus has been removed from our own central stations to make room for larger units, and is therefore in excellent condition.

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It has taken years of ceaseless testing and experimenting to produce the superior belt which we now offer, with elastic flanges and pliable body reinforced with specially woven duck. Every belt is manufactured by experienced workmen, and carefully tested on machines especially built for that purpose; consequently we are to-day manufacturing the best belts that mechanical ingenuity, combined with honesty of construction, can possibly produce.

SUPT. OFFICE WILDMAN GOLD MINING COMPANY, }
SUTTER CREEK, AMADOR CO., CAL., Feb 23, 1897. }
MR. JAS. S. BROWNELL, 132 Market St., San Francisco, Cal.—DEAR SIR: Replying to your favor of the 18th inst., will say that in the two mills operated by this company we have nineteen of your Patent Lip flange concentrator belts in use; some of them have been in constant use for the past two years and have given entire satisfaction. I know of no better flange for a side shake machine.

Yours truly,

JOHN ROSS JR., Superintendent.

MR. J. S. BROWNELL, San Francisco, Cal.—DEAR SIR: For some years we have used three different styles of belts on our Frue vanner at the Mexican mill, and for smooth working and endurance the Brownell Patent Lip flange belt has proved its superiority over all others, and I unhesitatingly recommend it to all who are using Frue machines.

Yours truly,

EUGENE MAY, Foreman.

For any information regarding Frue Vanner or Belts, call on or address

JAS. S. BROWNELL, Western Agent FRUE VANNING MACHINE CO.

(Successor to Adams & Carter.)

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All kinds of Mining, Milling, Concentrating, Pumping,
Air Compressing, Hydraulic, Water Wheel
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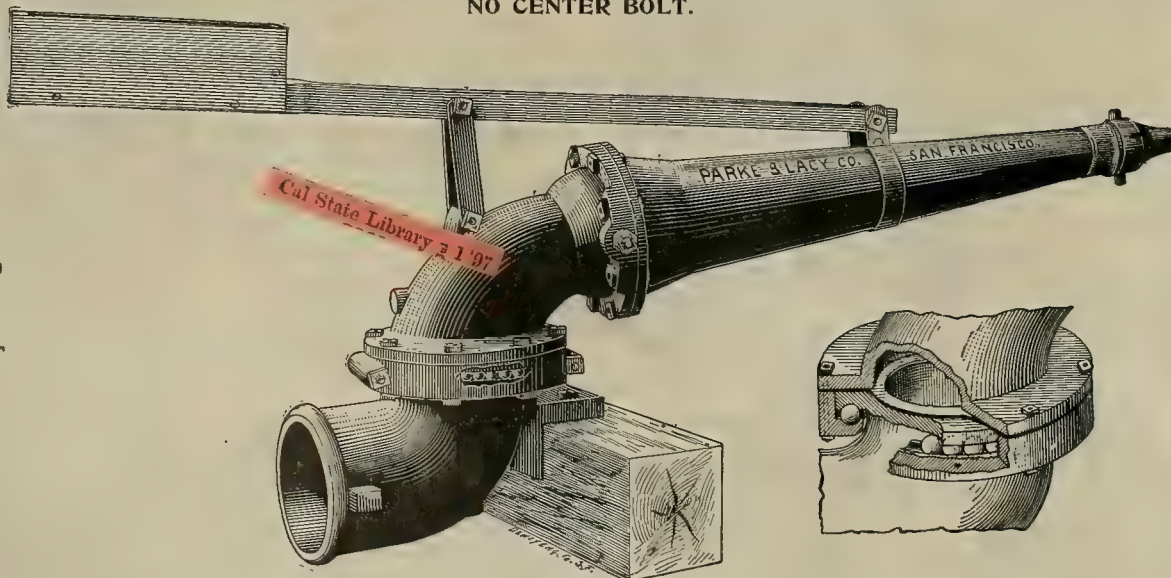
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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1983.—VOLUME LXXVII.
Number 2.

SAN FRANCISCO, SATURDAY, JULY 9, 1898.

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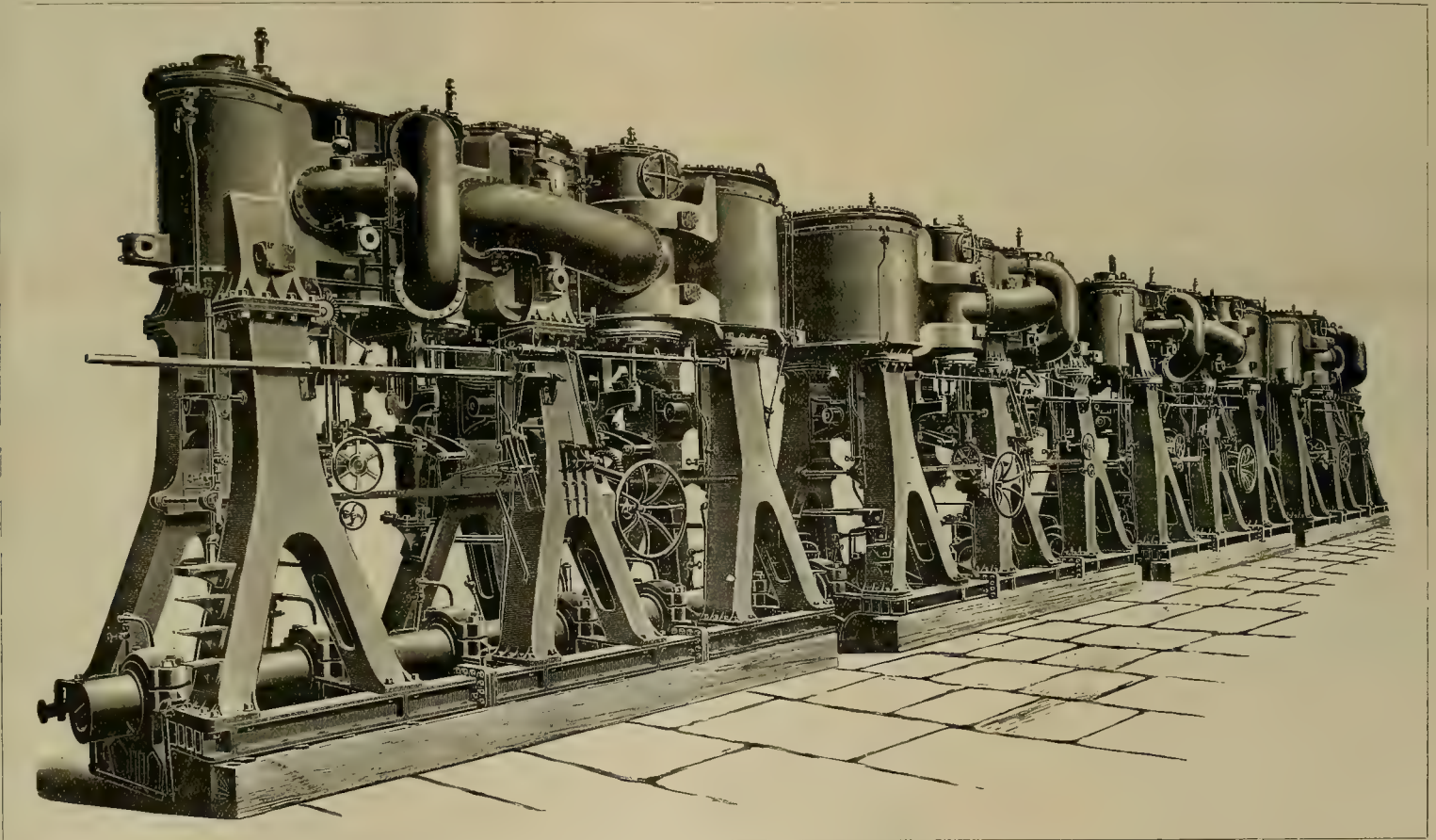
Our Fleet at Santiago de Cuba.

Present interest centers in the operations of the American army and navy at Santiago de Cuba. So far the navy had carried off all the honors of the war. The 14,000 mile trip of the San Francisco built battleship Oregon has rung around the world, solving one naval problem. Capt. Sigsbee of Maine fame has partially solved another in his successful action with the Spanish torpedo boat Terror, and the main squadron in command of Capt. W. T. Sampson, acting admiral, has made new naval history before

heating surface of 32,958 square feet. On her trial trip the New York averaged twenty-one knots. At the conclusion of the trial the forward engines were uncoupled and the vessel run for eight hours under two engines and four boilers, logging sixteen knots per hour.

The New York is a good type of the American armored cruisers, the "light cavalry of the navy," and has borne brave part in the movements that resulted last Sunday in the annihilation of the Spanish fleet at Santiago. Such vessels as the New York combine the speed of the cruiser with the offensive

and a few inches from the bottom is a port or opening, communicating with the jacket space. The cylinder below the piston is filled with liquid, for which the jacket forms a reservoir, and above both the piston and the water level in the jacket are air spaces with free communications between them. The head strikes the rock on the die before the cylinder has completed its downward stroke, so that, at the end of the stroke of the cylinder, the bottom of the piston is above the port in the side of the cylinder, and the liquid flows in. As the cylinder returns on its upward stroke, the liquid is squeezed



ENGINES OF THE "NEW YORK," FLAGSHIP OF CAPTAIN SAMPSON.

Santiago. Herewith is a good line engraving of the engines of his flagship the New York. She was launched in 1892. Her length is 380 feet 6 inches over all and beam 64 feet 10 inches. At mean draught of about 23 feet her displacement is 8150 tons. She is one the best cruisers afloat, being heavily armored and able to maintain a speed of 20 knots. The engines are triple-expansion, arranged in sets of two, one pair to each screw of the twin. The illustration shows the four machines in perspective. The cylinders are 42 inches in height (stroke). The high pressures are 32 inches in diameter, intermediate 46 inches and low 70 inches. Piston valves are used exclusively, two to a cylinder except the high pressures which have only one each. The bed plates are cast steel and the piston rods and crank shafts are of mild steel. Each engine is in a watertight compartment.

Steam is supplied from six double-ended main boilers and two single-ended auxiliary boilers, with a

and defensive power of the battleship and will be prominent factors in the new naval era now opening.

Morison's New Stamp Mill.

A gravity stamp mill by D. B. Morison retains almost every detail of a modern mill except the cam and tappet.

The feature of the Morison high-speed mill as claimed is, that it will give from 130 to 150 drops per minute as compared with the 85 to 95 of the ordinary slow drop cam mill, and will work with a 1500-pound stamp head as smoothly as with one of 400 pounds.

On the top of the king posts is a crank shaft with cranks at equal angles, each of which is provided with a connecting rod jointed to a cylinder, so that as the crank revolves the cylinder moves up and down. Within the cylinder is a deep solid plug or piston, the rod of which passes through the cylinder bottom, and constitutes a stem to which the stamp head is attached. A jacket surrounds the cylinder,

through the port from the cylinder into the jacket space, overcoming the resistance of the weight, until, when the bottom of the piston closes the port, no more liquid can escape and any further upward movement of the cylinder will raise the stamp head on an incompressible liquid buffer. The blow causes a rebound of the head, and, while rising therefrom, the liquid "pick-up" catches the weight.

When the cylinder and the stamp head have completed the up-stroke, the cylinder descends, under the control of the crank so that while the lifting of the stamp is controlled by the crank, the falling and the crushing effect are due to gravity assisted by the friction of the driven cylinder. The wearing away of the shoes and dies is provided for by several ports in the inside of the cylinder about 1½ inches below each other, so that when the shoes and dies have worn down to that extent all that is necessary is to unscrew the plug. The quick knapping blow in the Morison mill granulates rather than pulverizes.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

Office, No. 330 Market Street, San Francisco, Cal.
Telephone Number, Davis 771

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J. F. HALLORAN.....Publisher

San Francisco, July 9, 1898.

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Another Supreme Court Decision.

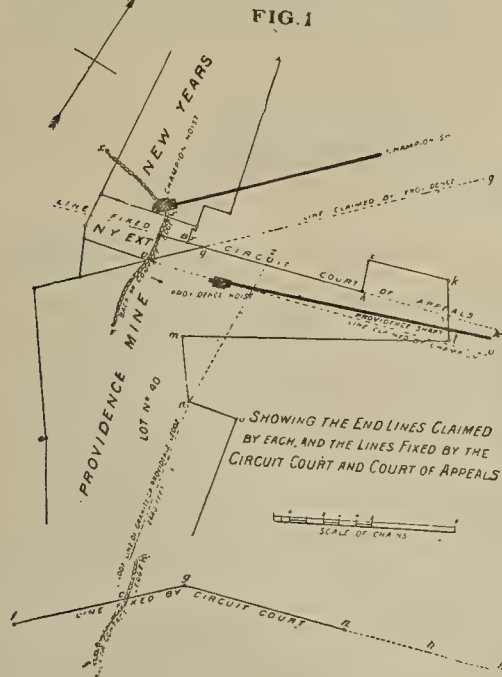
Of equal importance with the U. S. Supreme Court decision in the Del Monte-Last Chance case, published in full in last week's issue, is the decision from our highest American tribunal in the following case, which will be for permanent reference by mining men everywhere as final settlement of the questions raised.

The case was A. Walrath, appellant, vs. the Champion Mining Co., and was on appeal from the U. S. Circuit Court of Appeals for the 9th Circuit. The whole matter was reviewed in the issue of June 11th, '98, and the decision given in full, from which appeal was made. Illustrations were also published in that issue of the ground in controversy. Additional illustrations have since been engraved, and are presented herewith for the better understanding of the accompanying full text of this final adjudication of the case, which, it is believed, definitely determines a question not heretofore decided by the court of last resort.

Austin Walrath, Appellant, } Appeal from the United States
vs. } Circuit Court of Appeals for the
The Champion Mining Company. } Ninth Circuit.

This action, brought in the Superior Court of Nevada County, California, involves title to a triangular shaped section of what is known as the "Contact," "Ural" or "Back" ledge of gold-bearing ore, situated in the same county, claimed by appellant to be a portion of the Providence mine, to which complainant has title through a patent from the United States, and by appellee, a corporation, to be a part of the New Years Extension mine owned by it.

The relative situation of the two properties and the portion of the ledge in controversy is shown by the following Figure No. 1, the disputed section being contained between the lines thereon marked "Line claimed by Providence" and "Line claimed by Champion."



The figures marked "New Years" and "New Years Extension" represent the surface of the mining properties owned by defendant, while that marked "Providence mine" represents the surface of the patented ground of the plaintiff. The action was brought May 24, 1892, to recover \$300,000 damages

for ore extracted from the ledge and carried away by the defendant, and for an injunction against further trespasses thereon.

Upon motion of appellee the action was removed to the United States Circuit Court, as involving a Federal question, where the complainant recast his pleadings so as to separate the action into a bill in equity, upon which the action is now proceeding, and an action at law for the damages alleged.

The suit in equity was tried in the Circuit Court and decided mainly in favor of the appellee.

From this decree the appellant appealed to the Court of Appeals for the Ninth Circuit, where it was modified, and, as modified, affirmed.

The appellant now brings the case to this court upon writ of error from the Court of Appeals.

The appellant's title is designated as follows: In 1857, under the miners' rules and customs then in force, thirty-one locators located thirty-one hundred feet of the Providence or Granite lode. By mesne conveyances the title to this location became vested in the Providence Gold and Silver Mining Company, and on April 28, 1871, that company obtained a patent to thirty-one hundred feet of the lode and for surface ground as described in the patent.

The title thus granted to the Providence Gold and Silver Mining Company was, before the commencement of this suit, vested in the appellant.

The ledge, as granted by the patent, extends thirty feet north of the north surface line of the location and some six hundred and eighty feet south of the south surface line.

The patent conveyed only the Providence ledge and the surface ground. All other ledges contained within the surface lines were expressly reserved.

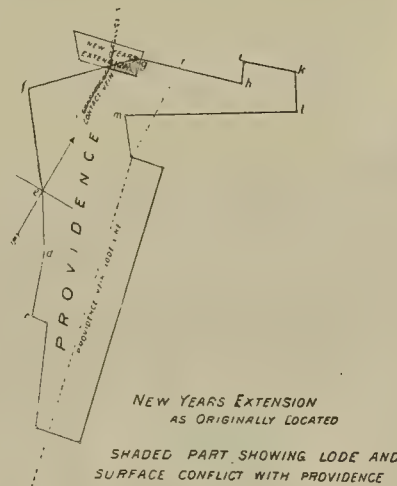
It is also contended by appellants that, by the Act of Congress of May 10, 1872, exclusive possession of all the surface included within the lines of the location was granted to the owners of the Providence, together with all other ledges or ledges having their tops or apices within such surface lines. This grant, of course, included the Contact vein, subsequently discovered within said boundaries, and now constituting the bone of contention in this action.

The Contact vein is shown in the figure, and crosses the surface line, *f-g*, of the Providence location.

On September 29, 1877, the appellee and defendant, the Champion Mining Company, made a location upon the Contact vein called the New Years Extension mine. This location overlapped, both as to surface ground and lode, upon the Providence location—that is, the lode line and surface lines of the said New Years Extension extended to the south of the boundary line *f-g* of the Providence location.

The New Years Extension mine is shown in the following Figure No. 2, together with the conflict caused by the overlap, the conflicting surface portions being shaded, and showing the Contact vein passing through it.

FIG. 2



In the year 1884 the complainant and his co-owners objected to the overlap, and demanded of the Champion Mining Company that it abandon all claims to the surface and lode to the south of the Providence boundary line, above described. Thereupon, in the month of November, 1884, John Vincent, the superintendent of the defendant, the Champion Mining Company, under the authority and by the direction of the said company, relocated the New Years Extension mine by a notice of relocation, in which the fact of the overlap under the original location was particularly recited, and the lines were readjusted so as to avoid the overlap and to conform to said line *f-g* of the Providence mine, as shown on Figure 1.

In the notice of relocation the lode line was particularly described as follows: "The lode line of this claim as originally located, and which I hereby relocate, is described as follows: Commencing at a point on the northerly bank of Deer creek, which point is 60 feet S. 11 degrees 45 minutes east of the mouth of the New Years tunnel, and running thence along the line of the lode towards the N. E. corner of the Providence mill, about S. 46 degrees 15 minutes east, 200 feet, more or less, to a point and stake on the northerly line of the Providence mine, patented, designated as Mineral Lot No. 40 for the south end of said lode line."

It also contained the following statement:

"And whereas, part of this claim, as originally described and as hereby relocated, conflicts with the rights granted by letters patent of said Providence mine, said Lot No. 40, now, therefore, so much of this claim, both for lode and surface ground, as originally conflicted or now conflicts with any portion of the surface or lode claims or rights granted by said patent, is and are hereby abandoned, which portion of this claim so abandoned is described as follows: All that portion of the above described New Years Extension claim for surface and lode which lies south of the northern boundary line of said Providence mine, which runs north 43 degrees 10 minutes east, across the southeastern corner of this claim."

The New Years Extension, as relocated, is coterminous with the Providence mine on the northerly boundary line, designated as the line *f-g*, running south 43 degrees west. (Fig. 1.) That line is the only boundary between the two properties, and the only boundary of the Providence location which is crossed by the Contact ledge.

The first workings of the appellee involved no conflict with appellant. The shaft ran parallel with the Providence line, and none of the levels crossed that line until about three months before this suit was begun, when the 1000-foot level was driven across it into the ground in dispute. Subsequently the eighth and ninth levels were driven across.

The work done by the Providence was carried on through a shaft sunk on the Providence or Granite ledge, from which shaft a cross-cut was run back to the Contact vein on the 600-foot level, and another on the 1250-foot level, and much of the ground now in controversy was thereby prospected and opened up by complainant and his co-owners. (See Fig. 1.)

The claims of the respective parties will be readily understood by reference to Fig. 1, which shows the relative position of all the mining properties belonging to both, with the lines claimed by them.

The portion of the Contact vein in dispute is that upon the dip of the ledge lying between the line marked "Line claimed by Providence" and the line marked "Line claimed by Champion."

The apex of the Contact vein is represented by the dotted line *x-y*, and shows the vein as far as exposed in both the Champion and Providence ground. South of *x* the course of the vein in the Providence ground is unknown.

The line *f-g* is the same line as that designated A-B by some of the witnesses.

Upon the trial the Circuit Court held that there could be but one end line for each end of the Providence location, and that the lines *g-h* and *f-g* constituted the end lines; that such lines constituted the end lines of not only the originally discovered Providence lode, but also of every other vein that might be discovered within the surface lines of the location. But, notwithstanding this holding, in entering the decree the line *f-g* was also established as an end line of the Contact vein, but for its length only, and then that from "g" the

line *g-h*, and that line extended indefinitely eastwardly, constituted another end line for the same end of the lode, and constituted the line through which the plane determinative of all extralateral rights in the vein must be drawn.

From this decree the appellant here was allowed an appeal to the Circuit Court of Appeals.

The latter court established the line *g-h* as the sole end line of the Contact vein, and reversed the decree of the Circuit Court in so far as it fixed the line *f-g* as an end line.

As a result of this decree the complainant was not only shut out of all extralateral rights in the Contact vein north of the line *g-h*, but also of that portion of the vein lying vertically beneath the surface lines of the Providence which extend north of that line, and which are marked upon the figures as constituting the parallelogram *h-i-k-h*, which was awarded to the Champion. (See Fig. 1, showing the end line fixed by the Circuit Court and that line as subsequently fixed by the Court of Appeals, with the latter line extended in its own direction both eastwardly and westerly.)

From the judgment of the Circuit Court of Appeals the appellant has appealed to this court.

There are nine assignments of error. The first eight attack so much of the decree as establishes the line *g-h* as an end line, for the purpose of determining the extralateral right, and fails to establish the line *f-g*, and that line produced indefinitely in the direction of *g* as such end line. The last two assail so much of the decree as awards to appellee the right to pursue the vein on its downward course underneath the parallelogram *h-i-k-h*.

Mr. Justice McKenna delivered the opinion of the Court.

There are two questions presented by the assignment of errors: (1) What are the extralateral rights of the appellant on the Contact vein?

(2) Is appellant entitled to that portion of the Contact vein within the Providence boundaries which lies north of the north end line fixed by the court, and which is described upon Fig. 1 as the parallelogram bounded by the lines marked *h-i-k-h*?

(1) The appellant contends that the patent of the Providence ledge was construed as evidence of his title to thirty-one hundred feet in length of that vein. If that carrier, this carries the northern end of the ledge thirty feet beyond the line fixed by either the Circuit Court or the Circuit Court of Appeals. It was truly said at bar: "If it is not the end line of the Providence location, then certainly there is no reason for holding it to be the end line of the Contact vein."

The language of the patent is: "It being the intent and meaning of these presents to convey unto the Providence Gold and Silver Mining Company, and their successors and assigns, the said vein or lode in its entire width for the distance of thirty-one hundred (3100) feet along the course thereof."

The patent was issued under the Act of 1866, and it is necessary, therefore, to some extent to consider that Act. By it, the appellant urges, the principal thing patented was the lode, and that the northern limit of that, and hence of his rights on that was thirty feet north of the line fixed by the Circuit Court of Appeals; and hence it is further contended that as the northern and southern surface lines (*g-h* and *x-y*) did not determine or limit his right to the lode under the Act of 1866—in other words, did not become end lines—they do not become end lines upon the Contact ledge (*x-y*) acquired under the Act of 1872, but that the surface line which crosses the strike of that ledge must be held to be the end line, and the line which fixes the rights of the parties. This line is *f-g*, Fig. 1, and, if appellant is correct, determines the controversy in his favor. The extent of the right passing under the Act of 1866 has been decided by this court.

In *Mining Co. v. Tarbet*, (98 U. S. 463), known as the *Flagstaff Case*, the superficial area of the Flagstaff mine was one hundred feet wide by twenty-six hundred feet long. It lay across the lode, not with it, and the company contended, notwithstanding that, it had a right to the lode for the length of the location. In other words, the contention was that it was the lode, which was the principal thing patented, and that the surface ground was a mere incident for the convenient working of the lode. The contention was presented and denied by the instructions which were given and refused by the lower court. That court instructed the jury that if they found Tarbet "was in possession of the claim, describing it, holding the same in accordance with the mining laws and the customs of the miners of the mining district, and that the apex and course of the vein in dispute is within such surface, then, as against the appellant, the latter is not entitled to be possessed of the land within his boundaries to any depth, and also of the vein in the surface to any depth on its dip, though the vein in its dip downward passes the side line of the surface boundary and extends beneath other and adjoining lands, and a trespass upon such part of the vein on its dip, though beyond the side surface line, is unlawful to the same extent as a trespass on the vein inside of that line, and that the boundary between the two is the surface line, on its dip, is limited in two ways—by the length of the course of the vein within the surface, and by an extension of the end lines of the surface claim vertically, and in their own direction, so as to intersect the vein on its dip; and the right of a possessor to recover for trespass on the vein is subject only to these restrictions."

Again: "The defendant (plaintiff in error) has not shown any title or color of title to any part of the vein except so much of its length on the course as lies within the Flagstaff surface, and the dip of the vein for that length; and it has shown no title or color of title to any of the surface of the South Star and Titus mining claim, except so much of No. 3 as lies within the patented surface of the Flagstaff mining claim."

And the following instructions propounded by the owner of the Flagstaff:

"By the Act of Congress of July 26, 1866, under which all these locations are claimed and have been made, it was the duty of the miner that was located and claimed; the lode was the principal thing, and the surface area was a mere incident for the convenient working of the lode; the patent granted the lode, as such, irrespective of the surface area, which an applicant was not bound to claim; it was his convenience for working the lode that controlled his location of his surface area; and the patentee under that Act takes a fee simple title to the lode, to the full extent located and claimed under said Act."

Commenting on the instructions, Mr. Justice Bradley, speaking for the court, said:

"These instructions and refusals to instruct indicate the general position taken by the court below, namely, that a mining claim secures only so much of a lode or vein as it covers along the course of the apex of the vein on or near the surface, no matter how far the location may extend in another direction."

And after stating that the Act of 1872 was more explicit than that of 1866, but the intent of both undoubtedly the same, as it respects lines and sides, and the right to follow the dip outside of the latter, he proceeded as follows:

"We think that the intent of both statutes is that mining locations on lodes or veins shall be made thereon lengthwise, in the general direction of such veins or lodes on the surface of the earth where they are discoverable; and that the end lines are to cross the lode and extend perpendicularly downwards; and to be continued in their own direction either way horizontally; and that the right to follow the dip outside of the said lines is based on the hypothesis that the direction of these lines corresponds substantially with the course of the lode or vein at its apex on or near the surface. It was not the intent of the law to allow a person to make his location crosswise of a vein so that the side lines shall cross it, and thereby give him the right to follow the strike of the vein outside of his said lines. That would subvert the whole system sought to be established by the law. If he does locate his claim in that way, his rights must be subordinated to the rights of those who have properly located their claim, and their right to follow the dip outside of their said lines cannot be interfered with by him. His right to the lode only extends to so much of the lode as his claim covers. If he has located crosswise of the lode, and his claim is only one hundred feet wide, that one hundred feet is all he has a right to. This we consider to be the law as to locations on lodes or veins."

The location of the plaintiff in error is thus laid across the Titus lode, and the direction of these lines corresponds substantially with the surface, and the side lines of the location are really the end lines of the claim, considering the direction or course of the lode at the surface.

"As the law stands, we think the right to follow the dip of the vein is bounded by the end lines of the claim, properly so called; which lines are those which are crosswise of the general course of the vein on the surface. The Spanish law mining law confined the owner of a mine to perpendicular lines on every side, but gave him greater or less width according to the dip of the vein. See Rockwell, pp. 56-58 and pp. 274-275. But our laws have attempted to establish a rule by which each claim shall be so many feet of the vein, lengthwise of its course, to any depth below the surface, although laterally its inclination shall carry it ever so far from a perpendicular. This rule the court below strove to carry out, and all its rulings seem to have been in accordance with it."

This law was followed and applied in *Argentine Mining Company v. Terrible Mining Company* (122 U. S. 478), and in *Iron Silver Mining Company v. Elgin* (118 U. S. 196); *King v. Amy & Silvermith Mining Company* (132 U. S. 223). The locations passed upon in these cases were made under the Act of 1872, but we have seen that the intent

of that Act and the Act of 1866, "as it respects end lines and side lines," was the same.

But appellant urges that "those cases are not in point here." We think that they are. The patent in the Flagstaff case appears to have been the same as here, and besides whatever the patent here it must be confined to the rights given by the statute which authorized it.

In the Flagstaff case the lode was claimed, and hence the right to follow it beyond the surface boundaries of the location was claimed. Here the lode is claimed and the right to follow it outside of the surface boundaries, that is, beyond the line *f-g* to the point *x*. In that case the right contended for was denied on the principle applicable to end and side lines. In this case the right contended for must be denied by the application of the same principle.

But, appellant asks, admitting for the argument sake that it (the line *g-h*) does constitute an end line of the location within the meaning of the law of May 10, 1872, does it constitute the end line of the Contact vein? And in answering the question he says: "The end line of a lode is the boundary line which crosses it regardless of whether it was originally intended as an end line or side line." Four times has this principle been sustained by this court. He then cites the cases we have cited, and claims that they "are, of course, conclusive of this controversy if they are in point."

Under the law of 1866 a patent could be issued for only one vein. (14 Stat. at Large, 351.) The Act of 1872 gave to all locations therefrom made, as well as to those thereafter made, all veins, lodes and ledges the top or apex of which lies inside of the surface lines. Section 3 of the Act, which is also section 2322 of the Revised Statutes, is as follows:

"The locators of all mining locations heretofore made, or which shall hereafter be made, on any mineral vein, lode or ledge, situ-

by the locator, were the true end lines, but those which are "cross-wise of the general course of the vein on the surface."

The court in *Iron Mountain Mining Co. v. East Chance Mining Co.*, decided at the present term (ante, p. 1), reviewed the cases we have cited, and, speaking for the court, Mr. Justice Brewer said:

"Our conclusion may be summed up in these propositions: First, the location as made on the surface by the locator determines the extent of rights below the surface; second, the end lines, as he marks them on the surface, with the single exception hereinafter noticed, place the limits beyond which he may not go in the appropriation of any vein or veins along their course or strike; third, every vein, the top or apex of which lies inside of such surface lines extended downward vertically, becomes his by virtue of his location, and he may pursue it to any depth beyond his vertical side lines, although in so doing he enters beneath the surface of some other proprietor; fourth, the only exception to the rule that the end lines of the location as the locator places them establish the limits beyond which he may not go in the appropriation of a vein on its course or strike is where it is developed, that, in fact, the location has been placed not along, but across the course of the vein. In such case, the law declares that those which the locator called his side lines are his end lines and those which he called end lines are in fact side lines, and this, upon the proposition that it was the intent of Congress to give the locator only so many feet of the length of the vein, that length to be founded by the lines which the locator has established of his location. Our laws have attempted to establish a rule by which each claim shall be so many feet of the vein, lengthwise of its course, to any depth below the surface, although laterally its inclination shall carry it ever so far from a perpendicular." (*Mining Company v. Turbell*, 98 U. S. 463-469.)

These propositions we affirm, with the addition that the end lines

hereby relocate, is described as follows: Commencing at a point on the northerly bank of Deer Creek, which point is 80 feet S., 11 deg. 45 minutes east of the northeast corner of the New Years tunnel and running thence along the line of the lode towards the N. E. corner of the Providence Mill, about S. 36 deg. 15 minutes east, 200 feet more or less, to a point and stake on the northerly line of the Providence mine, patented, designated as Mineral Lot No. 40 for the south end of said lode line. And that the contact vein crosses in its onward course the southerly end line of said New Years extension claim and enters the lands and premises of plaintiff described in said bill of complaint."

It is hence contended that if the line *f-g* is the southerly end line of the New Years extension it must necessarily be the northern end line of the Providence mine. This does not follow, nor is there any concession of it. Coincidence of lines between claims does not make them side lines or end lines. Whether they shall be so regarded depends upon the legal considerations which we have already sufficiently entered into and need not repeat. We do not say that there may not be an agreement settling end lines. One example of such an agreement was exhibited in *Richmond Mining Co. v. Eureka Mining Co.* (103 U. S. 839).

(b.) The testimony relied on was admitted against the objection of defendants (appellees). It was as follows:

"Q. Then you may go on Mr. Vincent, and state how you started that work, and how you planned it, and what communications you had, if any, with the board of directors of the Champion Mining Company."

"A. Well, I was sent up by the board of directors to do whatever work I thought was the best for the company. I started that shaft down and had it down about 10 feet, and I reported to the board of directors in session about what work I had done and they calculated to go to work and put up hoisting works and run that shaft down further."

"Q. What, if any, communication did you make, or was there any communication from the board to you concerning the direction of the shaft, and why any given direction was adopted for the shaft?"

"A. There was none, but then I reported to the board that such was the case, that the shaft was laid out so it would never interfere with this line."

The witness further testified that he sank the shaft 540 feet and was discharged on the 1st of August, 1889, and he was further questioned as follows:

"Q. State whether at the time you were sinking that shaft you were called upon by Mr. Walrath, the complainant in this action, or his brother, Mr. Richard Walrath, to make any inquiry of you concerning the construction of that shaft and what the intention was, whether to cross the Providence line or not, as marked on the map?"

"A. Well, Mr. Walrath he happened to come along, and he made a remark to me that he wished for us, of course, to keep his line and not to cross it, as he didn't want any more trouble as he did have with some other mining properties adjoining; that he didn't want any more holes in his ground; and so I answered him that I would respect his line as long as I am here."

"The Court—That you would respect his line as long as you were there?"

"A. As long as I was superintendent of the mine."

"Q. Where did this conversation take place?"

"A. Right on the premises."

"Q. You were then acting as superintendent, were you?"

"A. Yes, sir."

"Q. What line was referred to at that time as the Providence line; can you point it out on the map?"

"A. Yes, sir; it is the line marked 'A B' on the map, Exhibit 4."

This testimony does not establish an equitable estoppel, nor is the corporation bound by the declarations of the superintendent. They were without the scope of his agency or authority.

(2.) The right to that portion of the Contact ledge within the boundaries of the parallelogram *h-i-k-h* presents an interesting question. It does not appear to have been submitted to either of the lower courts, but the right by the decree of the Circuit Court is given to appellee by adjudging to it that portion of the vein on its course which lies northeasterly of the line *g-h* and its continuation.

The question is a new one in this court, but we think it is determined by the principles hereinbefore laid down. It may be true that under the Act of 1866 the patenting of the Providence mine in its irregular shape was in all respects legal and proper, and that the Act did not require the location to be made in the form of a parallelogram or in any particular form, and that there was no requirement that the end lines should be parallel. It is also true that under that Act only one vein could be included in a location, no matter how much surface ground was included in the patent, but that under the Act of 1872 possession and enjoyment of all the surface included within the lines of their location and all veins, lodes and ledges throughout the entire depth, the top or apex of which lies inside of such surface lines extended downward vertically, were given.

But rights on the strike and on the dip of the original vein and rights on the strike and on the dip of the other veins, we have decided, are determined by the end lines of the location. In other words, it is the end lines alone, not they and some other lines, which define the extralateral right, and they must be straight lines, not broken or curved ones. The appellant, under his contention, would get the right such lines would give him and something more besides outside of them. To specialize, he would get all within a plane drawn through the line *g-h*, and all within the planes drawn through the sides of the parallelogram *h-i-k-h* (Fig. 1).

It may be that the end lines need not be parallel under the Act of 1866; may converge or diverge, and may even do so as to new veins, of which, however, we express no opinion, but they must be straight—no other define planes which can be continuous in their own direction within the meaning of the statute. It may be that there was liberty of surface form under the Act of 1872, but the law strictly controls the right on the vein below the surface. There is liberty of surface form under the Act of 1872. It was exercised in *Iron Silver Mining Co. v. Elgin Mining Co.* (*supra*), in the form of a horseshoe; in *Montana Co. Limited v. Clark* (42 Fed. Rep. 629), in the form of an isosceles triangle. The decree is affirmed.

International Mining Congress.

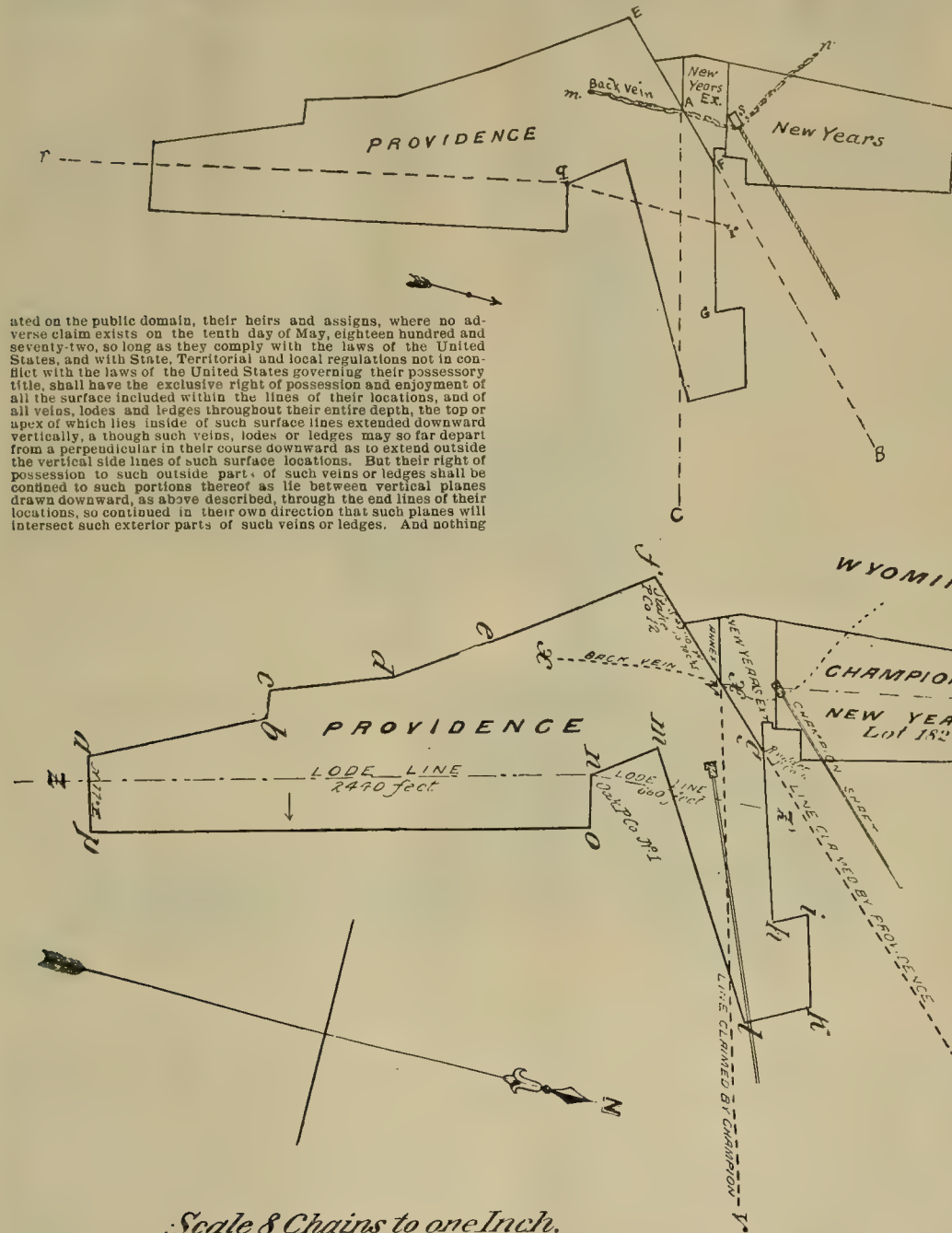
The second annual session of the International Mining Congress, which first met in Denver, Colo., one year ago, convened last Wednesday in Salt Lake City, Utah. There were present about 1500 delegates, representing all parts of the American continent. The organization resulted in the selection of B. F. Montgomery of Colo. president, W. D. Johnson of Utah secretary, J. H. Hawley of Idaho first vice-pres't, Chas. D. Lane of Cal. second vice-pres't, E. Elgura of Peru third vice-pres't.

There were presented two reports from the committee on proposed revision of the Federal mining laws. C. J. Moore of Colo., chairman of the committee, presented the majority report; W. P. Heyburn of Idaho made a minority report in opposition to revision.

The majority report recommends that the law of apex be abolished, with its corollary propositions, extralateral rights and questions of intersecting veins. The report recommends in its place legislation to establish enlarged locations, the location to be defined by straight boundary lines, but not necessarily parallel lines, no rights to extend beyond a vertical projection of the boundaries, and the location to include everything within the vertical projection, the enlargement of claims being intended as compensation for the abolition of extralateral rights. The majority report also recommends a new law governing the method of making locations, to make an official record of a claim necessary before any transfer of a claim can be valid, the location to be staked out as now, but requiring a survey by a Federal deputy mineral surveyor and a record made of this survey in the County Recorder's office as well as in the Surveyor-General's office.

The minority report recommends the retention of the present mining laws and the abolition of local rules and laws.

The two reports were the subject of considerable animated discussion all day Thursday. A motion to postpone final consideration of the revision question for one year was voted down, and yesterday morning the debate was renewed.



Scale 8 Chains to one Inch.

in this section shall authorize the locator or possessor of a vein or lode which extends in its downward course beyond the vertical lines of his claim to enter upon the surface of a claim owned or possessed by another." (Act of May 10, 1872, Sec. 3; Sec. 2322 U. S. Rev. Stat.)

Appellant's right upon the Contact vein is given by this statute. What limits this right extralaterally? The statute says vertical planes drawn downward through the end lines of the location. What end lines? Those of and as determined by the original location and lode, the Circuit Court of Appeals decided. Those determined by the direction of the newly discovered lodes, regardless whether they were originally intended as end lines or side lines, the appellant, as we have seen, contends. The Court of Appeals was right. Against the contention of appellant the letter and spirit of the statute oppose, and against it the decisions of this court also oppose.

The language of the statute is that the "outside parts" of the veins or ledges "shall be confined to such portions thereof as lie between vertical planes drawn downwards" * * * through the end lines of their locations * * *. And Mr. Justice Field, speaking for the court, said, in *Iron S. M. Co. v. Elgin Mining Co.* (118 U. S. 198-8):

"The provision of the statute, that the locator is entitled throughout their entire depth to all the veins, lodes or ledges, the top or apex of which lies inside of the surface lines of his location, tends strongly to show that the end lines marked on the ground must control. It often happens that the top or apex of more than one vein lies within such surface lines, and the veins may have different courses and dips, yet his right to follow them outside of the side lines of the location must be bounded by planes drawn vertically through the same end lines. The planes of the end lines cannot be drawn at a right angle to the courses of all the veins if they are not identical.

The court, however, did not mean that the end lines, called such

of the original veins shall be the end lines of all the veins found within the surface boundaries.

The appellant contends that, by agreement, by acquiescence and by estoppel the line *f-g* has become the end line between the two claims.

This contention is attempted to be supported by (a) A relocation of the New Years extension claim, by which it is asserted it recognized and designated the line *f-g* as the northerly end line of the Providence claim. (b) The testimony of the superintendent as to what took place between him and the directors before sinking the Champion shaft, and afterwards between him and a co-tenant of complainant (appellant).

(a.) The relocation does not in terms recognize the line *f-g* as the northern end line of the Providence. Its relocations are:

"And whereas, part of this claim as originally described and as hereby relocated, conflicts with the rights granted by the letters patent of said Providence mine, said Lot No. 40, now, therefore, so patent of said Providence mine, which runs 43 degrees 10 minutes east, designated, conflicting, or now conflicts, with any portion of the surface or lode, claims or rights granted by said patent, is and are hereby abandoned."

"Which portion of this claim so abandoned is described as follows: All that portion of the above-described New Years extension claim for surface and lode which lies south of the northern boundary line of said Providence mine, which runs 43 degrees 10 minutes east, across the southeastern portion of this claim."

It will be observed by reference to Fig. 1 that the northern boundary of the Providence is not one line, but two lines, and it is the one which runs north 43 degrees 10 minutes east across the southern corner, which is designated in the relocation of the New Years claim. In the notice of relocation, however, the northerly line of the Providence is called the south end line of the relocated ground. The description is as follows:

"The lode line of this claim as originally located, and which I

Orthoclase as a Gangue Mineral in a Fissure Vein.

By WALDEMAR LINDGREN.

The occurrence of feldspars as gangue minerals in fissure veins is not common. But, on the other hand, many well authenticated instances make it certain that they may be formed during the conditions attendant upon the deposition of ordinary fissure veins, i. e., by aqueous deposition. Lime feldspars or soda lime feldspars appear to occur very rarely, the only known instance being that described by the author from Grass Valley, Cal.* Even this case could not be as completely demonstrated as would have been desirable. Albite is more common. While it is only rarely mentioned from European mineral deposits, it has been described as occurring in places very abundantly in Australian gold quartz mines as well as in similar veins in the province of Minas Geraes, Brazil. In the United States, albite has been noted from several places. Genth describes it from the Steele mine, North Carolina, in the Appalachian gold belt. In California it was first noted by Genth in 1859 from Winters gold vein, Calaveras county.

Albite was also described by Wendell Jackson from Stanislaus mine, Calaveras county, and lately again by H. W. Turner from the Shaw mine, El Dorado county. The mineral will probably be found in many other places in the vicinity of the mother lode. It was recently noted by the author in specimens from the Gentle Annie mine, near Placerville. In spite of very careful search, no albite has yet been recognized from Nevada City or Grass Valley.

Orthoclase has been described from several European ore deposits, generally having the crystallographic forms and characteristics of adularia. Thus we find it recorded from Schmiedeberg and Kupferberg in Silesia, Himmelfahrt mine near Freiberg in Saxony, Schlaggenwald in Bohemia, Felsobanya and Schemnitz in Hungary; also from Transylvania at Botesbanya, Cseb and Verospatak. Most of the occurrences in the latter two countries are from gold quartz veins. Everywhere, however, the orthoclase is more of a mineralogical rarity than an abundant gangue mineral.

Breithaupt described, without detailed notes as to its occurrence, an orthoclase of adularia habit from the Valenciana silver mine, Mexico, and gave it on account of supposed abnormal angles the name of "valencianite." This valencianite probably occurred as gangue mineral in a vein.

From the United States orthoclase has been noted by Genth as occurring in minute crystals at the Silver Hill and Steele mines, North Carolina. G. F. Becker has recently recognized the presence of small grains of orthoclase in a vein quartz from Alaska. It may be added that during the examination of certain auriferous veins at Silver Crown, Wyoming, by the author, grains of microcline were sometimes found in thin sections of vein quartz.

Orthoclase is frequently mentioned from tin veins, in Saxony, Bohemia and Cornwall; and while many of these occurrences are beyond doubt, yet it may be pointed out that, owing to the peculiar structure of these veins, some feldspar from the surrounding granite might in the older reports have been mistaken for true gangue mineral. While orthoclase, of course, is common on pegmatite veins, it has not as yet been proved that these ever are auriferous.

During the examination of Silver City mining district, in southern Idaho, undertaken last summer for the U. S. Geological Survey, a vein was encountered which from various standpoints proved to be most interesting.

The Black Jack-Trade Dollar vein outcrops on Florida mountain, near Silver City, and can be traced for about one mile. The strike of the vein is easterly and westerly; its dip is nearly vertical. It cuts three formations—a normal muscovite-granite forming the fundamental rock, a basalt resting on this granite and a rhyolite capping both. As the latter two rocks are of Tertiary (Miocene) age, the deposit is clearly of comparatively recent origin.

The ore minerals are pyrite, chalcopyrite and argentite; the value is chiefly in silver with a smaller amount of gold. The vein is a characteristic fissure vein, well defined, and having a thickness of from a few inches to 2 or 3 feet. In the granite it is closely followed by a basaltic dike. The ordinary ore consists of typical vein filling, though low grade ores consisting of altered rhyolite appear along certain parts of the vein. The gangue is of an interesting and unusual character, consisting of quartz and orthoclase, in varying proportions. In general, quartz predominates, but at many places the two minerals occur in equal proportions or even with prevailing orthoclase.

The first and most common occurrence of the orthoclase is as large, irregular milk-white grains, intergrown with vein quartz; it contains inclusions of pyrite and argentite and sometimes thin lamellæ of pyrite deposited parallel to the best cleavage plane. The grains appear under the microscope as simple crystals. Crusts with projecting crystals of clear quartz and whitish feldspars with broken or curved faces often occur.

The second mode of occurrence is as small, more or

*17th Ann. Rept., U. S. G. S., p. 87. This feldspar occurs on small stringers differing in character from the typical gold quartz veins from that locality.

less perfect, almost transparent crystals 1-3 mm. in diameter, coating cracks and crevices in the altered granite adjoining the vein.

The third occurrence is as abundant, small and perfect crystals coating a lamellar quartz, itself a pseudomorph after some other mineral, probably calcite.

The vein is apparently richest in orthoclase where traversing the granite. Much of it was also found where it cuts the rhyolite, but none was observed in the basalt. The vein where entering the basalt contracts and becomes very narrow.

All these occurrences demonstrate beyond doubt the aqueous origin of the mineral. The crystals have the habit of adularia, though the only strongly developed faces are 110 and 101 (m and x, Dana), producing a distinctly wedge-shaped appearance. One of the larger crystals from the first described occurrence on the main vein was analyzed by Dr. W. F. Hillebrand with the following result:

| | |
|--------------------------------------|-------|
| SiO ₂ | 66.28 |
| Al ₂ O ₃ | 17.93 |
| K ₂ O..... | 15.12 |
| Na ₂ O..... | .25 |
| Undetermined..... | .42 |

Total.....100.00

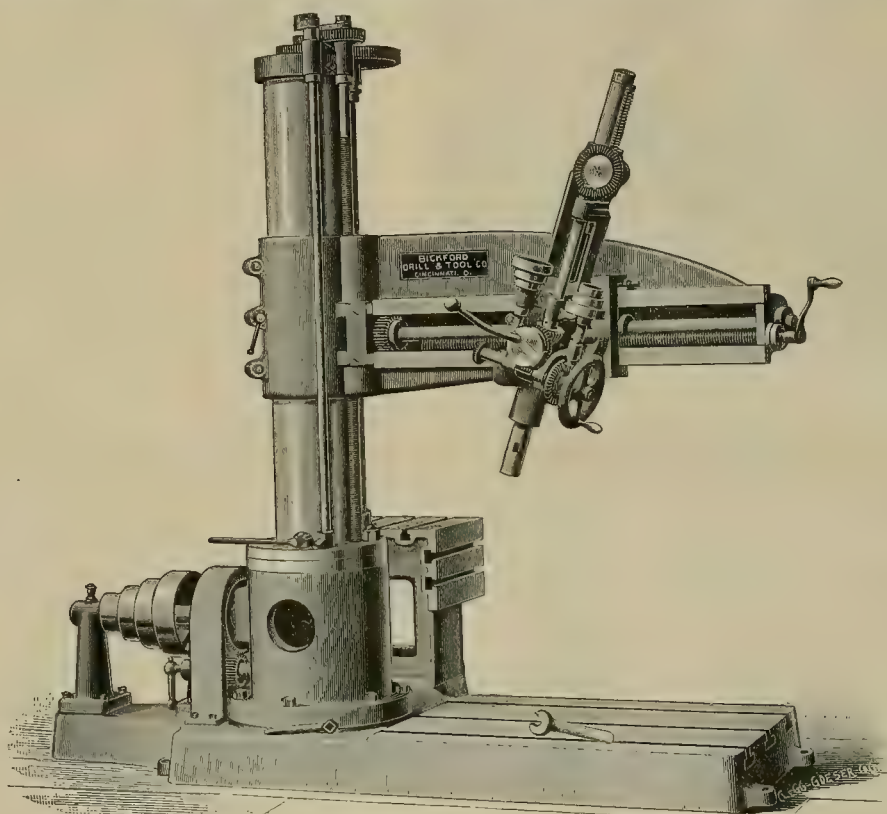
Specific gravity.....2.54

The analysis indicates typical adularia. No ortho-

that there would be a strong demand for years for competent men, and added that England kept the United States drained of its best mining talent. They are wanted in South Africa, in Australia, New Zealand; in fact, all over the world, and they can get higher pay than doctors, lawyers or any other class of professional men. Any young man who is ambitious for a career that will lead to fortune, if not to fame, and perhaps to both, if he be industrious and steady, will make no mistake by qualifying himself in the direction of mineralogy."—Denver Daily Mining Record.

Half Universal Radial Drill.

Herewith is illustrated the Half Universal Radial drill, manufactured by the Bickford Drill and Tool Co., Cincinnati, Ohio. This machine is made in two sizes, called styles "A" and "D." In both the base plate is heavy and deep, ribbed and braced on the under side so as to avoid all spring. The column, with large, round base, is bolted to the bottom plate, and over this column, with long bearing on top and bottom, is fitted the outside sleeve which carries the arm. The sleeve rests on the bottom, on a large flange, and is fitted with three clamping bolts. The rotating arm fitted over the sleeve is of box form, strongly braced, and raises and lowers by power. The flange of the sleeve is provided with roller bear-



HALF UNIVERSAL RADIAL DRILL.

class has thus far been found in the other veins near Silver City; many of them, though, possesses interesting structural and mineralogical characteristics which will be described in the full report of the district.

Orthoclase has been artificially produced by the wet way by Friedel and Sarasin in 1881. In 1890, Ch. and G. Friedel obtained orthoclase in small crystals by heating pulverized muscovite with a solution of potassic silicate. It is easily seen that the interesting experiment has a direct bearing on this occurrence.

The reason why orthoclase is not more frequently found on mineral veins may possibly be found in the abundant and usual presence of carbon dioxide in thermal waters. Under such conditions the more stable compound—muscovite or sericite—would be formed, orthoclase being rapidly attacked by waters under pressure containing CO₂. Orthoclase could then only result if CO₂ were absent or present in only small quantities.

A Paying Profession.

"There is no profession that holds out such tempting allurements to the youth of to-day as that of the metallurgist and mining expert," said Mr. D. G. Downs of San Francisco. "Last year, of the class of about a dozen who were graduated at the school of mines in the University of California, at least ten have found excellent situations, with big salaries. Our universities cannot turn out expert mining engineers fast enough for the demand. When I was in London last summer an English scientist told me

ings, which allow the arm to swing with perfect freedom. The machine is driven by a cone pulley, shown on the back of the drill, and by miter gears through the inside of the column to the top. All sizes are fitted with back gearing. The spindles have automatic feed and are fitted with the Bickford patent quick return motion. The box table and the countershaft complete are furnished with each machine. The shafts, spindles, worm, worm rings and the main gearing are made of steel. All gearing is cut from the solid. The head of these machines may be swiveled at any angle upon the arm. The makers also manufacture full universal radial drills, in which the head rotates and the arm revolves around its own axis, thereby making it possible to drill at any angle and in any direction within the range of the arm. The style "A" machine will drill to the center of a 10-foot circle and will receive 4 feet 10 inches over base. It weighs 6500 pounds. The style "D" machine will drill to the center of a 11-foot circle and will receive 6 feet 8 inches over base. It weighs 12,000 pounds. Full details in regard to these tools can be had from the Bickford local representatives—Messrs. Henshaw, Bulkley & Co., San Francisco.

Meant to be Humorous.

TO THE EDITOR:—In a recent issue of your valuable paper there appeared an article, or, rather a letter, on mine promotion, in which the writer deeply deplores the variation between the owner's statement of the value of his mine and the actual assays. All of us who have engaged in the examination of mines

and prospects have encountered this evil and felt the need of some method of overcoming the difficulty without the task of sampling and assaying, which frequently means a laborious and expensive trip. This the writer believes he has done, and ventures to offer his solution of the problem to the readers of the MINING AND SCIENTIFIC PRESS, in the hope that they will derive as much benefit from it as he has done.

All have, of course, noticed that the prospector's statement is invariably a multiple of the true assay, and so the writer's first attempt was to find the coefficient of expansion. This he soon saw to be so modified that a formula was necessary for its complete expression, and the formula could not be obtained from theoretical considerations, but had to be deduced from a rigid and painstaking comparison of numberless assays. By this method he found the influence of time, distance and the prospector's experience, and its expression, in the following formula:

Let A = true assay; S = owner's statement; y = number of years owner has prospected; t = time in weeks elapsed since last assay; d = distance in miles to prospect.

$$\begin{aligned} \text{Then } S &= A t \frac{1}{y} \frac{1}{d} \\ \therefore A &= \frac{S}{t \frac{1}{y} \frac{1}{d}} \end{aligned}$$

By finding d and y in terms of the other members of the equation, formulae may be obtained for determining the experience of a prospector or the location of a prospect, which will be very convenient for those who contemplate grubstaking a man in the Klondike.

The writer is at present engaged in a research developing the relation between a prospect vein, according to the owner's statement, and the angle formed by the vein, the owner's eyes and the nearest valuable mine.

Berkeley, Cal., July 1st, '98.

The Calumet and Hecla, Michigan.

The Calumet and Hecla Copper Mining Company employs 5000 men. The monthly pay roll is \$400,000. Its annual receipts average \$14,000,000, from which dividends at the rate of \$40 per share are annually declared. The total dividends paid by the company since its reorganization in 1867 amount to over \$52,000,000. The total receipts of the company to date amount to more than \$385,000,000.

Overlying the vein is a cupriferous amygdaloid rock; its floor or footwall is composed of trap rock. The first active mining by the present company was begun in 1867, in which year the initial shipment of 768 tons of copper was made. From that year the product kept increasing, till now the annual shipment has reached 96,000,000 pounds of copper.

The formation in northern Michigan, extending from Portage lake northwesterly to Keweenaw point, and thence across Lake Superior to Ontonagon, is a conglomeration of pebbles in solid form with an intermixture of pure native copper.

The method employed in mining this vein is as follows: The shafts proper which reach to the bottom of the mine are timbered from bottom to collar, pine timber being used clear through. Levels are uniformly 90 feet apart, which affords access to the different parts of the mine. Through these levels the copper rock is brought to the main shaft by tram cars that switch to and fro from the different openings. At the intersection of each level the ore is dumped into the skip which runs up and down the main shaft at a speed of 600 feet per minute. At the summit the skip rises to the top of the rock house, where the ore is automatically dumped into the ore crushers, thence into the ore cars, whence it is carried to the mills for treatment. The vein is punctured by diamond drills, the average depth of each hole being 5 feet.

In the Calumet and Hecla mine seventy-five drills are operating and they blast twice a day. During the forty years of mining on the conglomerate the bed, which averages 12 feet, has never lost its width, while the thickness ranges from 15 to 25 feet. The width and thickness of the amygdaloid vein are uncertain. Sometimes they are found to measure 25 feet across, while at other times but a few inches. The conglomerate is a dull red in color; the amygdaloid is a dirty gray.

The character of both lodes is such that the most economical way to mine them is by stopes, inclining toward the vein and under it near the footwall, and working obliquely around it.

The Calumet and Hecla stamp mill is situated at Lake Linden. There are practically two mills in one, of eleven ball heads each, and having a capacity of 6000 tons conglomerate per day. The metal is found deposited in the rock in all possible forms. The separation of the copper from the rock is effected by passing the stamped rock over a system of jigs, whereby the sand, by its less specific gravity, is floated off into a steady current of water, and the copper, being the heavier, settles and falls through the sieves. One line of jigs succeeds another, over which in succession the copper which has just passed through a previous set of sieves is made to pass, and the sand which is contained in the water is carried away by the current of water to the lake by a sys-

tem of sand wheels and launders. The number of jigs and the velocity of the current are so regulated as to secure the desired separation, with very little loss of copper.

The head current of water coming from the stamp heads, in which float the light material and fine dirt, is turned from the main launder into lateral ducts, which convey it to the large slime tables over whose conical-shaped, slow-moving surface it is made to pass.

The stamp mills and crushing machinery have been so perfected that 33 cents would cover the entire cost of treating a ton of rock in the stamp mill.

Some New Patents.

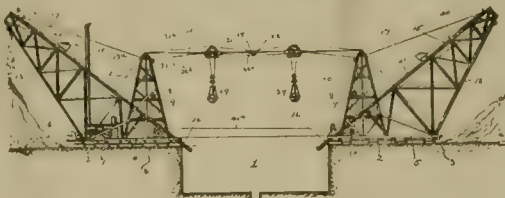


FIG. 1.

CABLEWAY SYSTEM AND APPARATUS FOR EXCAVATING AND CONVEYING.—Patent No. 605,488, dated June 14, 1898: J. H. Lancaster, New York. Fig. 1 is a side view showing one form of improved railway system for operating a series of grapples, dredgers, and diggers.

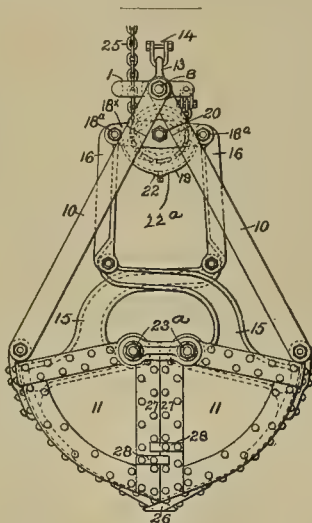
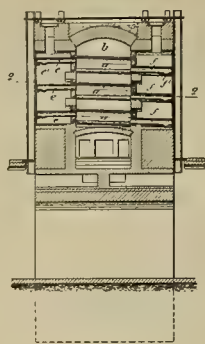


FIG. 1.

GRAPPLE, BUCKET, ETC.—Patent No. 605,489, dated June 14, 1898: J. H. Lancaster, New York. Fig. 1 is a side view of a clam-shell bucket.



FURNACE FOR WORKING ZINC AND LEAD.—Patent No. 605,802, dated June 14, 1898: R. Schneider, Dresden, Saxony. The drawing represents a vertical section of the entire furnace.

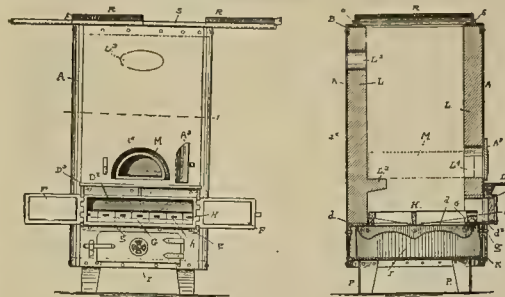


Fig 1

Fig 2

PORTABLE ASSAY FURNACE.—Patent No. 606,149, dated June 21, 1898: J. G. Iis, San Francisco, Cal. This invention has for its object a portable assay furnace that can be taken apart and readily

set up for use and one that combines in its construction the relatively large capacity of the square furnace and the quality or property possessed by the cylindrical furnace of withstanding high temperatures without warping or being twisted out of shape. Fig. 1 represents, in front elevation, a portable furnace for assayers' use constructed in accordance with the invention. Fig. 2 is a longitudinal section.

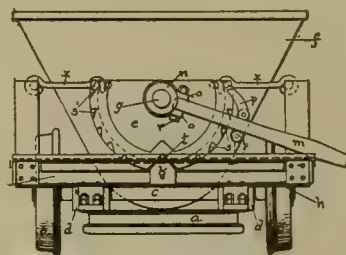
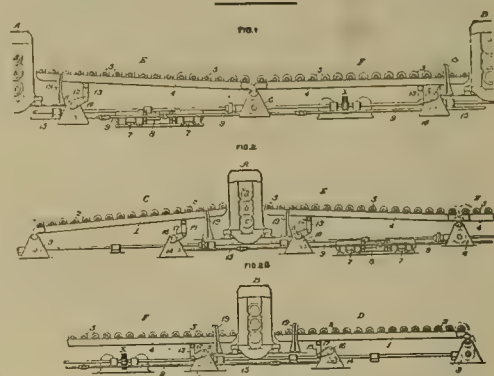
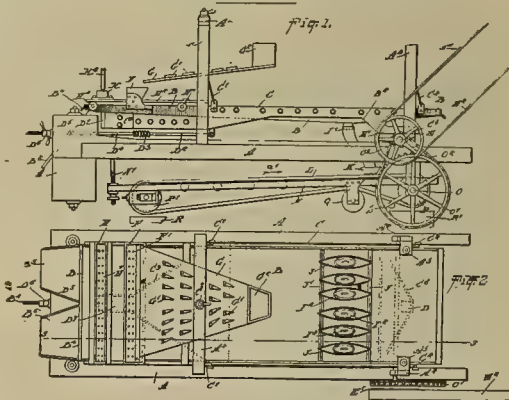


FIG. 1.

SLAG TRUCK.—Patent No. 605,566, dated June 14, 1898: John H. Morcom, Denver, Colo.: Improvement in slag trucks. Fig. 1 represents a longitudinal elevation, partly in section.



ROLLING MILL.—Patent No. 605,669, dated June 14, 1898: S. V. Huber, Youngstown, Ohio: Improvements in construction and operation of feed tables for a train of two or more three-high mills arranged in a common line of feed. Fig. 1 is a view in elevation of two stands of rolls arranged in a common line of feed and having the improved feed mechanism arranged between them. Fig. 2 is a view in elevation, on an enlarged scale, of a portion of the mill shown in Fig. 1 and also of the front of one of the end feed tables. Fig. 2 is a similar view, being a continuation of Fig. 2 and showing the remaining portion of the intermediate feed table and also the end feed table.



COMBINED ORE CONCENTRATOR AND SLIMER.—Patent No. 606,138, dated June 21, 1898: F. W. Harlow, Eureka, Colo. The object of the invention is to provide a new and improved combined ore concentrator and slimer arranged to readily separate the tailings from the ore in a simple manner without causing a heavy running expense. Fig. 1 is a side elevation of the improvement. Fig. 2 is a plan view of the same.

War Tax Stamps on Stock Issues.

On the question of the construction of that part of schedule A of the Act of June 13, 1898, imposing a tax "on each original issue, whether on organization or reorganization, of certificates of stock," it is held by the Commissioner of Internal Revenue that the meaning of the words "original issue," as therein used, is limited and controlled by the words, "whether on organization or reorganization," and that therefore the only certificates of stock on which the tax of 5 cents on each \$100 of face value or fraction thereof as imposed by this Act are those issued on or after July 1, 1898, on the organization or reorganization of a company. It is held, further, that in the case of a corporation having, for instance, an authorized capital of \$1,000,000, of which it has issued only \$500,000 prior to July 1, 1898, and which

on or after that date finds it necessary to make one or more additional issues under the authority possessed by it, each additional issue thus made is an "original issue" within the terms and meaning of the statute under construction, and the certificates of such issue are subject to the stamp tax.

Where any original certificate issued is presented by the holder to the company or corporation for the issuance of another certificate or certificates in lieu thereof, the certificate or certificates thereupon issued to take the place of the original certificate could not, under the language and limitation of the statute above recited, require any stamp as long as there is no sale or agreement to sell or memorandum of sale or transfer of any of those certificates issued in lieu of the original.

In case of sale, where the evidence of transfer is shown only by the books of the company, a tax of 2 cents is required to be paid on each \$100 of face value or fraction thereof, and the stamp representing this is required to be placed upon such books.

Where the change of ownership is by transfer certificate—that is to say, the executed authority to transfer is contained on the back of the stock certificate which is to be transferred—the stamp must be placed on the transfer certificate; that is to say, upon the surrendered certificate containing the transfer.

In cases of agreements to sell, or where the transfer is by delivery of the certificate as signed in blank, there must be executed a memorandum thereof, to which the stamp is required to be affixed.

Under the ruling herein stated, in a case, that may be supposed, of a man who is the owner of a certificate for 100 shares of stock and wishes to sell ten of them to another person, the result being that one certificate would be issued for the ten shares sold, and also an additional certificate for the ninety shares still remaining with him, the certificate for ninety shares issued, with the certificate for ten shares sold, in lieu thereof, does not require any stamp, and the certificate for the ten shares does not require a stamp representing the tax of 5 cents on each \$100 or face value or fraction thereof, as it is not an original issue thereof. The only stamp required with reference to these certificates is a stamp on the transfer of the shares sold, representing the payment of the tax of 2 cents on each \$200 of face value or fraction thereof.

In another case, stated for illustration, where a man holds several certificates for shares of stock aggregating 100 shares, and for his convenience calls upon the company to issue to him, in lieu thereof, one certificate for 100 shares, there being no sale or agreement to sell, or memorandum of sale or delivery or transfer of this new certificate, the statute does not require the affixing of any stamp thereto.

Another "Recorder" Decision.

At San Bernardino, Cal., in the case of J. W. F. Diss, County Recorder, against F. G. Killiam, district recorder of the Virginia Dale mining district, Judge Campbell holds that the Act of March 27, 1897, entitled, "An Act prescribing the manner of locating mining claims upon the public domain of the United States, recording notices of locations, and providing for the deposit of district records with county recorders and prescribing the effect to be given to recordation of notices and location and affidavits," constitutional, and decides in favor of the plaintiff. A local report of the decision says: "While the plaintiff Diss gets judgment, he is in reality loser, for the reason that the action was brought to determine whether the county recorder was personally entitled to the fees for recording notices of mining claims. If the Act had been declared unconstitutional then the recorder would be entitled to the fees, but under the decision of Judge Campbell the notices must all be recorded in the recorder's office, and the county will be entitled to the fees. Under the County Government Act, which goes into effect January 1, the recorder will receive \$1500 per annum and 6 cents per folio for recording. But the presumption all along has been that the recorder would get the fees for recording mining claims the same as at present. This was evidently the intention of the persons who fixed the salary. The Court had at that time decided under an old Act that the fees for recording mining claims was a perquisite of the recorder. The fees for recording mining claims have averaged \$600 per year, and this, with the \$1500 per year, would have made it possible to run the office on the salary prescribed by law. How the next recorder will be able to run the office and hire a deputy on \$1500 per year is a problem which he will have to solve."

SOME TIME AGO an Arizona subscriber wanted a copy of this paper published in 1864. There are frequent requests for copies published in the 70's and 80's and orders for issues in the 90's are of daily occurrence. Chicago and New York papers have agreed upon a scale of prices for back numbers: For papers one month old, 10 cents; three months old, 25 cents; six months old, 50 cents; one year old, \$1; and \$1 is added for each additional year. Thus a copy for any day in April, 1890, would cost the purchaser \$7, and in certain events it would be cheap at that price.

Scorification and Cupellation Without Muffle

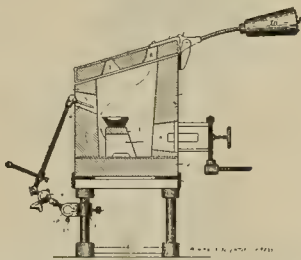
---A New Furnace and Method for Gold and Silver Assays.*

By GEORGE A. KOENIG, PH. D.

This new departure in assaying is the outcome of a long-felt desire to shorten the time required in muffle-assaying, as well as to do both crucible and scorification work in one furnace. The first object in view was the gold assay, which must always be a combination of the crucible and muffle-work. The large lead buttons consume much time in their reduction by scorifying and cupelling. The Hoskins gasoline furnaces have been a great convenience, for years past, in that class of practice, where only one assay was required at a time. But even with them I found myself hampered, since the crucible-furnace takes only one crucible at a time, and my practice implies always duplicate assays. Another difficulty was to get the muffle up to the necessary heat and to maintain it at that heat. Whenever I had pumped myself into perspiration and out of breath, the question presented itself, "Is the muffle necessary to do this work properly?" Hartmann and Plattner and all their blow-piping disciples have shown that very good results are obtainable by playing a direct flame upon the work-lead. Could this be done on the regular muffle-assay scale? I placed a cupel upon a fire-brick, surrounded it with charcoal, and then played upon it with a Bunsen gas blow-pipe. The result was encouraging. With some care a 2.75-inch scorifier charged with 0.1 A. T. of a 100-ounce ore could be melted down and scorified without any apparent loss. I thought then of constructing a furnace with four blow-pipes in a row; but the combination of gas and charcoal seemed unpractical. Instead, I placed an F crucible, bottom up, in a Hoskins crucible-furnace. Upon this support I placed a charged scorifier. The rapidity with which a very refractory charge melted and scorified was simply amazing to me. Then a cupel was put in the place of the scorifier, the lid was moved sideways, and a blow-pipe was adjusted, just blowing air, since the heat was supplied with gasoline. A thirty-gramme lead button disappeared in three and one-half minutes, the lead oxide volatilizing instead of soaking into the bone ash. I was naturally still more amazed than before. All right so far. But did not the silver also go into the chimney? No; to my still greater amazement, the loss in silver was not much above that of the well-known cupel-draught in the muffle. The preliminary experiments seemed to prove the muffle unnecessary; they were sufficiently encouraging to warrant further expenditure of time and thought. In order to come up to wants, a furnace must permit the making of a number of assays at a time, if necessary, so as to utilize to the utmost the time and working capacity of the assayer. It must, furthermore, permit the simultaneous execution of crucible-fusion, scorifying and cupelling. It must allow roasting, and it must work with either gasoline or gas.

The Furnace.—The furnace designed to satisfy these conditions, according to the experience gained, has a rectangular ground-plan 10 by 22 inches in outside measure, and 5 by 17.5 inches inside measure at the bottom. These dimensions accommodate in one operation six F Battersea crucibles, or six 2.75-inch scorifiers, or six cupels. Fig. 1 is a vertical

FIG. 1.



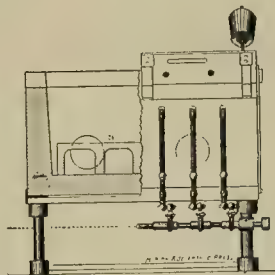
Vertical Cross-Section of Furnace (scorifying).

cross-section, showing the furnace in the act of scorifying. At 1—1 we see the front and rear walls, tapering from 2.5 inches at the bottom to 2 inches at the top. The rear wall is 10 inches high outside; the front wall only 7.25 inches. Thus the lid (3) has a considerable slant backwards, with a vent-slot at (6). The reason for this slant is this. The flame entering through the rear wall at (4) follows the line of the arrows to the vent. If the lid lay in horizontal position the current of the gases would rebound against it and cause disturbing whirls, whereas now the gases only rebound against the front wall and then expand naturally, yielding their heat more fully. There is neither tendency in the gases to escape through the observation hole at (7) nor through the blast hole at (8). Much heat is wasted through unnecessary contraction of the flames. When the flow of gasoline is properly regulated there is neither pressure nor suction at the blast-hole; so that neither scorifier nor cupel, though standing before the opening, is needlessly ex-

posed to chill. In roasting at a low red heat there is a natural draught from the blast-hole to the vent, which would not be equally advantageous with a horizontal lid. For reasons of easy manipulation, the top edge of the front wall should not be much above the scorifiers and cupels, and this constitutes a further reason for raising the back wall to avoid a crowding of the flame. It is seen that the lids are hinged at (9), and that the hinge-plate is supported upon side brackets, quite independent of the back wall of the furnace. An adjustable counterweight (10) is mounted on each lid in such a manner that a very slight force will either lift the lid or depress it or keep it opened at any desired angle. The four walls form in the present stage of development one piece of non-conducting refractory casing; but a new pattern is contemplated in which the walls will each form a separate, exchangeable piece, they being simply held together by means of two iron bands. An entire sheet-iron outer casing has been tried, but not found of any special advantage. The casing rests upon a 2-inch bottom tile of similar composition as the casing. The bottom plate rests upon a cast-iron frame (11), which is supported by four pipe legs (12) 7 inches high. The feet of the legs are secured to a double forked brace (13), thus making a simple and rigid understructure. Upon the front legs slide two arms (14) with set screws (15). The arms carry a main blast-pipe (16), which can be secured in any desirable position by set screws (17). From this main six branches (18) lead to the blast nozzles. Each branch is furnished with a double swivel-joint stop-cock (19) and a cast-iron handle (20). For the suggestion and design of this iron understructure I am indebted to my friend and colleague, Professor Kidwell. My first furnaces had shorter legs, cast to the bottom frame. The blast main was in front of the bottom tile, bringing the stop-cocks midway up the front wall. With such an arrangement the joints came under the influence of radiating heat, expanded and became loose, unless they were screwed up so tightly that in the cold state they would not move freely.

Each branch is entirely independent of the others, and may be thrown fore and aft without moving its neighbors. The swivel joints allow any horizontal or vertical adjustment of the nozzle with the greatest ease by means of the handle. Since a change is often desirable in the angle at which the air current

FIG. 2.

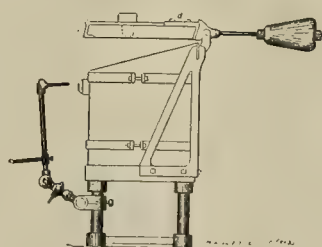


Vertical Half-Section and Front Half-Elevation.

strikes the surface of the metal in scorifying or cupelling, such change of angle can be effected by lowering or raising the arm bracket (14) along the leg. In the figure this angle is large; the knee at (19) is nearly a right angle. By lowering the arm the knee may be changed to a straight line; the air jet will then be nearly horizontal, a position which is required in roasting, to avoid blowing away ore particles. At (21) stands the bench or bridge, which supports scorifiers, roasting dishes or cupels. It is 8 inches long, 2 inches wide at top, 3 inches at bottom and 3.5 inches high. Any sand crucible, ground to the proper height and placed upside down, could be used as a support in an emergency. In its present form the bench is supported by three legs. The first ones had only two legs. These latter sagged when, after an upset or spill, the scraper was rubbed back and forth over them. The three-legged type wears better.

It has another advantage in affording a fire-brick mass without interfering with the passing of the fire gases. The fire-brick mass acts like a Siemens heat storer. When the furnace is

FIG. 3.



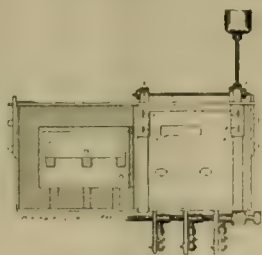
End-Elevation.

used for crucible-fusions this bench is taken out, and when, after the crucible-fusions, cupelling or scorifying is to be done, the bench is simply dropped

*Atlantic City meeting of the American Institute of Mining Engineers, February, 1898.

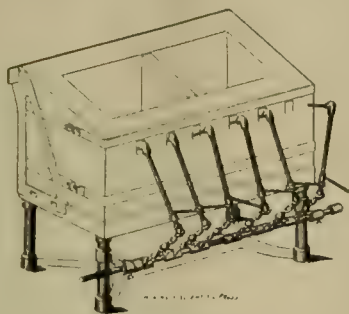
into place by means of suitable tongs. The clear length of the furnace at the bottom being 18 inches, there is ample room for two benches and the diaphragm (22), Figs. 4 and 5. This diaphragm is a fire-

FIG. 4.



Half Ground-Plan and Half Top-View.

FIG. 5.



Furnace in Isometric Projection—Lids Off.

tile, 0.75-inch thick, just fitting loosely the cross-section of the furnace. I consider it a very important part of the furnace, because it makes either two independent furnaces or one single large furnace. In a very busy office the diaphragm will be discarded, most properly; the whole furnace being used for a time as a roaster, then as a smelter, and lastly as a cupeller. It is for one, two or three assays at a time, that it comes in as an economizer both in time and fuel. In Fig. 4 the bench has not been placed in proper position; it should be reversed, so as to bring the edge, *a b*, towards the front or blast side of the furnace. The figures are readily understood. In Fig. 2 one-half of the furnace is seen as front elevation, showing the position of blast pipes, the tuyeres and the lid. The second half is the vertical section through the bench, without the lid, and with the hole for the burner behind the bench. The center of the latter is located so deep that the flame will not strike against the top of the bench, but only against its central leg, and will then pass sideways against the front wall and up in the direction of the arrows. In Fig. 3 is given the end elevation of the furnace, showing the bracket which supports the hinge plate, and the plugs which close the tuyeres (when the blast is not required), as well as the two observation holes in the lid. The position of the latter indicates its balanced condition. Notice here also the two bands of stovepipe iron which brace the casing. Since the drawing was made, I have found that one single band, only 1-inch wide, is quite sufficient to hold the four sides of the furnace together, because, in experimenting with different refractory mixtures, I have hit upon the right composition, which will give a durable, very refractory, non-friable and non-cracking tile. The two bands are necessary to hold together the fractured or cracked pieces, which are the inevitable outcome of incorrectly composed and over-baked refractory material. In the top view, Fig. 4, attention is specially to be drawn to the manner in which the fire-tile forming the lid is held. The tile is 1.5 inches thick and covers exactly one-half the furnace, including one-half of the diaphragm when the latter is in use. The tile weighs about ten pounds. It is held by the back-piece, *c*, which is cast in one with the eyes *l*, *l'* and the arms *d*, *d'*. The arms are cast hollow and have slots *e e*, *e e*. The pieces *f*, *f* are hooked at one end (see *f*, Fig. 3), the hook gripping under the lower edge of the tile in a recess specially molded in the tile. The other end of *f* slides into the hollow arm *d*, having threaded holes which correspond with the slots *e e*. In this way the tile can be quickly inserted and fastened with the set screws, independently of any slight variations in the size of the tile, avoiding also, as much as possible, heat-radiating iron surfaces. This scheme only works well when the tile is made of the proper material. Such fire tiles as are found usually in the lining of portable furnaces will inevitably crack. I have had a furnace in use since last May, and the lids show no sign yet of any crack. The observation holes (7, 7) are so located that the entire interior of one compartment is visible through them. The perforation through the counterweight (10) is made eccentric. After the lid is counterweighted by means of sliding the weight the nut upon the end of the rod is brought up to the weight. Then, by rotating the weight, the adjustment of the center of gravity is easily performed, a set screw holding the weight against the rod. Fig. 5 shows the furnace in isometric projection with lids

left off. Fig. 6 shows the scorifier tongs. A special tool was found necessary, or, rather, convenient, although any goose-neck tongs of sufficient length can

FIG. 6.



Scorifier-Tongs.

be used. In these special tongs one prong terminates in a circular segment *s*, whose radius is equal to that of the scorifier. Above this segmental ring a thin rod *r* is welded to the prong. The length of this rod slightly exceeds the top diameter of the scorifier. The other prong terminates in a flat round piece perforated by a hole *p*, into which the end of the rod *r* enters, when the grip upon the tongs closes. The rod *r* coming flat down on the edge of the scorifier prevents a tilting of the latter before the ring and the flat have had time to grip. The operator sits in front of the furnace and looks through the tuyere, behind which the scorifier stands. Seeing the tongs, he can adjust the grip. Removing scorifiers from a muffle is simpler, and yet an overtilting is not uncommon. I have not had many mischances, yet I am not quite satisfied, and hope to get some time a more perfect tool. Fig. 7

FIG. 7.



Cupel-Tongs.

shows similar tongs, without cross-bar, for the cupels. There is no difficulty in connection with the lifting or setting of the cupels.

Fig. 1 shows at (4) how the Hoskins disk burner is fitted to any furnace. Both burners are set on the same feed pipe. In working with the gasoline furnaces of Hoskins, every one has the experience that much, if not all, depends upon keeping a strong, as well as a steady, pressure in the supply tank. The hand pump is a nuisance. It more than counteracts the relief which the assayer gets from the absence of stoking a coal or coke fire. A hydrostatic pump avoids the whole trouble. I have found the Cleveland Brass Co.'s pump very satisfactory. It is self-acting and, without question, the most economical source of pressure, wherever a head of water is at the assayer's disposal.

(To be Continued.)

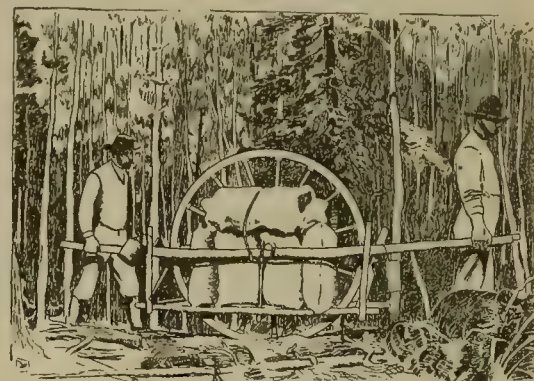
The Stickeen Route a Failure.

A. P. Dennis, member of the engineer corps of the McKenzie-Mann expedition to Telegraph creek and Lake Teslin, has returned to civilization after a vain effort to reach the Yukon country by the all-Canadian route. He says that the trail from Glenora to Teslin, instead of being an open way over a prairie country, as advertised by the Canadian government and its railroad, is nothing but an Indian trail over mountains, through swamps and heavy timber. Travel is practically impossible over the so-called route to the gold fields. Mr. Dennis describes in detail the appalling condition of the 3000 miners, many of whom have lost every cent they had in the world in trying to get to the Klondike by the all-Canadian route. Hundreds of outfits have been lost and many of the stranded miners are approaching a destitute condition. The wail from the Stickeen route began last spring, just before the river opened, and after several hundred miners in small parties and large companies had made the start from Wrangel, hoping to reach Telegraph creek over the ice. Disappointment and hardship was all they encountered. Having been a member of the McKenzie-Mann engineering corps, and being qualified in a technical way to judge of the country and of the feasibility of the route, Mr. Dennis' narrative goes far to show the failure of the all-Canadian route to the Klondike, and that by misrepresentations scattered broadcast through the country thousands of inoffensive men have been lured to undertake a journey in which they had practically no chance to succeed.

"While camped along the trail in the valley of the Little Tahtlan about thirty-five miles from Glenora," says Prof. Dennis, "we were cut off from all communication with the outside world for a period of nearly six weeks. During that time all progress along the trail had ceased on account of the break-up of the river and the condition of the snow on the first summit. By May 15th occasional small outfits in parties of two or three began to dribble through. These men were taking in only a few hundred pounds distributed upon their own backs and upon their dogs. With the drying out of the moss the stream of gold seekers swelled and one could not but marvel at the ingenuity displayed by the Klondikers in their attempts to transport baggage through the wilderness. The roughness and narrowness of the trail demanded the use of one-wheeled vehicles. As a

consequence, unicycles in all shapes and forms were fashioned rudely out of the poor material at hand. Men were tooling various wheelbarrows, wrought in the woods with only an ax for work.

"With a stout man pushing and a well-trained dog pulling, 300 pounds could be taken over the first fifty miles of the trail. No uncommon sight was a wheel 5 or 6 feet in diameter with a load placed in a framework below and to each side of the axle, bringing the center of gravity very low. Such a contrivance required a man in front and one behind, and could carry as high as 500 pounds. Its general appearance is shown in the accompanying illustration.) In some cases a horse might be seen in



A STICKEEN UNICYCLE.

place of a man in front. Here it would require several men to keep the 'go devil' in an upright position, or to hold it back on a heavy down grade. The sharpest grades are the descent to the valleys of the Little and Big Tahtlan rivers respectively. In the case of the latter outfits were lowered by block and tackle down a declivity of 150 feet. By June 1st pack trains were attempting the long pull over, and were finding the trail fairly serviceable for fifty-five miles, or as far as the Shesley river. Here the mountain trail substantially ends and the pathway winds through Willow and Muskeg swamps, out of which mosquitoes rise in sanguinary hordes and plague the wayfarer beyond endurance. Any modern treatise on contemporary martyrology, in order to be comprehensive, should catalogue the experience of men stalled along these stretches of the all-Canadian route to the gold fields.

"Here it begins to look as if only a man in a fever would be foolish enough to dream that he was on a practicable route to the Yukon. Men begin to ask themselves how it was that they got side-tracked in this wilderness and thus lost a whole season in a vain effort to get to the gold mines. Some men will tell you that they wished to thoroughly prospect the Hootalinqua route with their eyes open. Others will tell you that they could not consider Chilkoot or White pass without a shudder; but a majority of the 2000 or 3000 will tell you that they were booked through to Wrangel or Glenora with the impression that a wagon road had been constructed and without the faintest conception of the difficulties that awaited them on leaving the Stickeen river.

"A large proportion, of course, of the stranded miners are from England, Australia and Eastern Canada, but many of the unfortunates are Americans who have trusted unwisely to the reported advantages of this line of ingress to the Yukon."

An Englishman has invented a memorandum clock which will doubtless prove very valuable to the busy business man, who is eternally forgetting his appointments, etc. A mechanism is provided whereby the clock can be "loaded," as it were, with memorandum, which will only come into sight when the precise moment at which they are timed to appear arrives. Thus, by glancing at the clock, the busy man can tell at a glance what is to be done next.

ONE of the most remarkable engineering feats in recent years was the moving of a pier of the new iron bridge of the Northern Pacific at Bismarck, N. D. It took but a minute to move the structure, weighing 9,000,000 pounds, 4 feet, but a year was spent in preparation. An artificial earth slide was used, which carried the huge granite pile on rollers to its new position.

THE Anaconda Company, as usual, was the greatest individual producer of copper during 1897, its output being 131,471,127 pounds. The Calumet & Hecla was second, with 88,378,985 pounds; the Boston & Montana third, with 60,000,000 pounds; the United Verde fourth, with 31,355,025 pounds, and the Copper Queen of Arizona fifth, with 23,999,873 pounds.

It is thought that the three triple expansion crank and fly-wheel pumping engines to be built by a Cincinnati company for the water works of that city, will be the largest machines ever built for any purpose. They will have a capacity for pumping 30,000,000 gallons per day each. Each engine will weigh 1414 tons.

Some Law Points for Inventors.

Fraud is never to be presumed, but must be strictly proven.

The decisions of the courts recognize a radical difference between invention and skill.

The wife is not a competent witness for her husband in an interference case in the Patent Office.

The employer is not entitled to any knowledge of the independent invention of his employe.

A patentee is entitled to all the benefits of his improvement, though he did not foresee some of them.

An invention does not pass absolutely from the domain of experiment until it has actually been used in public.

As between the proprietor of an establishment and his general workmen, the presumption of an invention is with the workmen.

The law looks with indulgence upon delays which arise from the circumstances of the party and demands only reasonable diligence.

The mere fact that a device was patented in a foreign country before it was invented by the applicant is no bar to the grant of a patent to him.

An invention being assets, just the same as the patent itself, it passes at the inventor's death into the hands of his personal representative.

The name of a "patent" cannot be registered as a trade mark after the expiration of the patent, as this would be a virtual extension of the patent.

The labors of a mechanic or model-maker can raise him to the rank of an inventor only in rare cases as against him who had the original conception.

That the change from an old device is an obvious one, requiring only ordinary skill, is no objection to an invention if important advantages result from it.

Although an interference is not the same in nature as an action for infringement, the character of proof required to show the fact of invention is the same.

In the event of a person renewing a forfeited application, he will be subject to contest with any new and successful party whose application has been filed in the interval.

Where there is doubt on the testimony as to which of two contending parties invented a combination, the doubt will be resolved in favor of the first applicant.

It is a well established principle that an inventor has the right to employ the mechanical skill of others to carry out his ideas without forfeiting his right to the invention.

To show that a patent is void because others made the invention before the patentee, it must appear that they had completed it and put it into practical form ready for use.

Delay, no matter how long continued, cannot impair an inventor's right to a patent, unless, by reason of it, another party becomes the first to give the invention to the world.

One who makes a machine goes one step further as a mechanic and manufacturer than he who has made a model; but the law rewards the first inventor rather than the first maker.

Applicants must furnish a description that will tell how the invention is practiced as distinguished from its general theory, and must accompany it with a clear and tangible form of claim.

There is nothing to prevent an inventor from filing an unlimited number of applications for the same subject matter if some benefit, real or imaginary, would seem to justify the additional expense.

Where the difference in degree of diligence in favor of the inventor is the result of superior health and superior means, this will not prevail against his competitor, who is diligent to the extent of his health and means.

The true date of an invention is at the point where the work of the inventor is succeeded by that of the mechanic. Up to that point he was in-

venting, but had not invented, and he must have invented before the law will come to his protection.

A trade mark interference, unlike those for patented matters, has nothing to do with the question as to who was the first to conceive or suggest the mark, but who was the first to put it into actual practice.

Where the inventor, after making a model, took no further steps for five years, although able to apply for a patent, and another in the meantime obtained a patent, the first party was held to have been wanting in diligence.

He who first conceives and gives expression to the idea of an invention in such clear and intelligible manner that a person skilled in the business could construct the thing, is entitled to a patent, provided he use reasonable diligence in perfecting it.

The fact that a party made but a small quantity of an article may be fairly accounted for by showing that there was no demand for it. The discovery by another party of a new use for the article does not affect the prior right of the previous inventor.

It is a well settled fact that if two inventors are on equal terms in respect to the invention, such as partners in the business, and both contribute to the parts of the organization regarded as a whole, the patent would be invalid if issued to one of them.

The manner and the purpose of the payment of the fee required for patents is well understood. It is not in the nature of a tax levied upon inventors, but it is for the purpose of defraying expenses of the examination, and will not be returned on any account.

If an inventor has fully worked out the idea and demonstrated it in some fixed form, and shows by his conduct that he intends to pursue it to a patent and practical use, the law favors his having ample time to improve, adapt, perfect and test his invention before obliging him to come to the Patent Office. For two years he may push its introduction before the public, and manufacture, sell and use it without fear of forfeiture or abandonment, but probably not one inventor in a hundred puts his invention into actual use before applying for a patent.

The fact that property involved is covered by letters patent cannot be urged as a justification of a contract which enhances prices and restrains trade. Patents confer a monopoly as respects property covered by them, but they confer no rights upon the owners of several distinct patents to combine for the purpose of restraining competition and trade. Patent property does not differ in this respect from any other. Such combinations are conspiracies against the public interests and abuses of patent privileges. The object in granting a patent is to promote the public benefit, as well as to reward the inventor.

Long-Distance Steaming of Warships.

The recent performances of the United States battleship Oregon and the gunboat Marietta in steaming from high up along the North American Pacific coast around Cape Horn to the West Indies have very properly challenged the admiration of the whole world. Until quite recently much more had been heard of the failings of warships than of their good points, and one was almost tempted to believe that the average modern naval vessel was so delicately constructed and so complex a piece of machinery as to be scarcely fitted to withstand in due measure the rough usages of war or the knocking about of a protracted sea voyage under the pressure of high speed and with all kinds of weather. When, several years ago, the United States cruiser Columbia crossed over from Southampton to Sandy Hook, at the entrance to New York harbor, in a little less than seven days, racing successfully against one of the crack Atlantic liners, her performance stood unparalleled in naval history. It bordered, in fact, on what had long been considered impossible. What the Ore-

gon and the Marietta have done, however, is a worthy counterpart of that earlier magnificent performance, and admirably demonstrates what may be accomplished by good engineering, even when subjected to the exacting conditions of naval restrictions.

The Wealthiest Nation.

The United States is the wealthiest nation in the world. This is a fact that is often repeated, but because of the natural disposition of the American people to belittle themselves, which has arisen by a kind of reaction from the old disposition to brag and bluster, it seems to be universally forgotten.

The great English statistician, Mulhall, has compiled tables showing the wealth of the nations of the world in 1895 as follows (pounds being converted into dollars at the rate of \$5 per pound):

| | |
|--------------------|------------------|
| United States..... | \$81,750,000,000 |
| Great Britain..... | 59,030,000,000 |
| France..... | 47,950,000,000 |
| Germany..... | 40,360,000,000 |
| Russia..... | 32,125,000,000 |
| Austria..... | 22,560,000,000 |
| Italy..... | 15,800,000,000 |
| Spain..... | 11,900,000,000 |

These figures include everything, such as farms, railways, houses and merchandise.

When annual earnings of the people are taken into consideration—and this is the real security behind a public debt—the lead of the United States is even greater. The earnings of our nation are not far from one-half as great as those of all Europe combined, the figures being \$37,710,000,000 for all Europe (including Asiatic Russia) and \$15,580,000,000 for the United States. The comparative figures for the principal nations are as follows:

| | |
|--------------------|------------------|
| United States..... | \$15,580,000,000 |
| Great Britain..... | 7,115,000,000 |
| Germany..... | 6,402,000,000 |
| France..... | 5,995,000,000 |
| Russia..... | 5,020,000,000 |
| Austria..... | 3,535,000,000 |
| Italy..... | 2,180,000,000 |
| Spain..... | 1,365,000,000 |

Hydraulic Power on Warships.

It has generally been allowed even by those who are most strongly in favor of its adoption that, owing to the conditions which govern the operation of most auxiliaries on board warships, economy must be sacrificed when a hydraulic system is adopted. Hydraulic motors for any of the varied purposes requiring power on warships must be designed large enough to meet the maximum requirements of the service; and if these motors are of the piston or plunger type, the regular form at present in use, the maximum amount of power will always be used, although the minimum work only is required.

If, instead of using a motor having cylinders with moving pistons or rams, utilizing the pressure to obtain power, and measuring out a given quantity of water for each movement, irrespective of the work to be done, the pressure water was applied to a properly designed wheel of the tangential type, an efficiency averaging about 70 per cent could be obtained with a great variation in the load, and thus one source of waste with this system would be avoided.

The direct ram would be still retained for certain purposes where precision of movement is of the first importance, such as in steering gears and gun-training movements.

The mania for direct-acting steam pumps to generate power for such an installation is the most fatal obstacle to be encountered in any effort to reach reasonable economy in a hydraulic system of power transmission on board our warships. In some of the battleships now building it is proposed to install, for the generation of hydraulic power, say six duplex hydraulic pumps of 400 gallons capacity each per minute, at 600 pounds pressure per square inch. This requires twelve steam cylinders, 22 inches in diameter and say 24 inches stroke, being with pump friction about 950 H. P. This will require, with the type of pump proposed, not less than 95,000 pounds of steam per hour, and this certainly would give on the main engines 5000 H. P. Half the

total boiler power of the ship with forced draught would be absorbed by such a pump installation, if working at its full capacity. This is the main reason why hydraulic power is condemned. But there is no reason which we can discover why a hydraulic system of power distribution for all purposes requiring power should not be more economical than steam applied direct, provided ordinary steam pumps are avoided in the generating department and something else than a water meter is used as a motor.—George W. Dickie in Cassier's Magazine for July.

The War and Twine.

Manila hemp, the most valuable of all fibers for cordage purposes, is a production of the Philippine islands, where it is grown in large quantities by small farmers. The plant, called abaca by the islanders, throws up clusters of sheathing leaf stalks from an underground stem, and these grow to a height of 20 to 30 feet, spreading out into a crown of large, undivided leaves, not unlike in characteristics the common plantain of this country. The plant is related to the banana. The plant is cultivated for its fiber alone; it requires very little attention, and at three years of age it flowers and is ready to cut. The stock is then cut down and the sheathing stalks torn asunder and reduced to small strips. These strips in their succulent condition are drawn between a sharp knife-edged instrument and a hard wooden block, to which it is fixed, until all the soft parts surrounding the fiber are removed, and the fiber so cleansed has only to be hung up in the air to dry, when, without further treatment, it is ready for use.

Each stalk yields on an average a little over one pound of fiber, and two natives cutting down plants and separating fiber will prepare not less than twenty-five pounds per day. Though the plant has been introduced into many tropical lands, the cheapness of labor in its native regions has made its cultivation elsewhere unprofitable, and the whole supply comes from Manila and Cuba. One of the chief substitutes for Manila is sisal, a fiber grown in Yucatan in large quantities. It is inferior to the Manila hemp, being more brittle and not as long or as strong in the fiber. The plants from which it is made mature in four or five years, and produce fiber-bearing leaves for forty or fifty years. Hemp has been tried for use on binders, but is not a success, being incapable of resisting the strain, and much more subject to the attacks of mice and insects.

He Failed to Make Gold.

E. C. Brice, who claimed to be able to make gold, has gone, and the \$20,000 building and plant he erected at Thirty-ninth street and Lowe avenue stand idle. He is reported to be suffering from nervous prostration. The plant is said to have been a commercial failure, although P. G. Lamoreaux, who was appointed temporary manager, says the theory is all right. He asserts that the books show where every dollar received by Brice was expended, even to \$1800 he received for stock two weeks ago. It was the dream of his life to make the plant a success. Pressed on all sides by stockholders when the plant was not turning out gold according to expectations, he held them off by his iron will, at all times claiming to be on the verge of success until his money was exhausted. A little over a week ago he acknowledged his system was a failure and asked Mr. Lamoreaux to take hold. Mr. Brice flung himself on the couch in his office and wept like a child.

The shareholders numbered about 300. Many of them were poor people who suffered privations to buy stock. Shares which sold for \$10, their face value, in October rapidly increased in value. By November they were quoted at \$50 and \$75. During December some were sold for \$200 and \$250. Shareholders built air castles and looked over their back yard fences at the stone mansions they would buy. Now they are having a hard time to pay rent.—Chicago Record.

Mining Summary.

CALIFORNIA.

Amador.

Republican: The Anita shaft at Jackson is down 750 feet. For the past two months hard rock has been encountered, which reduced the result of a day's work to 1½ feet; sinking will continue until 1000 feet is attained.—At the Amelia mine water still interferes with work, but every twenty-four hours marks a few feet nearer the desired depth.—The Zella mine will close down for repairs and sinking.—The Onelda, Kennedy and Argonaut are moving along as usual.—Work is progressing at the Tennessee, Douglass and Mason & Griesbach mines in Volcano district. The Reward mine, which has been closed for five weeks, is again under operation.

Butte.

The Oroville Register says that a sulphur property has been discovered near Pentz.—The Last Chance M. Co. have started work on their claim near Elstersee.

Calaveras.

The Ranch mine near Milton has closed down.

It is locally reported that the Sticks mine at Angels will cease operations about Sept. 1st; repairs will cost about \$50,000, including the rebuilding of six miles of the Union flume.

The Ohio mine at Douglas Flat is the only property in the neighborhood having water for operating. Their last cleanup is reported to be satisfactory to the company.

Citizen: It is expected that the California Exploration Co. will unwater the Thorpe mine near San Andreas and resume operations at an early day.—The Demarest mine started up last week.

Echo: Work in the Great Western mine near Angels is progressing. Sinking will be commenced; the mill is not running.—The Woodside mine in Bear Mountain is being worked steadily, but work on the new mill has been discontinued.

El Dorado.

Georgetown Gazette: The Santa Rosa gravel mine, near Volcanoville, has been bonded to W. Simms of Sacramento, and the first payment made.—A tunnel will be run, new machinery added, and operations pushed.—After a successful test with three tanks at the cyanide plant, Taylor mine, the management have decided to erect seventeen additional tanks.

Nugget: At the Griffith Consolidated near Diamond Springs the vertical shaft is down 480 feet and crosscutting is in progress at the 450-foot level. A tunnel is in 1000 feet that is intended to tap the main shaft, and 1600 feet yet remain to be driven before a junction is effected. Levels have been opened at the 138, 250 and 350-foot stations. A new shaft is being sunk 1300 feet south of the main shaft and is down 130 feet; grading is in progress for a 20-stamp mill. An 80 H. P. steam hoist has been erected at the main shaft. A new shaft is also being sunk 800 feet north of the main shaft. A 3-foot ledge of ore has been struck in this shaft, going from \$60 to \$80 per ton. The company now has about 4000 tons of high grade ore on the dump. The Griffith Consolidated embraces nine claims. Sixty men are employed, and the force will be increased.—At the Larkin mine two shafts have been sunk, one 250 feet in depth and one 300 feet. A shoot of good ore 16 feet in width has been cut at the 300-foot level. Good ore is being extracted from the 100 and 200 levels. A 5-stamp mill has been running since last October. Within the next sixty days five and probably ten more stamps will be added to the milling plant. C. H. Dutton is Supt.—At the Crown Point mine the shaft is down 192 feet. The company will sink 300 feet before crosscutting. A tunnel is being driven to connect with the shaft at a depth of 210 feet. The tunnel is 420 feet. Two feet of ore has been encountered in the tunnel. Thirty men are employed. Development work is also being prosecuted on two other claims belonging to this company.—At the Grand Victory mine thirty stamps are crushing sixty-five tons of ore per day. The mill is operated by an 8-foot impulse wheel, under a 7-foot head. The mill and mine are lighted by electricity. The shaft is down 265 feet from the adit level, which is 150 feet from the surface. The ore runs from \$2 to \$10. The ore body on No. 1 level measures 75 feet in height, 120 feet in length and 130 feet average width. Four veins have been encountered which contain 60 per cent of ore.

Kern.

The Wedge and the Butte mines at Johannesburg are shipping ore to Red Dog mill.—T. D. Vandevort, on the Golden Rule mine, is taking out paying rock.—The Red Dog mill completed a 550-ton run for the Yellow Aster Co. The mill averaged about twenty-five tons per day.—Work has commenced anew on the Pinmore mine; several carloads of ore will be shipped to Barstow for a test run, and if the results are satisfactory, work will be continued and a 10-stamp mill erected at the mine.

Mariposa.

Supt. Kennedy of the Campodonico mine, Hornitos, has resumed work with a full force.

Nevada.

The shaft of the Texas mine, near Nevada City, is down 250 feet, at which depth drifts are being run. Three eight-hour shifts are working.—Work has begun on the Lindsay mine, near Maybent, which is under bond to a St. Louis company.—The Eagle Bird is running day and night, both mine and mill. Work has been temporarily suspended at the Red Dog drift mine near Yuba Bet.

Herold: J. S. Goodwin contemplates fitting up his hydraulic mine at Red Dog.

Transcript: Tributers are finding some good ore on the 1000-foot level of the Pittsburg mine near Nevada City.—A test run on ore from the Mineral mine at Moor's Flat

gave results that warrant continuance of development work.

Placer.

Kulver & Hall have begun operations near Dutch Flat. They will run a bedrock tunnel 400 feet.

Plumas.

The legal entanglements in which the Bullion mine at Mohawk was involved have been adjusted. Under the superintendence of H. H. Bence work in the mine has been resumed.

Riverside.

At the placer camp in the Pintos the dry washers who are on the pay streak are making good runs. One nugget of \$38 and another of \$76 were found.

San Diego.

Good ore in an 18-foot ledge has been found in the Ranchita mine at Banner. The cyanide plant at the Cargo Muchacho mine, near Ogilby, is handling 100 tons of tailings per day.

Shasta.

The Redding Searchlight says that a cinnabar property is being developed near Millville in which a ledge several feet wide has been traced 600 feet.

Sierra.

C. B. Wright advertises the sale at public auction of the Thistle Shaft mine, near Gibsons, under authority of a trust deed, July 14th, at Quincy.

Siskiyou.

News: Mining at Bentz Bar is being done by a Chinese company.—The Quinn & McConnell mine near Yreka is operated night and day by twenty-five men with good results.—Work at Big Bar is progressing under the superintendence of E. Mathewson.—The Beasy Bar mine is employing twenty-five men with prospect of a good season's run.—The Pacific mine began hoisting gravel. They have good prospects.—Spengler Bros. are working at the mouth of Humbug. They will make a good season if the water holds out.—The Shurtliff mill on the north fork of Humbug is running on good ore.

Journal: J. G. Waugh is working a placer claim on Beacon creek in the Siskiyou foothills that gives good yield, but as he has no water he is storing the dirt for winter rains.

F. Le May is taking out good quartz in the Cape mine on Greenhorn. The ore carries gold and copper.—The Lone Jack mine near Hornbrook, because of scarcity of water, is putting in a steam plant to run the 20-stamp mill.—The Hazel G. M. Co. is taking out good ore.—In the Sound Money mine the tunnel has reached 480 feet and considerable ore is ready for crushing.—On the California Queen fifty men are employed.

Journal: The Williams & Wademan mine, on Greenhorn, had a few tons of ore crushed which paid well. The ledge prospects very evenly throughout, but is narrow.—The river miners on the Klamath, in Honolulu district, are all hoisting pay gravel. The Pacific mine, at mouth of Humbug, is worked day and night with large force. Other claims on the river are also being worked in similar manner all the way from Shasta river to Gottle.—Jillson & Co. have added five stamps to their quartz mill near Henley, and will soon be ready to run by steam, as water is getting short for power. They have realized so far this season from 154 tons crushed about \$15,000.—The Distlehorst & Barton dredger in Klamath river, near Oak Bar, continues to raise good pay gravel, and will take out considerable all summer.—Barton & Co. are doing well in their river claim near Oak Bar, which is fitted up for successful working.

Trinity.

Journal: The dredger at Lowdens will be running in a short time. The machinery is all in place. They have had steam up several times testing the pipes and different parts of machinery. It is run by three engines and a 150 H. P. boiler; a dynamo will be used to furnish light.—The output of the Altona quick-silver mine at Cinnabar for June was 500 flasks.

Tuolumne.

The Arbona mine, at Tutletown, contemplates sinking a 500-foot shaft.—At the Gerrymander near Sonora sinking and drifting continue. The shaft has reached 110 feet and will be driven to 500 feet depth. At another point in the mine a vein 12 feet wide has been uncovered.

Littlefield & Fisher on the Densmore, near Parrott's Ferry, are developing the property with ten miners. The shaft shows a 4-foot vein of quartz. The ore is being hauled to Sonora and run through the reduction works. All of the rock so far encountered is of very high grade, and despite the fact that it is quite rebellious and the expenses of extraction, hauling and reduction are high, yields a handsome surplus. A mill will in all probability be shortly put up at the mine.—At the Agnes mine near Soulsville operations were resumed this week, W. H. Storms, Supt.

Independent: The tunnel at La Estrella mine near Sonora is in 315 feet.—At the Maine mine the vein matter is 2 feet 8 inches in width.—The Gerrymander M. Co. and Sherman & Wetmore have brought action in the Superior Court against the Golden Gate M. Co. for \$150,000 damages and costs of suit.

M. Cleveland will commence work on the mine bonded from W. Grundy at Big Oak Flat.—The Longfellow mill remains closed. Three men are working at the mine.

Magnet: The Seminole mine near Carters has been unwatered and Supt. Kirby will put a force to work.—The Lady Washington Co. is shipping 300 tons of ore.—W. D. Bannister & Co. have purchased the mining claim on Gold hill known as the White Lead gravel mine. They will put up pumping machinery and sink the shaft, now down 120 feet, to bedrock. There has never been any deep mining done to demonstrate the extent of this gravel deposit, the early miners being content to abandon the workings as soon as water was

encountered.—C. W. Ayers, having secured a working bond on 255 acres of gravel lands in the vicinity of Montezuma, has put ten men to work.

Union-Democrat: At the Golden Gate the lower levels have been temporarily abandoned and all work is concentrated above the 500. Eighty-five men are on the pay roll.

Yuba.

H. Visscher is in charge of operations at the Narrows, near Smartsville, by the U. S. Debris Commission, to determine upon a site for the proposed debris restraining dam. From thirty to forty men have been employed there several months, sinking and trenching for bedrock. The explorations show there are in the 4000-foot gorge, known as the Narrows, at least three good sites. The funds on hand are nearly exhausted.

NEVADA.

Placer miners in Van Duser district, Elko county, are said to be making \$7 per day with a small head of water.

The Gold Crown mine at Aurum has shipped a carload of ore which averaged 95 ounces silver per ton.

The Magnolia mine at De Lamar recently marketed a carload of gold ore for which they received \$210 per ton net. This is the third shipment. A mill will be built at the mine next spring. Its completion will give De Lamar three mills and increase the output of that camp to over 100 tons a day.

The North Mountain M. Co.'s mill and mine at Egan are running full capacity. The mill is now crushing sixty tons per day.

Tuscarora Review: Notwithstanding the recent addition of tanks to the Dexter cyanide plant, nearly doubling its capacity, the new mill is producing tailings so rapidly that it is taxing the plant to its utmost to keep up. There are now ten circular tanks, holding thirty cars each, and four square tanks with a capacity of about ninety cars each. At present about 150 cars a day are being leached.—The De Lamar Co. is putting in four more leaching tanks 200x40 feet.

Pioche Record: J. E. Price has brought suit for himself and J. Sneath against the Nevada M. Co. for \$850, and attached the property of the company. The result was a shutdown at both mine and mill. The company is a local concern operating the Yuba mine and the mill of the Pioche Co. Co., and is involved for \$15,000.—English capitalists have agents in Nye county inspecting mining properties.

OREGON.

The Lewis-Hampton M. Co. of Josephine county is building fourteen miles of ditch, which will be completed Sept. 1.—The Willow Springs mine near Medford has struck a body of good ore.—Beekman & Huffer, who have been taking out a large quantity of ore from their mine in Shively Gulch district, have struck a new body of good value.

WASHINGTON.

The Horace Co. has resumed work near Republic. Samples taken from the various cuts show that the pay streak is about 10 feet wide and averages \$16 per ton.

G. B. Henton found in the Swauk mine, near Ellensburg, a nugget that weighs 27 ounces.

The cross-cut tunnel on the Eureka Queen at Republic is in 147 feet. The Erdmann tunnel is in 60 feet, and a contract has been let for 40 feet more.—Two shifts are at work on the Ben Hur. A 124 foot tunnel has partially crosscut the ledge at a depth of 120 feet.

The Young America concentrator at Bossburg is being pushed to completion. The Bonanza mine is shipping ore at the rate of 100 tons per month.—The Uncle Sam has shipped the first carload of ore.—Four properties on Toulon mountain are being worked with full forces. The Scotia reports a strike. The Brown-Reese mine has four carloads of ore on the dump, and is taking out shipping ore at every blast.—At Fruitland an 8-foot lead has been struck in the Mountain Queen mine, assaying 1000 ounces silver.—In the Chloride and Rattler a vein of copper, silver and gold ore was discovered.

The Indian bill, carrying with it the opening of the south half of the Colville Indian reservation to mineral entry, is signed by the President, and there was on the 1st a stampede from points in northeastern Washington for the borders of the reservation. It is estimated that 3000 people have crossed into the reservation preparatory to locating mining claims.

BRITISH COLUMBIA.

In the Velvet mine, near Rossland, the drift has been driven in ore for a distance of 200 feet, 4 feet wide. Samples of ore assayed \$32 in gold and 24 per cent copper.—Four thousand feet of the Noble Five air-pipe line has been laid. A compressor will be installed.

The strike in the 300 level of the Monte Cristo has widened to 11 feet of shipping ore. It will average \$25 across the 11 feet. The output last week was sixty tons. The compressor on the Monte Cristo keeps two drills going on the Monte Cristo and two on the Virginia. It also keeps one hoist and one pump going on both these properties. As soon as the Power & Light Co. puts in its plant, an electric hoist will be installed and more drills put in.—Last week ore shipments from Rossland were 1712 tons. Total since Jan. 1, 112,505 tons.

The Trail smelter will start next week and will handle 250 tons of ore daily; 125 men will be employed in the smelter. It has been receiving ore steadily ever since its acquisition by the Canadian Pacific railroad and there are thousands of tons on hand. Work is proceeding as rapidly as possible with the construction of new blasts.—Work on the Jackson mines near Kaslo has been discontinued pending the installment of the new compressor plant and other machinery. When work stopped at 475 feet depth there was 4 inches of high grade galena besides a quan-

tity of concentrating ore.—Work has begun on a 200-foot tunnel on the Golden Eagle near Grand Forks.—It is asserted that \$50,000 will be spent this summer in development work on the Oro Denero, in which J. M. Burke of Spokane is interested.—Beaton Bros. sold the Jenny Lind and Golden Gate claims to McMillin & Merced, who represent English capital, for \$7000 cash. This property is on the Salmon river near Ymir, and the ore runs in gold and copper.

A strike has been made in the Monte Cristo, which has been crosscut for a distance of 10 feet. The ore will average over \$30 per ton.

THE KLONDIKE.

The tug New England has arrived from St. Michaels with eighteen returning Klondikers and about \$100,000 in gold. They say that twelve other miners are at St. Michaels awaiting a chance to come south. The ice left St. Michaels harbor on June 17th. The Yukon river is 8 feet higher than it was ever known to be in its history. Out of 1500 claims that have been recorded in Dawson district less than 200 have proved to be paying property.

UTAH.

The Silver King vein at Park City is said to be 400 feet in width, carrying values in silver, lead and a little gold that net \$60 per ton. Keith & Kerns are said to have offered to make a contract with the Philadelphia Smelting Co. to furnish 25,000 tons of ore per year for five years. Last year the property paid \$500,000 in dividends, with 125 men on dead work and 35 men in ore.

The increase in tonnage in the various camps during the first half of the present year is estimated to be 45 per cent and the belief is expressed that a corresponding increase will be maintained during the balance of the year. The Tribune says that the Golden Gate alone has added 400 tons to the daily record of that which is put through the respective crushing plants.

The Silver City Star says thirty-six carloads of ore were shipped from there last week.—Bingham shipments for the week amounted to 3673 tons.

The shaft off the tunnel level of the Ajax at Mammoth has reached a depth of 500 feet. It will be continued to the 600-foot level before prospecting will commence.—Near Milford the Montreal mine made a shipment of ore.—In the Gothard and Hickory ore has been found that runs from 9 to 40 per cent copper.

The Treasurer Hill, Silver City, marketed twenty-six tons of ore that netted \$2600; the shipment is from the new strike in the property.—At Marysvale the antimony properties have resumed work under a contract to furnish a carload of ore per day. The Mammoth shaft at Mammoth has reached the 1700-foot level.—The Swan Baines mill at Bingham has started and has an abundance of ore.—At the Martha Washington, Tintic, from which ore shipments had ceased during the erection of machinery the hoisting of ore has been resumed.

Tribune: Two new discoveries of ore were made in the Mercur mine, Mercur, at places far apart. The discoveries at points so far distant from the main workings in the company's ground practically give it two new mines, and to test its milling values ore is now being taken out for the tanks.—The property of the Sunshine M. Co. at Sunshine has been leased to C. H. Jacobs, and everything indicates that work will be resumed.—Samples from the Highland Boy mine at Bingham shows from 14 to 30 per cent copper and as much as \$90 in gold per ton, and yet the ore comes from a zone, the presence of which is a surprise to the company. The ground had sold for the gold dollars it had been shown to contain, not for the ingots of copper which the company is taking out.

Tintic Miner: In the Picnic mine at Silver City three shifts are at work. The shaft has reached 450 feet and will be continued 200 feet additional.

IDAHO.

The Tip Top mine near Hailey has reached 300 feet depth. The mill is running on \$20 ore.—Work is to be resumed on the Custer near Wallace. When the Custer was one of the steady producers of the Coeur d'Alenes the ore above the tunnel was pretty well worked out and sinking commenced. The shaft was put down over 100 feet and considerable stoping done. A tunnel has been driven 1600 feet. When the shutdown came these workings were allowed to fill with water and nothing has been done since.—The Mammoth is increasing its ore shipments rapidly. A month ago three cars of ore was the regular shipment. During the past week it has shipped six cars daily.—The Cumberland mine near Silver City is milling ten tons of ore per day that yields \$100 per ton.—Unwatering the Empire mine progresses.—A Pittsburg company that has had a bond on the Sweet mines near Basin has paid \$6000 down and is operating extensively. The amount for which the property was sold is said to be \$40,000. The group consists of nine claims. There are ten 50-foot shafts and one 232 feet. Two tunnels have been run 100 feet each, while a third is 1870 feet long. This latter cuts the vein at a depth of 700 feet. Three shifts are engaged. The ore is low grade but free milling. The new owners propose to construct a mill two miles below the mine. It will be run by electricity and be connected by a tram. J. T. Keegan is Supt.—Five new companies have taken hold of properties at Basin—two dredge companies, the Twin Springs Co. and the companies controlling the New York and Lucky Boy mines. Most of the ore is low grade. Electricity and modern methods of treatment will be used.—At the Reber mine near Mountain Home they are crushing twenty tons of ore per day and save about 90 per cent of the gold.

The Checkmate of Willow Springs is making two shipments per month of a carload of high grade ore.—Work has begun on the Bunch and Carpenter quartz properties near Idaho

City.—The Jay Gould mine at Hailey shipped a carload of ore.

MONTANA.

A Chicago company has bonded the Little Katie mine near Clancy for \$10,000 and begun work.—The Tallaquah mine is being unwatered and sinking will be resumed.—The Montana G. S. Co. are building a dredge on the Cope placers near Dillon. They expect to have it in operation Sept. 1. If this proves a success the company will build four more boats next season. E. L. Hall is Supt.

The London, one of the biggest silver-lead propositions of Nelhart, has been leased to J. McAssey and associates. The mine has a large ore body blocked out, and while it is not a high-grade silver mine it can be worked so cheaply and so much ore taken out, combined with the amount of lead, that the men leasing it believe they can make it pay. The mine has lain idle for years.

The leasers of the Arkansas mine at Revenue shipped twelve tons of high grade ore.—Johnson & Co. shipped a carload of ore from the Columbus, which proved satisfactory.

Ham & Co. shipped a carload of ore from Sterling that netted \$60 a ton.—The Revenue is producing forty tons a day.

A check for \$41,232.22, in payment of judgment with interest in the Blackrock-Niagara mining suit, has been deposited with Clerk Clark of the District Court at Butte. The action was tried in 1895 and has been to the Supreme Court.

Montana's total copper output for 1897 was 237,158,540 pounds or nearly 50 per cent of the total product of the United States. The increase over 1896 is over 8,000,000 pounds.

The Boston & Montana Co. is shipping regularly. The company is enlarging the plant at Great Falls and before winter it is likely that the whole plant will be in operation, its capacity to be increased about one-third.

There is a report again that the Butte & Boston will take charge of the Butte smelting plant some time in July, but the report is not generally credited in Butte. The company is hoisting about 200 tons daily of low-grade ore and a little high grade from the Harrington placer.

Butte Miner: It is reported that the work will resume on the Vulcan mine, a silver property at Butte, which has been a great producer in the days when silver brought \$1.29 per ounce. It has a shaft 400 feet, full of water.—Mgr. Buzzo of the Alice at Walkerville makes regular shipments of gold and silver bullion to San Francisco. There is no thought of ceasing operations. Some rich ground has been opened in the Alice mine which has been a producer for many years. In the Blue Wing which has reached a depth of 700 feet some high grade ore is being hoisted which carries some gold as well as silver. Last year a large amount of high grade gold and silver ore was hoisted, some of it running \$40 to the ton in gold and 500 ounces in silver.—The Monitor Tunnel Co. which was reorganized, it is reported, will soon commence development work on the Monitor mine. Butte people are interested with some Chicago capitalists.

Lee & Co. have leased their Madison mine, near Twin Bridges, to Wright & Hayes for \$30,000.

WYOMING.

M. W. Harrington and associates will build a sampling and reduction plant at Grand Encampment.

At South Pass, in the Empire State mine, work is progressing.—The Carrissa mine was sold to Eastern people and work is pushed on a large scale.—E. N. Breitung has bought the Albany placer mines, near Cheyenne, and will operate them.

In the Portland mine, at Grand Encampment, the second grade ore runs \$20 in gold and copper.—Screenings from the Doane dump carries 21 per cent of copper and \$4 in gold.—The Gertrude produces ten tons of ore daily which averages \$10 in gold per ton.—The Charter Oak has 500 tons of ore on the dump. The ore body averages 12 feet in width; its value is 11 per cent copper and \$4 in gold.

SOUTH DAKOTA.

A Colorado company, headed by M. Weber, has bought seventy claims near Custer for \$250,000, payable 10 per cent August 15, the balance in six months. F. W. Bush becomes Supt.

MICHIGAN.

Michigan Copper M. Co., capital \$2,500,000, 100,000 shares, has been organized. The property consists of the old Minnesota and Rockland mines of Ontonagon county, comprising 4720 acres.

ONTARIO.

The Bully Boy mine at Rat Portage at the 125-foot level has a vein 4 feet wide.—The Nora mine, on Ptarmigan bay, is down 137 feet. The vein at that depth is 5 feet wide, and gives good assay values.

COLORADO.

In a case recently tried in the District Court, Leadville, there was an important decision rendered fixing the right of lode claimants to prospect placer grounds. The court held that the location of the placer mining claim gives exclusive right to possession, and until it is abandoned a prospector cannot enter upon the claim for the purpose of discovering a lode claim that may be within the limits of the placer. The question as to the right of a lode owner to work his vein (discovered on the outside of the placer) into the placer was not decided, and remains a mooted question among mining men.

The Electric Company of Lafayette has incorporated, capital stock \$200,000, to introduce into the Northern Colorado coal fields a new plan for lighting the mines, substituting incandescent lamps for the oil lamps now in use among the various operators.

BOULDER COUNTY.

The Rip Van Dam mine in Springdale dis-

trict is in good ore. The streak is several inches wide of nearly solid tellurium.—In Wall Street district the Doss is shipping. The Last Chance is stopping. The Franklin has opened 3 feet of ore running from \$30 to \$75 gold and from \$25 to \$300 in silver. The Forest has several carloads ready for shipment as soon as the tramway is completed. The camp is an old one, but it is showing new vigor.

The Telephone mine in Ward district will resume work as soon as unwatered. A steam plant will be put up and sinking begun.

The Intercean mine, Sunshine, is worked almost entirely by leasers, who are making good wages. Occasional strikes of ore are made that run as high as \$75 and \$100 per pound in gold.—The Emancipation mine is making an output of about fifty tons of telluride per month, which pays the proprietors a good profit. After years of litigation and final abandonment of the mine an English syndicate was induced to take hold of the property. Good machinery was placed for hoisting, pumping and thoroughly testing the quality and quantity of the mineral produced at an expense of about \$15,000. The payments were not made at the specified periods and the machinery and improvements reverted to the original owners. The mine to-day is paying big.

The Village Belle mine at Eldora is getting out shipping ore of \$40 to \$60 per ton.—The Clara has developed a large ore body, which will be cut by the Mogul tunnel at a depth of 1000 feet.—Ward mining camp claims an output of 500 tons of ore per day, of which fifty tons is an \$80 smelting ore that is shipped to the smelters, and 450 tons is milling ore that will average \$10 per ton, which is treated in local mills or left on the dump. There are eleven mills in the district that aggregate 170 stamps, seventy-five of which are dropping.

CHAFFEE COUNTY.

The copper matte smelter at Buena Vista was blown in and is running at its full capacity of 150 tons a day. It was erected by a party of Chester, Pa., capitalists, who have a lease on the old Mary Murphy mine at Romley for the treatment of their own ores. The smelter was originally designed to use a hot blast, but this has been discarded, and it is running with a cold blast. A large amount of outside ores will be treated, and it is expected that a number of properties in this vicinity will be operated. The smelter employs twenty-five men. Electric power is used to run the blowers and hoist. The electricity is generated by twin turbines. The plant has cost about \$40,000.

A mill will be erected both at Salida and on Cameron flats. Out of \$8 ore, it is claimed that a value of \$7.20 per ton is obtained, giving a saving on low-grade ore of 90 per cent. In ore that runs upward of \$500 to the ton 98 per cent is saved.

CLEAR CREEK COUNTY.

The Lamartine mine at Idaho Springs which has been a silver producer is being opened in the lower leads where the vein has changed from silver to gold values. The work is almost entirely in new ground.—The Chocapeake tunnel is in 600 feet. The tunnel is driving for a group of gold claims, all of which have been opened at the surface.—The Albro and Lee mines at Dumont are being worked steadily and furnishing good profits. One shipment gave \$70 gold, \$14 silver and 5 per cent copper per ton. The concentrates give \$40 per ton.

CUSTER COUNTY.

Lead mining at Ilse, which is the only place in the State where mining for lead alone is done, has been resumed after a rest for some years. The ore there is a lead carbonate, carrying neither gold nor silver.

EAGLE COUNTY.

The old Ground Hog mine, at Red Cliff, which was supposed to be worked out, is again in good ore. Leasers recently shipped a car of ore which ran nearly \$20,000.

EL PASO COUNTY.

The Badger Boy mine, near Cripple Creek, is to be the first in the district operated by electricity. The Raven tunnel is in 3300 feet, and in 15 feet it will reach the connection from the Elkton side of the mountain. The amount of work in the tunnel and other development work, during which but little attention was paid to outputting, accounts for the property only shipping seventy tons per week.

A 40-ton smelter is being built at Woodland Park.—The lessees operating the Free Coinage properties, Cripple Creek, have four producing shafts. The Pinto is a regular shipper. Most of the ore is of medium grade, but there is one streak of sylvanite that runs as high as \$700 in places. The lessees on the Pueblo, another Free Coinage claim, are shipping ten tons per day.—The Pharmacist mine shipped sixty tons of \$30 milling ore and thirty tons of smelting ore that will run over \$80 per ton. In a crosscut from the 175-foot station in the shaft they caught 2 feet of ore that will average \$80 per ton without assorting. Four inches of sylvanite ore in the vein runs \$500 per ton.

Investor: The total amount shipped from the Anchoria-Leland properties last week was in the neighborhood of 125 tons, all of smelting grade.—Following are shipments credited to the Matoa the past few days: 56½ tons, net value \$2435.86; 54½ tons, \$1489.96; 55 tons, \$1475.59; 54 tons, \$2234.47.

In the Modoc the chute at the 600-foot level is not long, but the ore is rich and the pay streak wide. In places there is 12 feet of ore that is good from ten to fifteen ounces without sorting. Picked samples of the ore show sylvanite in large quantities.

Denver Republican: Probably the most valuable single shipment of ore sent out from Victor district was made by the Portland Co. It approximated \$200,000; some of it ran as high as \$50,000 per ton. The ore was mined in the ground belonging to the Portland Co. known as the Hidden Treasure.—The Stand-

ard tunnel, which was started for the purpose of draining the Elkton and other mines as well as developing ore, has been added to the list of shippers. The company is breaking ore from a 4-foot vein that carries good values. The tunnel is in about 1000 feet. Most of the Standard stock is owned by officials of the Standard Oil Co.—The sorted ore from the dumps is making business for the stamp mills, and at least two that have been closed since last summer have resumed.

GILPIN COUNTY.

Development work is being done in the Mountain Rose, Packard gulch. Their mill returns give an average of \$20 per ton.

GUNNISON COUNTY.

The Daisy mine, Crystal district, has seventy-five burros packing ore to the smelters. The shipments amount to twenty tons daily.

HINSDALE COUNTY.

The Barrett claim in Burrows park is shipping its winter and spring output. The property has been working for three years and has made a number of small shipments of pay ore. The present shipment is four carloads of high-grade ore.

LAKE COUNTY.

The Resurrection mine, Leadville, is working 100 men. The shaft is 800 feet deep. The water, which comes in at the rate of 150 gallons per hour, is handled through the Grand View incline. The output of the mine is increasing.—Last week in the long drift of the Mab Shaft, at a depth of 1000 feet, the ore chute was opened. It is the same as the Mahala ore chute, which was 100 feet wide and 50 feet deep.—Mgr. Bulkeley is pushing development work on the Ibex combination, and has about 400 men on the payroll, which calls for a monthly expenditure of over \$35,000. Shipments at the Ibex continue at 250 tons per day, of which amount two-thirds is a sulphide and the remainder oxide. No. 5 shaft is also going after the lower ore bodies, and will be the deepest shaft on the property. It has reached a depth of 800 feet. All of the water of the Ibex combination drains to No. 3 shaft, from which point the pumping plant has no difficulty in handling the water flow, which is about 500 gallons per minute.

It is stated that D. H. Moffat will resume work on his Louisville mine at Leadville. The shaft is down 900 feet, but it will go down to 1200 or 1300 feet. The Louisville has paid \$4,000,000 in dividends.

LA PLATA COUNTY.

A test of 9300 pounds of Tenderfoot ore, La Plata district, gave 1500 pounds of concentrates and a 6½-ounce gold retort. The concentrates assayed two and a half ounces gold per ton, and the tailings \$8 per ton.

PARK COUNTY.

In the Mable Grace mine, in the Freshwater district, the shaft has been sunk on a body of mineral so large that the 5½-foot shaft has not touched a wall. Ore has been tested that ran \$125 in gold and \$3 in silver.

A body of copper has been discovered on the Little Platte, near Fairplay. It is reported to run 8 per cent copper and a little gold and silver.

SAGUACHE COUNTY.

In the Lord Kinney mine, at Crestone, a 12-inch streak of galena was uncovered that yields thirty-five ounces in silver, \$3 in gold and 55 per cent lead.

SAN JUAN COUNTY.

In the Irene mine, near Eureka, a 7-inch streak of ore has been found that runs 275 ounces in silver and 55 per cent lead.—The Ridgeway, near Silverton, has disclosed a new chute, the ore from which assays nine ounces in gold and 450 ounces in silver per ton.—The Hancock mine, on Cement creek, is being operated successfully by lessees. They have opened a mineralized vein, the pay streak of which is 6 inches wide and carries values varying from 44 to 62 per cent lead and 52 to 135 ounces of silver per ton.—Among the silver producers maintaining a steady output with profits is the Alta, in Gold King basin; the vein is large, is easily handled, the output is large, and the ore is of a character that receives cheap treatment. It is profitable, even at the present price of silver.

The Silver Ledge mill, at Silverton, is outputting a carload of concentrates daily. It is reported that a 4-inch streak of tellurium has been discovered in the mine.—The Snowshoe of South Lookout gives returns from a 2-inch streak of quartz of one-half ounce gold, twenty-eight ounces silver and 30 per cent lead.

SAN MIGUEL COUNTY.

In the North Chicago mine, near Telluride, at 200 feet a vein was cut, and has been cross-cut in mineralized vein matter 10 feet from the footwall without reaching the hanging wall. Two feet of quartz taken from the foot wall ran \$215.20 per ton in gold and silver.—Saw Pit has three regular shipping mines that are sending out a daily product to the smelters. The difficulty which existed at the Jim Corbett has been adjusted and a car a day is going out. The Iron Cap is also sending out a good product as development pushes ahead. The Belle-Champion has a large body of ore blocked out since resuming operations, and has begun shipping. The Lizzie G. expects to complete the tunnel being driven to cut the big ore body in a short time, and this will add another car a day to the output.

Two years ago the Tom Boy mine at Telluride built up a record which brought about its sale for a large sum. A few months later, from causes or reasons which have never been publicly ascertained, the product began to fall off, and after a time the mine closed down. The belief gained ground that it had exhausted its wealth. This, though, did not lie with the owners, and work was again started and an extensive amount of development done. From this time on good reports were had of the success of this work. This spring the mill of 175 tons capacity was again put in operation, and as soon as the water supply would

permit, treated its full limit of ore every twenty-four hours. Recently a large ore body was opened up in the lower workings, and the mill is now unable to take care of the output.

SUMMIT COUNTY.

The old Robinson mine, at Robinson, which has a record of \$3,000,000 of ore sales, is now being worked by Leadville people. Thirty tons per day is being shipped to the smelters.

The El Dorado, in the Ten-mile district, is shipping pay ore, and the White Quail, one of the old mines of the district, has resumed shipments, which are a lead carbonate.

NEW MEXICO.

The Tyroler Tunnel Co. has resumed work upon the Tyroler and Elizabeth claims at Hematite. They have a tunnel in 350 feet, showing a 6-foot vein of good ore.—Work on the quicksilver deposits in the southern part of Brewster county continues with promising results.—The smelter at Kingston is again in operation.—The 30-stamp mill of the Helen Co. is running on ore from the Confidence mine, near Silver City.—The Othello and Desdemona mines at Cook's peak supply daily from 70 to 100 tons of lead carbonates.

The Chicago people who had a bond on the Western Belle mine at Gold Hill have suspended operations. The bond has expired and the owners refuse to renew it.—The Pinos Altos G. M. Co. at Pinos Altos has a large force on development work in its several mines. The mill is constantly at work on ore taken from the shafts and drifts in development work, no stopping being done. The Gillette shaft is over 700 feet in depth and will be continued to 1000 feet. It is necessary that an extensive reduction plant be built before the extraction of ore from the stopes is commenced, as the present plant is inadequate.—At the Atlantic mine sinking has been resumed below the 450-foot level. The shaft will be sunk to 750 feet and levels run at 600 feet and 750 feet.

The Santa Rita copper mines ship from 600 to 1200 tons of ore to the smelter each month.

The Confidence mine, at Mogollon, is working seventy men and producing eighty tons of ore per day.—D. B. Gillette Jr., Mgr. Pinos Altos G. M. Co., has leased a large area of the Santa Rita Copper & Iron Co.'s property.—The Mystic, a Baldy mountain property, has been leased to M. C. Ferris under a bond of \$36,000. He agrees to work fifty shifts per month.—Capt. T. Brannigan, receiver of the Modoc group at Las Cruces, is conducting the operations of the property.—The Cochiti Co. has 4500 tons of ore on the dump, most of which is said to average \$11 a ton.

Placer mining near La Belle is in operation. In Foreman gulch and Bitter creek a large force is working. A company is working the Urraca placers and the Monte Cristo M. Co. is working a force. The Grouse gulch miners have resumed work on their placers. The Carmichael Placer Co., near Red river, made their first clean-up. The Galisteo M. Co. has begun operations.

ARIZONA.

(Special Correspondence).—J. Murphy expects to sell his Pay Roll mine at Chloride to Denver men for \$35,000.

The Tennessee mine has a new hoisting plant from San Francisco. The main shaft is down 350 feet. The mine is a regular shipper to Denver and other points in Colorado.

Last month placer gold was discovered five miles below Kingman, by the McGuire Bros. and McKesson, in the Wallapai mountains. Since then they have been at work with both dry-washer and rocker, and are taking out more than miner's wages in good coarse gold. For the rocker they haul the water from the McGuire goat ranch two miles.

Old Mineral Park, which was once the county seat of Mohave county, is fast acquiring new immigration on account of some reported rich discoveries of native silver in unexpected quantities. These discoveries have been made in old and abandoned workings, and give promise of activity again in the old district.

Kingman, July 6th, '98.

The World's Fair mine near Crittenden shipped two carloads of ore which assayed 800 ounces of silver per ton and netted \$7200.—The Tucson sampling works, which have been closed nearly two years, have resumed operations. The Citizen says that the revival in the mining industry will keep its plant in operation to its full capacity.

A 3-foot strike of good ore was made in the Erie mine, Cedar district, Mohave county.—The Oro Plata near Cerbat is said to be the largest ore shipper in Mohave county. O. B. Hardy is pushing development on the Pena Blanco mine in the Oro Blanco country and shipping two carloads of ore weekly.—It runs about 65 per cent lead with some silver.

A new formation was struck in the South Bisbee Co.'s shaft at a depth of 175 feet of decomposed iron and lead.

The Black Warrior Copper Co. is reported to have made an extensive strike on the Montgomery lode near Globe. It is said that there are 30,000 tons of ore in sight.

At the Gold Rock mine near Yuma almost 600 tons of ore are crushed daily by the 140 stamps in operation.—The Arizona Copper Co. at Clifton contemplates adding to its reduction plant two 150-ton concentrators and a new furnace.—A new strike of good ore is reported in new ground of the Azurite copper mine near Tucson.

Yavapai county has 259 stamps in operation.

MEXICO.

At Cucube, Sonora, Bonney & Kearney are developing a property and erecting a mill of forty tons daily capacity.

Cranz Bros. have bought a group of mines near Alamos upon which they are doing extensive development work and building a ten-stamp mill.

A shipment of ore from the Bufer mine, near La Dura, went \$400 per ton, and netted \$1127.—The Reina mine near Cusihuiriachic has 400 miners at work. Last year it produced

\$500,000 silver and has an equal amount in ore on the dump.—The Santa Elena, in the same district, ships from forty to seventy-five cars of ore daily.

The gold, silver and copper coined by Mexico the last seventeen years averages about \$26,000,000 a year.

The Esperanza Co., a Kansas City corporation with a capital of \$600,000, will open extensive placer grounds near Jopacari, Sonora. Alamos, Sonora, is shipping from \$10,000 to \$15,000 worth of gold bullion monthly, and the 10-stamp mill of the company is to be doubled in capacity. The New York & Sonora M. Co. will put up a smelter and build a railroad to its mines at Las Cruces.—Barnes & Furman of London have taken a bond on the San Pablo mine near Chihuahua for \$30,000.—G. J. Rieger bought Las Coches mine near Geoblan, Sonora. He will put in hoisting and pumping machinery, and work the property on a large scale.

Charles W. Kindrick, United States Consul at Juarez, reports to the State Department regarding the Juarez Concentrating and Smelting Works, as follows: "The Juarez Co., organized under the laws of the State of New York, started with a cash capital of \$100,000 and ample banking facilities to handle all raw material it might purchase. The officers of the company are: President and Gen. Mgr., Britton Davis of El Paso, Tex.; vice-president, C. B. Agnew, New York; directors, J. T. Terry, E. D. Morgan, Jr., A. G. Agnew, and S. J. Tilghman, all of New York, and Max Weber of El Paso, Tex. The products of the plant will be marketed partly in the United States and partly in Europe. I was informed by the Gen. Mgr. that the works were located on the Mexican, instead of the American side of the Rio Grande river, in order to avoid the payment of a very high duty on the lead contained in the crude ore or raw material as brought from the mines, and to facilitate its reduction into metallurgical shape before subjecting it to the increased cost of transportation to the final reduction works in the United States. The concentrator will have a daily capacity of 200 tons, which can be increased at any time by 50 per cent. The sampling works in connection with the concentrator will be able to handle 500 tons of ore per day. Mr. Davis says that two 100-ton smelting furnaces will be added to the plant in a short time, one for silver and lead and the other for copper. It is the intention of the Juarez Co. to make this plant, in the course of a few years, the largest in Mexico. The managers believe the mineral resources of the States of Chihuahua and Sonora will justify them in increasing the capacity of their plant from time to time."

The official report of the Batopilas mine, Alexander Shepherd's bonanza property, for the year 1896-7, shows that the total workings for these years was 23,700 feet, and ore to the amount of 43,807,612 pounds was taken out, valued at \$907,626 (Mex.) of which \$690,595 was in silver bars. The expenses were \$1,360,521, showing a deficit of \$452,896. The debt of the company is \$681,347 (Mex.) and \$389,997 gold, unfunded, and 6 per cent bonds for \$454,700. The Porfirio Diaz tunnel is now in 6069 feet, and advancing at the rate of 100 feet a month. In 550 feet more it will cut the Todos Santos vein and the Roncesvalles 360 feet farther on, which will reduce the cost of working these veins. The company is now doing its own casting at a great saving of expense, and proposes to increase its milling facilities.

CUBA.

The iron mining enterprise in the Santiago country is getting considerable advertising these days. The Spanish-American Iron Co. has headquarters at Philadelphia. C. R. Rand is president. The company was formed eight years ago and has about \$3,000,000 invested. The steel pier was built in 1894. The area of the country operated is 2500 acres. Before the war 300,000 tons of iron ore were annually shipped to American, English and German ports. Several furnaces and steel companies on the south Atlantic coast were largely or wholly dependent upon the company, and the war has cut off their supply.

SOUTH AFRICA.

The gold output of the Rand increased during May nearly 50 per cent over 1897. Thus far in 1898 this South African gold product has aggregated 1,616,900 ounces, against 1,136,900 in the same five months of 1897 and 860,800 in 1896.

Recent California Mining Incorporations.

California Dredging Co., San Francisco; capital stock, \$25,000; subscribed, \$18,088; W. E. Palmer, F. S. Mayhew, W. M. Klink, L. J. Holton, F. B. Peterson, S. W. Cheyney, J. M. Goodman.

The Nashville G. M. D. Co., Sutter Creek; capital stock, \$1,150,000; subscribed, \$150,000; C. P. Eells, E. C. Voorhees, J. Ross, J. S. Parkes, C. W. Howard.

Slap Jack M. Co., San Jose; capital stock, \$300,000; subscribed, \$225,000; F. F. Britton, F. L. Argall, B. Griswold, H. Argall, E. L. Emerson.

Sizes M. Co., Lakeport; capital stock, \$100,000; subscribed, \$85,000; W. P. Butler, C. M. Hammond, W. O. Edmonds, R. S. Rodman, A. B. Rodman.

El Promontorio M. Co., San Francisco; capital stock \$700,000, subscribed \$250,000; G. H. Kavanagh, E. A. Engelberg, A. A. Brown, W. Hasenberg, C. Boone.

Climax G. M. Co., San Francisco; R. B. Teedy, D. McCormick, F. B. Burnett, R. H. Warfield, H. Francis, V. Neale, J. W. Pew, C. S. Benedict, H. N. Williams; capital stock \$200,000, subscribed \$4500.

Bay State and Alaska M. Co., San Francisco; capital stock \$5000, subscribed \$4000; L. B. Terrell, H. O. Rogers of Boston, H. C. Burdick, T. Mackiernan, R. G. McConnell of San Francisco.

Coast Industrial Notes.

—Tickets are being sold from San Francisco to Chicago, via Portland, for \$28 net.

—Columbia river canners expect to put up 500,000 cases (forty-eight 1-lb. tins) salmon this year.

—At Ontario, Oregon, \$4000 worth of wool has been shipped daily since sheep shearing begun.

—It is announced that the salaries of engineers and firemen on the Northern Pacific Railroad are advanced 15 per cent.

—The auditing department of the Southern Pacific Company has issued the financial report of the fiscal year. It shows an increase of \$4,000,000 in the profit of last year.

—San Francisco shows an increased assessment of \$3,839,264 on personal property and real estate in '98, the assessment of last year being \$347,954,830 against \$351,734,094 for the present year.

—The past year the Highland, Cal., Fruit Growers' Association has handled 70,743 boxes of oranges and 12,016 boxes of lemons. The cost of packing the oranges was \$29,016; of the lemons, \$4996.

—Churchill Bros. at Summerland, Cal., have contracted to deliver to H. T. Oxnard 450 barrels of oil per month for five years at 90 cents a barrel, to be used for fuel at the beet sugar factory at Oxnard.

—At Pasadena, Cal., oil is used for fuel in burning brick. This is said to be one of four brick factories in the United States that have successfully adopted this fuel. The Pasadena factory consumes sixty barrels daily.

—The Philippine Islands has but one railway, from Manila to Dagupan, 123 miles. This railway has a single track of steel rails, is well built, and the bridges along the route are of iron or stone of excellent construction.

—During the eleven months ending June 30, '98, the United States mint in San Francisco has coined in gold \$48,931,000, and in silver \$4,889,441, a total of \$53,820,441. This is the largest year's coinage in the history of the mint.

—The Western Sugar Refinery of San Francisco has closed a contract with producers at Coalinga, Cal., for 700 barrels of oil a day for two years. All the furnaces at the Spreckels sugar factories are being changed from coal to oil burners.

—A company has been formed for the cultivation of ginger, which grows wild in the States of Guerrero, Puebla and Chiapas, Mexico. An acre will produce 4000 pounds of the root at a cost of 2 or 3 cents a pound put at the seaport, and it is worth 20 cents in New York.

—Two trainloads of cattle are shipped daily from Ontario, Oregon. It is estimated that 400 trainloads are contracted for shipment, representing 12,000 carloads (192,000 head), worth on the range \$4,000,000. Most of the stock comes from Harney and Malheur counties.

—J. P. Morgan & Co. are the purchasers of the Spokane and Northern Railroad property, presumably for the Northern Pacific. It is believed the roads will be operated jointly by the Northern Pacific and Great Northern. The price paid for the property is said to be \$5,000,000.

—After Senator White and other obstructionists had spoken their pieces, the U. S. Senate last Wednesday, by a vote of 42 to 21—2 to 1—passed the resolution annexing the Hawaiian Islands. It had already passed the House. The President signed the bill on the 7th, and the Island Kingdom is a part of the United States. The Philippines come next.

—It is again asserted, this time in the Los Angeles, Cal., Review, that the California Eastern railroad is to be extended from Manvel, San Bernardino county, to Goode Spring, Nevada, a distance of seventy miles. It is said that the Campbells of Salt Lake, who own valuable lead mines at Goode Springs, have guaranteed an average freight of 300 tons of lead ore per week.

—A meeting of the Auditing Board to the Commissioner of Public Works was held in Sacramento last Wednesday. The board arranged for the use of stone in the place of sand on a portion of the contemplated work on the Newtown Shoals upon recommendation of the Government engineers. Work on the Newtown Shoals will be commenced as soon as possible. The work on the cut-outs on the San Joaquin river is progressing.

—The big timber raft that left Astoria, Or., June 24 in tow of the tugs Rescue and Monarch broke in two somewhere in latitude 42 north, longitude 123.40 west. The Monarch brought in 2250 M. feet of lumber; the Rescue is towing about 2000 M. feet, and a million feet was lost. The raft was built on the Columbia river by Inman, Paulson & Co. for the D. H. Bibb Lumber Co. and was originally 376 feet long, 43 feet broad and 47 feet deep. It was bolted together by 110 bolts, 27 feet apart.

—The Boston News Bureau says: "On the Pacific coast one finds a sentiment which must be met with to be appreciated. It will be recalled that the Pacific States were warmest for war with Spain. Now one finds the Klondike excitement superseded by the 'On to China' sentiment. Californians declare that in the next century the great trade with the world will be upon the Pacific ocean rather than upon the Atlantic. They say that Africa and South America and the undevel-

oped portion of North America hold forth no such trade incentives as can be had in China, where more than 300,000,000 of people have a civilization thousands of years older than our own, are possessed of art and letters, manners and habiliments, and need only American machinery and American organization to make across the Pacific the greatest interchange of trade that has ever taken place between nations, continents or civilizations."

—Coast benefits conferred through the completion of the Nicaragua Canal under American control are great. It will bring the ports of Europe 7000 miles nearer and reduce the distance by water to New York 10,000 miles, thus solving the transportation problem. It will save \$2,000,000 annually in the handling of the cereal crop and other products of California. In a military point of view, it will duplicate the effective value of the United States navy, as exemplified by the recent remarkable trip of the Oregon around Cape Horn. As a business investment, it would pay 8 per cent yearly on \$100,000,000. The Suez Canal cost \$87,500,000 and yields a net annual profit of nearly \$9,000,000, besides an increase of 300 per cent in the par value of its shares.

—J. F. Flynn of Durango, Mexico, tells Iron and Steel that the greatest development in silver-lead mining has taken place in the States of Nuevo Leon, Coahuila, Chihuahua and Durango. Monterey has shown the greatest increase in production. Large bodies of silver-lead fluxing ore have been discovered there and the production has increased from about 1000 tons per annum ten years ago to over 100,000 tons per annum at the present time. The silver output in the State of Durango is increasing. Gold and copper mines are also developing. The Avino mines in that State have been sold to a wealthy London syndicate and several American companies have made purchases of good mines in the same district. Extensive reduction works will be erected immediately at Avino. At present the States of Guerrero and Michoacan are attracting the attention of mining men. The Inguaran copper mines have been acquired by the Rothschilds for \$5,500,000. A railroad 150 miles long will be constructed from the coast of Sihuataje to the mines and a reduction works of 2500 tons daily capacity established. There are now two railroads leading for the district, one to be built by the Rothschilds, which will run from the coast to the mines, and another by the Mexico Cuernavaca & Pacific, which already has about 300 kilometers constructed and will run from the City of Mexico to the Pacific. The last-named road, besides tapping this mineral district, will pass through an agricultural country in the Balsas river valley. The Government is interested in the construction of this road and is giving Col. Hampton, the president of the road, every assistance to enable him to complete it. This will give Mexico two transcontinental lines and will open for development two of her richest States. There has been no material increase in the price of labor nor in the prices of articles of prime necessity. For this reason the cost of producing all articles is about the same as when silver was higher, while on the other hand the silver value of all articles produced for export has increased about 40 per cent. This is the cause of the activity in gold, copper and lead mining, and in the cultivation of tobacco, coffee, vanilla, cacao and all other articles of export.

Commercial Paragraphs.

M. P. Ross of San Francisco is building a gold mill at Guanajuato, Mexico, with a daily capacity of 300 tons. The Union Iron Works is furnishing the machinery.

C. B. Boothe & Co., of Los Angeles, Cal., here recently installed for Colton Terrace Water Company of Colton, San Bernardino county, a pneumatic lift pumping plant using as motive power a 20 H. P. single-phase A. C. motor. The same firm has put in another of these motors of the same size for the Cucamonga Water Company, North Ontario. The Covina Water Company, Lordsburg, Los Angeles county, have their steam-actuated pneumatic lift plant in satisfactory operation. Its installation was superintended by Mr. W. A. Wood, foreman of construction for C. B. Boothe & Co. and is designed to pump from ten deep wells.

This season the San Francisco Launch Co. has built for the Yukon trade, the Mary Ellen Galvin, 200x40, drawing 18 inches loaded, and on that draft carrying 400 passengers and freight; the City of Dawson, a stern-wheeler, 125x38, 22-inch draft; a Government cutter, speed sixteen miles, 180x36 feet, draught 16 inches; the steamer Florence, schooner rigged, 125x22, now on the Yukon; the steamers May D., City of Redlands, Edith McKyle, each about 65x16, all stern wheelers. The Launch Co. also built 132 metallic life boats, yawls, etc., during the year, a 27-foot yacht, besides tug boats and launches.

The directors of the General Electric Company at a recent meeting voted to recommend to the stockholders a reduction in the share capital of the company, both common and preferred, of 40 per cent, so that each holder of 100 shares of present stock will get sixty shares of the new stock. This settlement, while satisfactory to the common stockholders, is regarded as particularly favorable to the preferred shareholders, inasmuch as it will render unnecessary the taking of any steps for the liquidation of the company, in

which even the preferred stockholders would receive only the same amount as the common stockholders, and no back dividends. The plan now adopted contemplates the payment, from the surplus earnings of the company as they are hereafter made, of the accrued dividends on the preferred stock. On the basis of the new capitalization \$1,275,000 will be required annually to pay 7 per cent upon the preferred stock and 6 per cent upon the common stock. Stockholders meeting Aug. 10th, '98, at noon, at Schenectady, New York.

The Denver Engineering Works, Denver, Colo., have orders for two complete concentrating mills, two 10-stamp mills, seventeen of their new concentrating tables, one 110 H. P. geared steam hoist, two 20 H. P. and one 50 H. P. power electric hoists, four 80 H. P. horizontal tubular boilers and other apparatus. They are now constructing eight of their new automatic high speed engines. Three are to be installed in the Daniels & Fisher building, where they are to be used in driving the Siemens & Halske electric lighting generators; two are for a large silver mine in Mexico, and three will be installed in Denver.

Personal.

J. T. KEEGAN becomes Supt. Sweet mines, Basin, Idaho.

CHAS. BUTTERS was at Kennett, Shasta Co., Cal., this week.

GEO. BLAKE, Supt. Bell mine, Tuttle town, Cal., is in San Francisco.

F. P. BONNELL, Supt. Flint mines, De Lamar, Idaho, is in Denver.

C. JOHNSON, Mgr. Mt. Gaines mine, Hornitos, Cal., is in San Francisco.

M. B. HARRIMAN, a mine owner from Sonora, Cal., is in San Francisco.

O. L. BARTON, Supt. Herman mine, Westville, Cal., is in San Francisco.

A. B. McDONALD, Supt. Kanaka mine, Groveland, Cal., is in San Francisco.

WALLACE MACGREGOR is in present charge of a cyanide plant at Johnsville, Cal.

W. MAITLAND, Supt. Nash mine, Abrams, Cal., has returned from San Francisco.

D. W. DEITRICK, Butte, Mont., is examining the Frazier copper property near Taos, N. M.

J. S. KENNEDY, Supt. Campodonico mine, Hornitos, Cal., has returned from San Francisco.

F. W. WILMANS, Supt. Bonanza mine, Sonora, Cal., has returned home from San Francisco.

J. ROSS, JR., Supt. Wildman-Mahoney mine, Sutter Creek, Cal., has returned from San Francisco.

JNO. DERN, Mgr. Mercur mine, Mercur, Utah, has returned from Fremont, Neb., to Salt Lake City.

JOS. MCGILLIVRAY and F. T. PETERSON, formerly of Grass Valley, started to Dawson on the 6th inst. by steamer Brunswick.

HENRY BRATNOBER of the London Exploration Company is examining copper properties between the White and Copper rivers in Alaska.

T. KERNS and D. KIETH are in Lake City, Colo., examining the concentrating mill on the Hidden Treasure mine with a view to introducing the process at their Silver King mine at Park City.

A. RAHT, a Colorado metallurgist, has been engaged for six months by the Exploration Co. of Australia to work on the problem of treating the Central Broken Hill mine zinc ores. The company has given up the Ashcroft process.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING JUNE 28, 1898.

606,496.—BICYCLE BRAKE—J. L. Allen, Mendocino, Cal.

606,418.—ARRYING APPARATUS—J. Anderson, Walla Walla, Wash.

606,452.—GUN SIGHT—S. E. Fischer, Haywards, Cal.

606,215.—LACE HOLDER—W. O. Hill, Spokane, Wash.

606,581.—WAVE MOTOR—J. H. Leonard, Leonard Station, Cal.

606,578.—BICYCLE SUPPORT—P. Person, Stockton, Cal.

606,237.—LOCOMOTIVE—G. W. Prescott, Highland, Cal.

606,238.—HYDROCARBON BURNER—G. W. Prescott, Highland, Cal.

606,239.—COAL BURNER—G. W. Prescott, Highland, Cal.

606,593.—CAMERA—H. Stender, Prospect Park, Cal.

606,594.—CAMERA—H. Stender, Prospect Park, Cal.

606,432.—IGNITER—A. J. Tackle, Oakland, Cal.

606,493.—PISTOL—W. H. Trippett, Redlands, Cal.

606,261.—ENVELOPE OPENER—W. Yates, Richmond, Wash.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Recently Declared Mining Dividends.

Swansea, Utah, \$5000; July 9.

Cariboo M. & S. Co., B. C., 2 cents per share, \$16,000; July 2.

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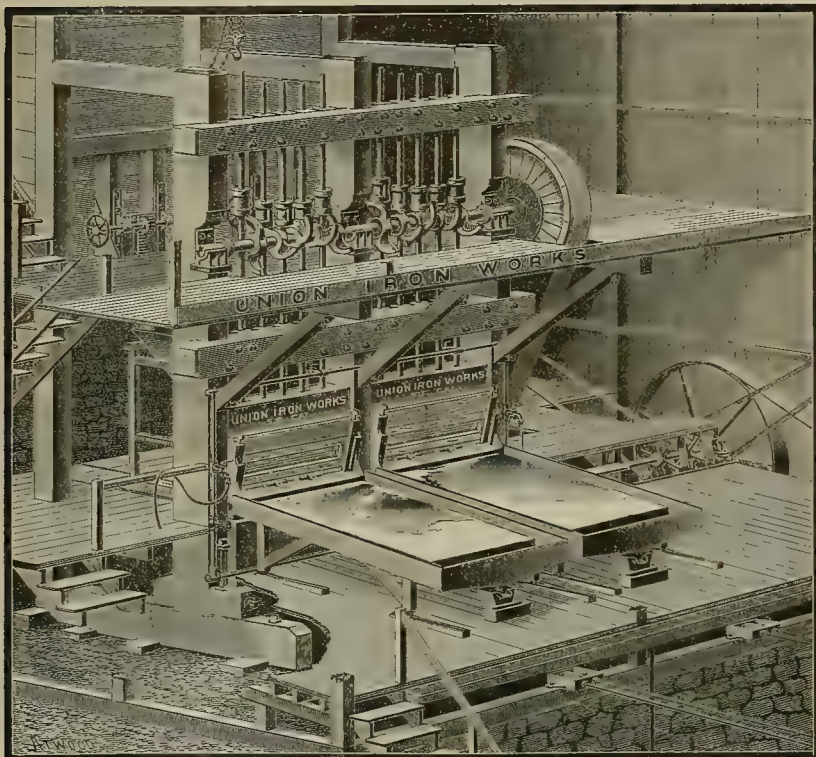


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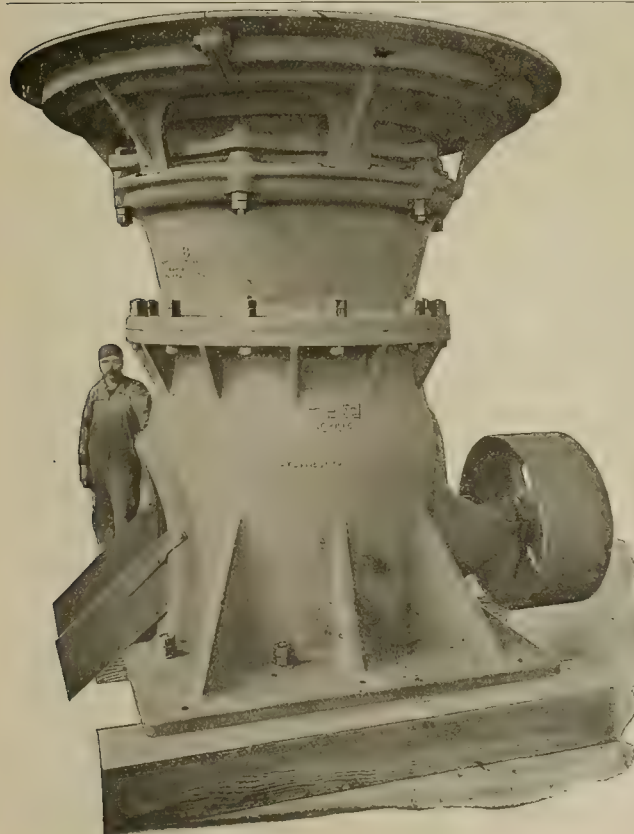
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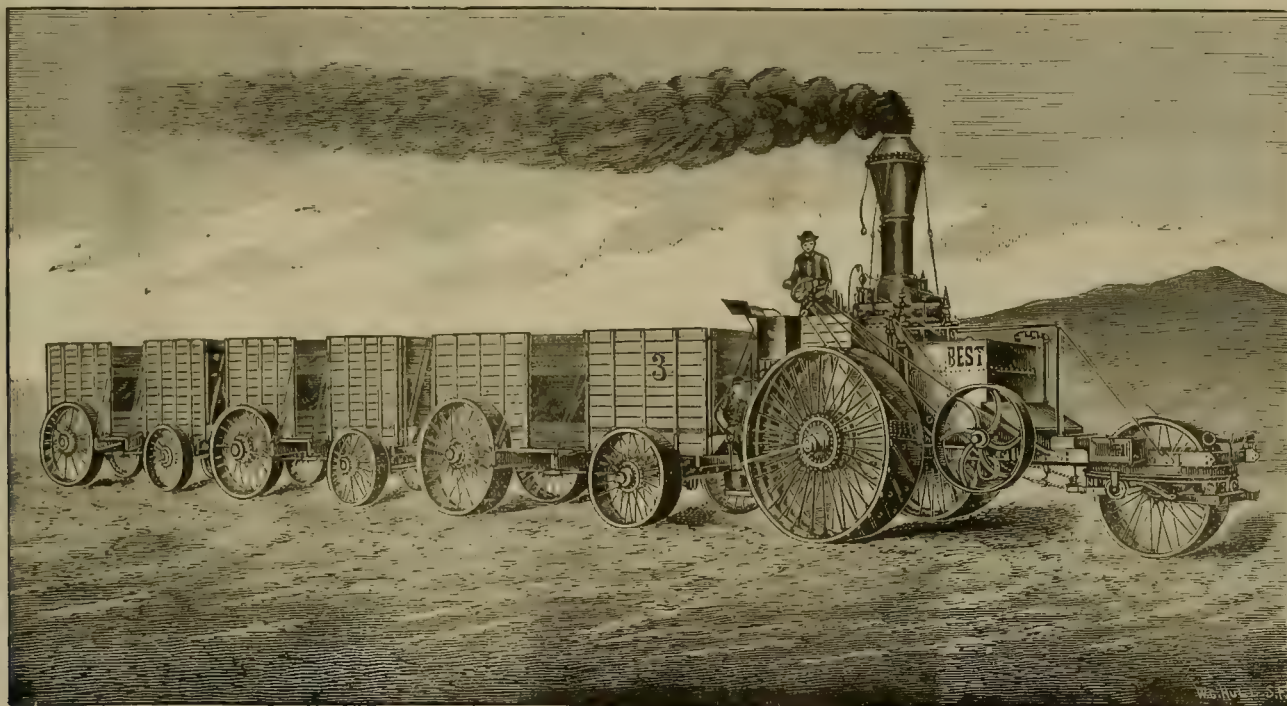


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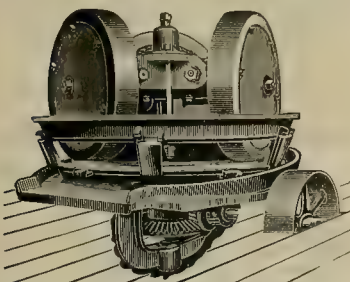
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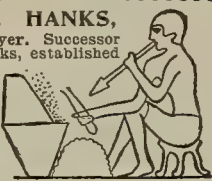
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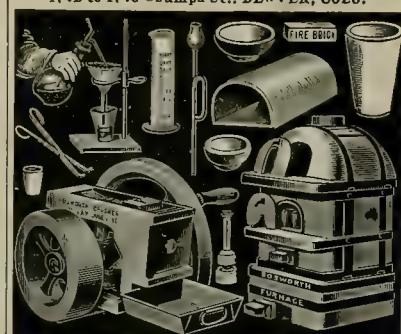
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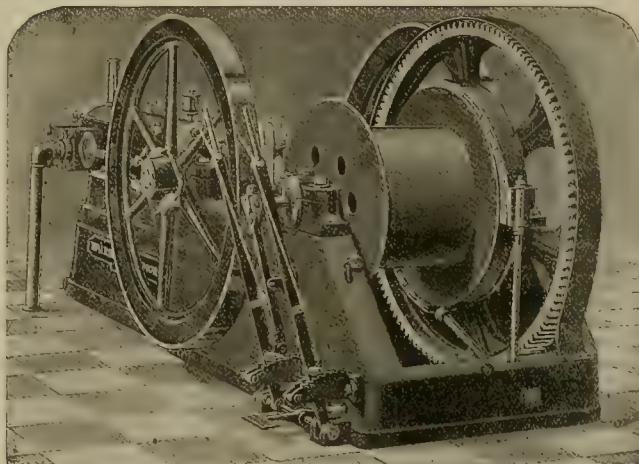
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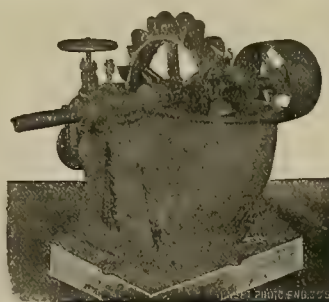
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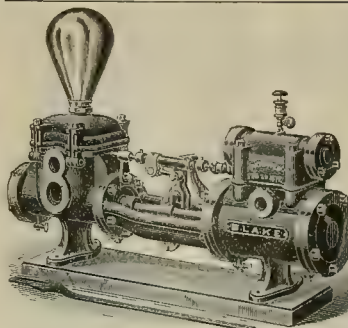
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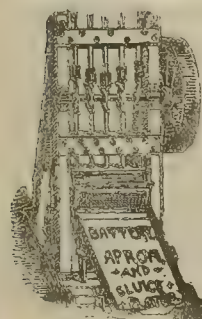
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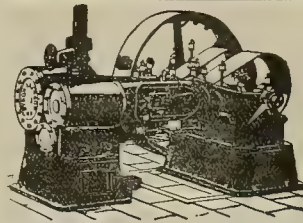
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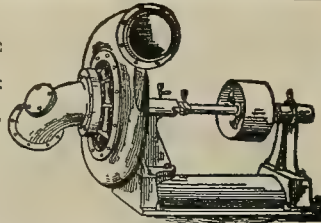
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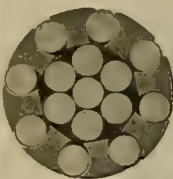
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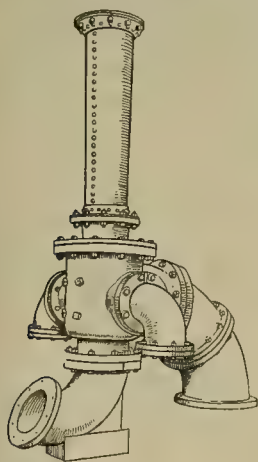
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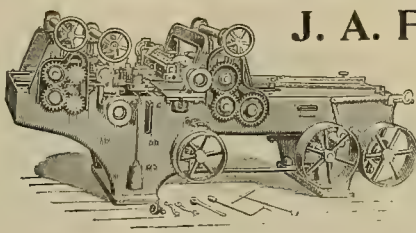
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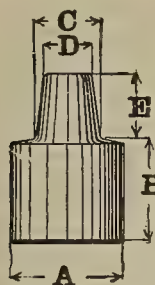
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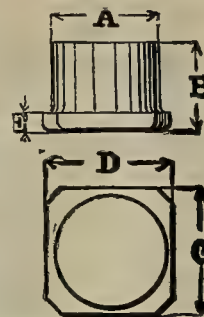
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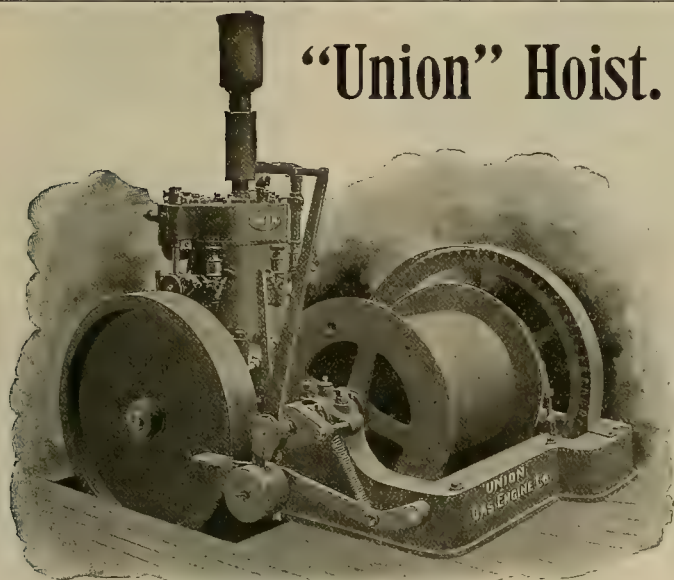
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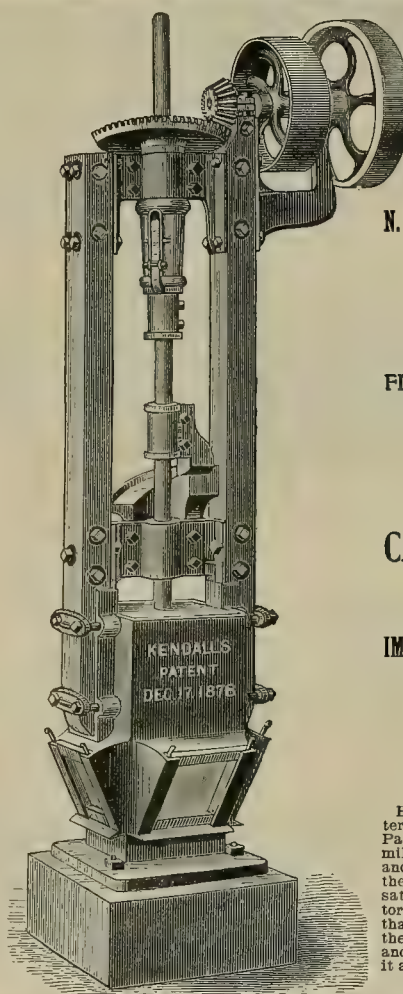
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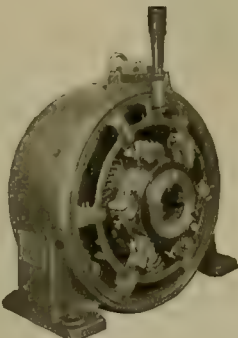
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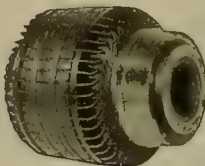
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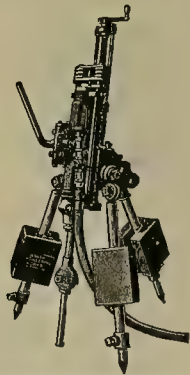
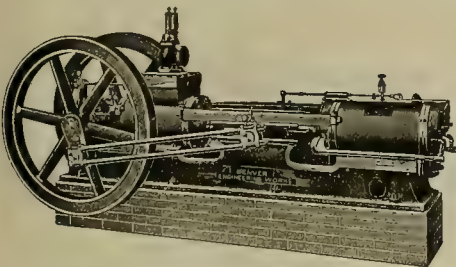


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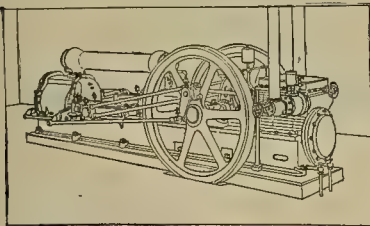
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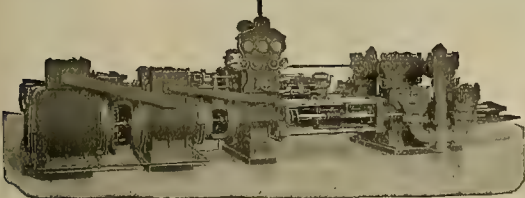
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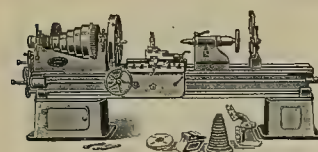
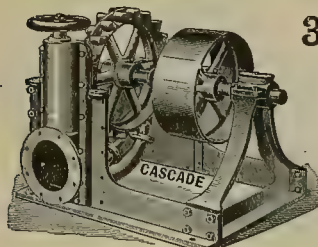
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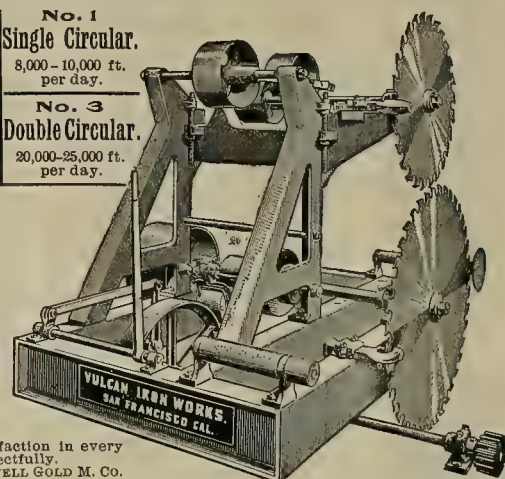


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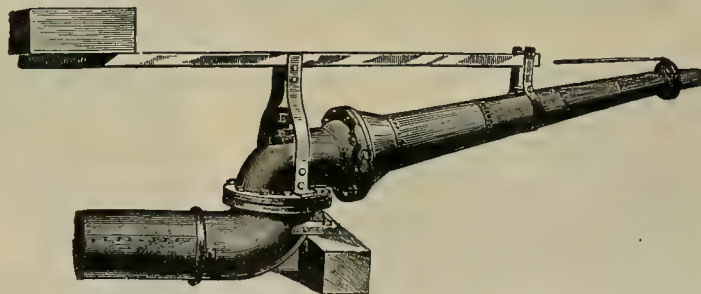
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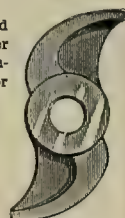
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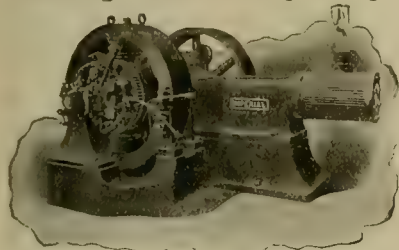
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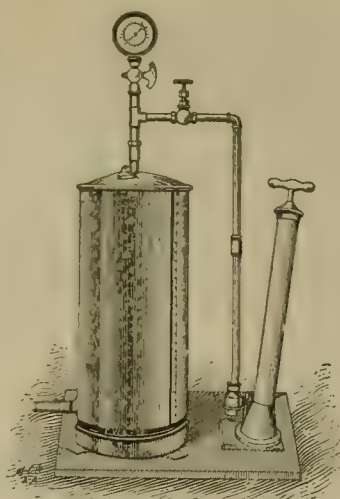
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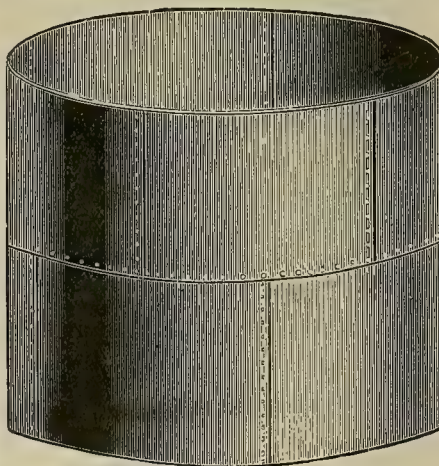
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QUICKSILVER.—Strong and unchanged. Domestic, \$42.50@43; export, \$37.50@38.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1** 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8.00; Coos Bay, \$5.00; Seattle, 6.00; Southfield, 7.50.

Cargo lots, Eastern and foreign: Wallsend, \$7.50; Cumberland, \$10.00; Brynbo, 7.50; Cannel, 9.50; Pennsylvania, hd., 14.50; Welsh Anthracite, 12.50; Scotch, 8.00; Rock Springs, 7.50.

CHEMICALS.—Cyanide of potassium is quoted jobbing, 32@33c per lb.; carloads, 29½c; sulphuric acid, 2½c per lb. for 60%; nitric acid, 12½c; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½c per lb.; blue vitriol, 4½c per lb.; borax, refined, 56c per lb.; chlorate of potash, 9½@10c.

LUMBER.—Retail: Pine, ordinary sizes, \$17@18.50; redwood, No. 1, \$18@20; No. 2, \$16@18.

A Washington dispatch says the value of the Mexican dollar for the quarter commencing July 1 will be 45 cents 4 mills, 1 cent lower than last quarter.

The following from the Commercial News shows the monthly fluctuations of foreign goods for spot cargoes:

| Name. | Jan. | Feb. | Mar. | Apr. | May. | June. |
|------------------------|--------|--------|--------|--------|--------|--------|
| Australian gas, \$6.25 | \$6.35 | \$6.50 | \$6.75 | \$7.00 | \$7.25 | \$7.50 |
| English steam, 7.00 | 7.00 | 7.00 | 7.25 | 7.25 | 7.50 | 7.50 |
| Scotch splint, 7.00 | 7.00 | 7.25 | 7.50 | 7.50 | 7.50 | 7.50 |
| West Hartley, 7.50 | 7.50 | 7.75 | 7.75 | 8.00 | 8.00 | 8.00 |

COAL RECEIPTS AT SAN FRANCISCO FOR 1898.

| Month. | Pacific Coast. | Eastern. | Foreign. |
|----------|----------------|----------|----------|
| January | 94,794 | 1,948 | 11,249 |
| February | 79,247 | 3,955 | 31,939 |
| March | 124,880 | 1,950 | 4,687 |
| April | 84,613 | 2,501 | 12,504 |
| May | 93,808 | 2,339 | 12,547 |
| June | 126,031 | ..... | 28,834 |
| Totals | 1,062,281 | 24,573 | 349,876 |

Total from all sources, 1,436,730 tons.

Under date of the 1st, New York reports: "Financiers and leading business men here declare that the fiscal year which ended last night was one of the most prosperous in American history. It is impossible to get any approximately accurate estimate of the amount of money which is to be disbursed in the way of dividends and interest during the next week, but it is said with confidence that the sum is larger, both in the aggregate and in proportion to the capital which it represents, than in the record for any July 1, excepting, possibly, that of 1890 or 1891. But the most striking feature of the history of the fiscal year is found in the records, which show that foreign commerce is vastly in favor of the United States, and a financial condition which clinches the conviction of those who for a year or two have been persuaded that this country would before the end of the century be practically independent, financially, of any other nation. It is believed in financial centers here that, had it not been for the war, some attempt would have been made to invest American capital in other parts. In one sense some is being loaned to-day to Europe, for, in order to carry the credits or trade balances until a more convenient season for meeting these obligations, Europe is hypothecating exchange in the United States, or, in other words, discounting in our markets. It is believed that this satisfactory condition will continue in spite of the war."

In San Francisco, as elsewhere, the new war tax occasions considerable friction and annoyance. No one objects to paying whatever is determined to be legally required, but so far it is difficult to tell just what is requisite.

Mining Share Market.

SAN FRANCISCO, July 7, 1898.

Pending authoritative decision of the new war tax on stock sales, practically no business has been done by the Boards since June 30. Conflicting statements continue to be made. Commissioner Scott of the U. S. Treasury Department, Washington, D. C., writes:

Mining stock brokers and also persons doing a purely speculative business in mining stocks, strictly on their own account, doing no commission business whatever, are, in the opinion of this office, subject to the tax of 50¢, if, as it is understood, they are engaged in negotiating purchases or sales of stock "for themselves."

Mining companies which, as you state, are capitalized at from 1,000,000 to 2,500,000 and 3,000,000 shares of a par value of \$1 each, and whose stock is selling at from 50 cents to \$2 and \$3 per 1000 shares, are required to affix and cancel a 5-cent stamp to every certificate of this stock originally issued on or after July 1, 1898, even though its face value is but \$1.

On every transfer of a certificate of stock a broker delivering the certificate should affix thereto and cancel a 5-cent stamp, in accordance with the provisions of schedule A of the Act of June 13, 1898.

Richard Olney, ex-Attorney General and ex-Secretary of State, gives it as his opinion that the stamp tax on transfers of stocks applies only to corporations which may be formed after July 1st of this year, which is comforting.

Watson & Gibson of New York says: The opinion of the attorneys for the consolidated exchange is that a broker making a sale of 100 shares of stock in New York should affix a stamp of \$2 to the bill of sale which he delivers to the purchaser of the stock in question, but the selling broker is not required to put a 10-cent stamp on the notice to the customer who gave the selling order. An out of town broker who acts for a local customer does not need to put any stamp on the notice to him of execution of the order.

Regarding the 25 cents additional necessary if the certificate is transferred by the signing of the power of attorney on the back, officials of some of the Boston trust companies, acting as transfer agents, say that 25 cents is not necessary if the person in whose name the certificate is issued surrenders his certificate at the transfer agency and transfer the shares in person.

On the 5th inst., the executive committee of the San Francisco Stock and Exchange Board prepared and sent the following telegram to Senator Perkins at Washington:

Hon. George C. Perkins, Senate Chamber, Washington, D. C.—Under war revenue act business in San Francisco Stock and Exchange Board here is suspended until we can receive authoritative ruling on the following question: Clause 1 of schedule A imposes tax on sales of certificates of stock of 2 cents on each \$100 of face value, or fraction thereof. Does that mean on each \$100 of face value of the amount of the sale, or does it mean on each \$100 of the par value of certificates of stock? In dealings on the stock exchange here the distinction is vital, for in many instances sales of mining stocks could not carry the tax on the par value of the certificates. For example, on 1000 shares of Savage, sold at 1 cent per share, the value of sale would be \$10, and the tax at the rate of 2 cents per share on the face value of the certificate, which is \$100 per share, would be \$20, or twice the value of the thing sold. If the tax is on the par value of the certificates the tax is the same as on the sale of 100 shares of Chemical Bank stock and on 100 shares of low-priced mining stock, it is utterly destructive of the business of all mining exchanges west of the Mississippi. The intention was to impose a tax on the value of the sale in the same way and in the same amount, and substantially in the same language, as clause No. 2 imposes a similar tax on sales of products and merchandise in produce exchanges and boards of trade. This was also the construction given the former stamp law. Please obtain an immediate ruling from the Treasury Department and telegraph an answer at our expense.

San Francisco Stock and Exchange Board, A. G. Burnett President, F. W. Hadley Secretary.

To the above Senator Perkins to-day wired a reply that he visited the Commissioner of Internal Revenue, who decided that the tax of 2 cents is on each \$100 of the face value of the certificates, and that in this case face value means par value, so that a tax of \$2 must be paid on each 100 shares of stock whose par value is \$100 per share, until another ruling to the contrary is made, as of course it will be, as it was manifestly not the intent of Congress to tax anything out of existence. Meanwhile it is in order for the companies whose stock is dealt in to incorporate with capital stock shares from \$1 to \$5 per share, instead of \$100, as has been the rule. The days of "wash sales" are over.

San Francisco Stock Board Sales.

SAN FRANCISCO, July 7, 1898.

9:30 A. M. SESSION.

300 Gould & Curry..... 09:200 Ophir..... 18

100 Mexican..... 13:100 Potosi..... 04

2:30 P. M. SESSION.

500 Mexican..... 12:100 Savage..... 13

250 Con Cal & Va..... 16:50 Sierra Nevada..... 44

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY
Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

AN ASSAYER AND CHEMIST of long experience, who is also an Amalgamator and Practical Millman, desires a position with a mining company. Address W. care of Mining and Scientific Press.

WANTED.—Position as Mining Engineer and Assayer. Have had four years' practical experience in mining and milling in Mexico. Can speak the Spanish language. Address A. B., care of Mining and Scientific Press.

WANTED.

Position as Machinist or Engineer in Quartz Mill. Mexico Preferred.

First-class references. C. W. G., care this office.

AMERICAN MINING ENGINEER, in the employ of a wealthy syndicate, wants a good gold, silver and lead, or copper property in the Western States or Northern Mexico, upon which considerable development work has been done. Will take up on lease and bond or put up a plant for an interest; or, if considerable ore is in sight, will buy on equitable basis. Send full particulars of mine, amount of water, timber and fuel available, transportation facilities, standard wages, etc.

Address A. N., Mining and Scientific Press.

Position Wanted by a Mining Engineer.

Am thorough assayer and amalgamator and can fill any position about mine or mill. Have complete set of engineering instruments and assay outfit. At present am manager of gold mine in California and will be at liberty about July 10th. All letters from present employers. Address P. L., care Mining and Scientific Press.

WANTED.

A First-Class Diamond Drill Operator.

Address:

THE MOUNTAIN COPPER COMPANY, LTD., Keswick, Cal.

FOR SALE.

5-Stamp Quartz Mill, Shafting, Pulleys and Belting, 25 H. P. Engine and Boiler, Hoist, Pump, Steam Pipe and Fittings, Blacksmith, Carpenter and Mining Tools. Located near San Andreas, Cal. Enquire of DR. W. G. WALLACE, 636 Sutter St., San Francisco.

FOR SALE.

HOISTING MACHINERY, ENGINE, BLACKSMITH OUTFIT, 120 ACRES MINING PROPERTY, U. S. Patent. Some Development. Will sell as a whole, or in parts to suit. Address J. F. HOLLING, 113 Crocker Bldg., San Francisco.

The State Ore Sampling Co.
DENVER, COLO.

Gold, Silver, Lead and Copper Ores and Matte sampled and marketed to the best advantage. With modern mills and machinery our facilities for sampling ores are the best.

Our long experience in the market enables us to obtain the highest prices for all marketable ores. Write for our "Reference Book." Send analysis of your ore for prices and information.

BAILY & MONNIG, Managers.

Any Book on Any Subject

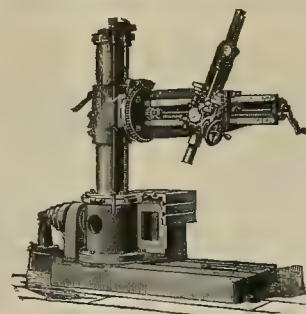
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Mines, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

Examine mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

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Marquette, Mich., U. S. A.

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TOTAL WEIGHT.....only 2½ tons.
TOTAL COST F. O. B.....only \$750.

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Students can enter at any time. Pupils receive individual instruction. Twenty teachers. Moderate charges. Write for Catalogue and Journal.

The DAISY FLY KILLER, 20c.



The best fly killer known. It is a beauty, neat, clean and attractive in decorated metal. Will not injure or soil anything. Will attract and effectually kill all the flies in a room. Harmless to persons. Write for one; sent postpaid for 20c. by the manufacturers, SOMERS BROS., 3d Ave. and 3d St., Brooklyn, N. Y.

IT WILL LAST ALL THE SEASON.

Assessment Notices.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of June, 1898, an assessment (No. 19) of three cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 11th day of July, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 3d day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
CALVERT MEADE, Secretary.
Office—106 Leidesdorff street, San Francisco, Cal.

CONSOLIDATED CALIFORNIA AND VIRGINIA MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of June, 1898, an assessment (No. 12) of 25 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 29, Nevada block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 22nd day of July, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 12th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
A. W. HAVENS, Secretary.
Office—Room 29, Nevada block, 309 Montgomery street, San Francisco, California.

CONS. ST. GOTHARD GOLD MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 9th day of June, 1898, an assessment (No. 14) of 5 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 113 Crocker building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23d day of July, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 10th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. F. HOLLING, Secretary.
Office—113 Crocker building, San Francisco, Cal.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of June, 1898, an assessment (No. 10) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 237 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 4th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 3d day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
F. METTMANN, Secretary.
Office—237 12th street, San Francisco, California.
The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansone street.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 29th day of June, 1898, an assessment (No. 4) of Two Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 14, Nevada block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
WILLIAM McPHERSON, Secretary.
Office—Room 14, Nevada block, No. 309 Montgomery street, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of June, 1898, an assessment (No. 10) of 2 1/2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of July, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 3th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
A. F. FREY, Secretary.
Office—Room 44, Phelan building, San Francisco, California.

INVENTORS, Take Notice!

L. PETERSON, MODEL MAKER,
226 MARKET ST., N. E. Corner Front (Up Stairs), SAN FRANCISCO. Experimental machinery and all kinds of models. Tin and brasswork. All communications strictly confidential.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 16th day of May, 1898, an assessment (No. 1) of 14 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 7, 5th floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
R. L. CHENEY, Secretary.
Office—Room 7, 5th floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 8th, 1898.

R. L. CHENEY, Secretary.
Office—Room 7, 5th floor, Mills building, San Francisco, California.

DELINQUENT SALE NOTICE.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

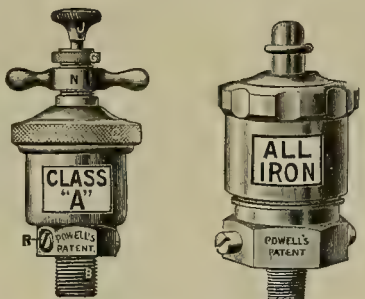
Notice is hereby given that there are delinquent upon the following described stock, on account of assessment (No. 3) levied on the 16th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------|-----------|-------------|--------|
| Charles Rehn..... | 75 | 2,000 | 100 00 |
| Charles Rehn..... | 76 | 1,000 | 50 00 |
| Charles Rehn..... | 77 | 1,000 | 50 00 |
| Charles Rehn..... | 78 | 500 | 25 00 |
| Charles Rehn..... | 81 | 499 | 24 95 |
| Charles Rehn..... | 82 | 1 | 05 |
| Charles Rehn..... | 161 | 150 | 7 50 |
| Adelheid Rehn..... | 176 | 250 | 12 50 |
| W. J. Patterson..... | 207 | 200 | 10 00 |

And in accordance with law, and an order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, room 57, No. 916 Market street, San Francisco, California, on SATURDAY, the 23d day of July, 1898, at the hour of 12 o'clock M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office—No. 916 Market street, room 57, San Francisco, California.
GEO. W. FLEISSNER, Secretary.

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Large Variety. For Every Requirement.
FEED adjustable the entire length of Cup.
CUT-OFF in base regulates the flow.
Any Supply House on the Pacific coast can furnish them.

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Peterson Current Motor for streams not less than 3-mile current. Horse Powers, Portable Wood Saws. Some second-hand Pumps and Gas Engines, Steam Engines and Boilers for sale cheap. 115 and 117 First Street, San Francisco, Cal.

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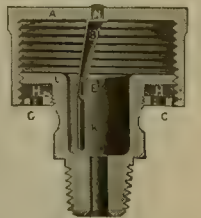
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Are practical cups and popular with all users. You cannot afford to be without them if you desire entire satisfaction. Our catalogue of superior specialties for steam, water, gas, oils, etc., will interest you, free for the asking.

Specify "Lunkenheimer" make. Supplied by dealers everywhere.

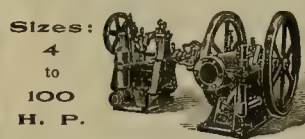
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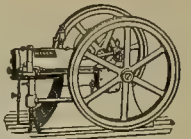
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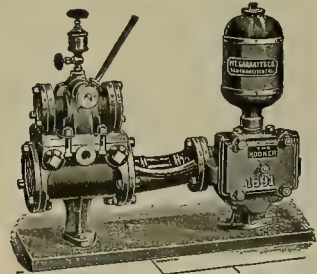
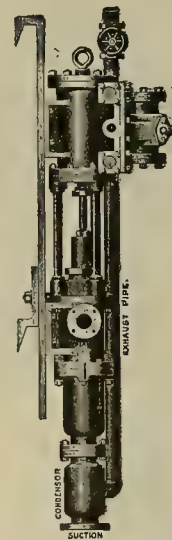
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Bankers, Importers, Exporters and Commission Merchants.
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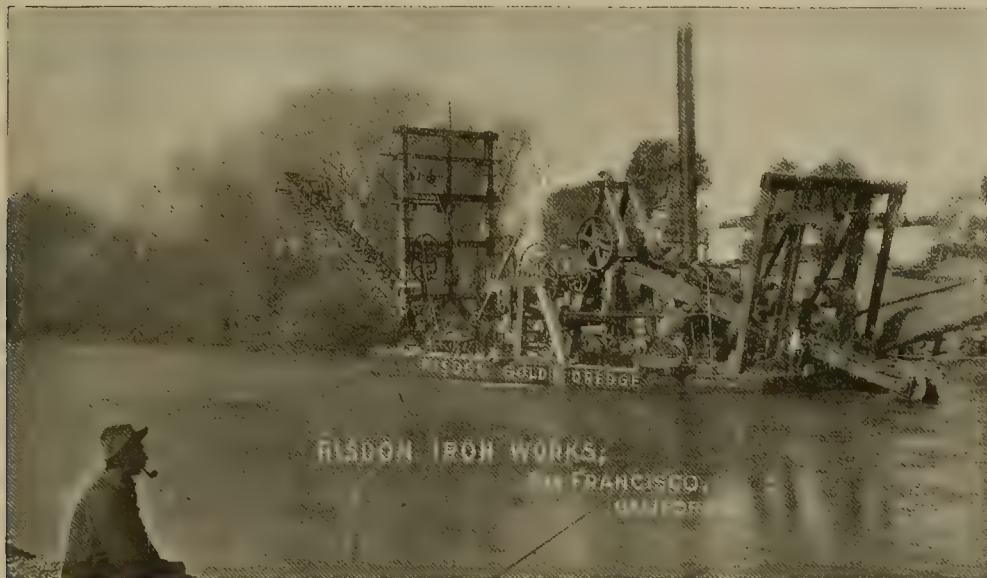
Most of this apparatus has been removed from our own central stations to make room for larger units, and is therefore in excellent condition.

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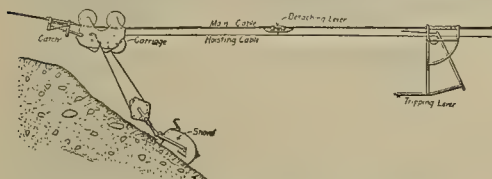
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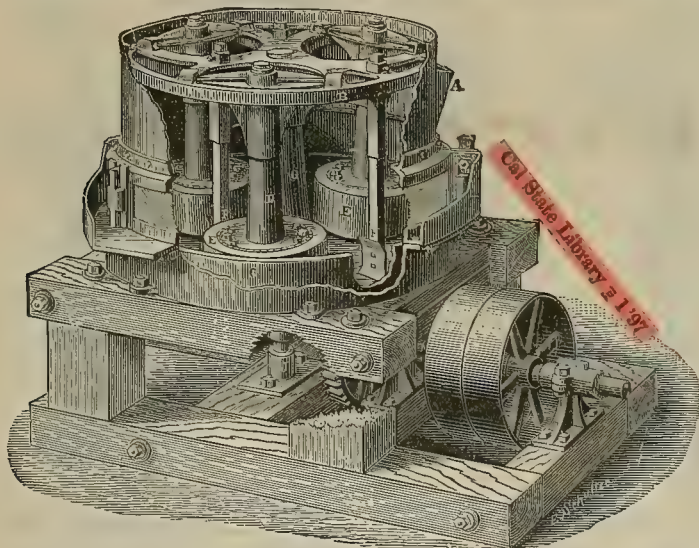
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SAN FRANCISCO, SATURDAY, JULY 16, 1898.

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California Bituminous Rock.

In the issue of June 25th, '98, appeared an interesting scientific article on California "bituminous rock." Bituminous sandstone in Santa Cruz Co. is among the important deposits of that character. The cuts on this page and page 56 give a good idea of how the bitumen is "mined." This Tertiary form of bitumen rock is usually in stratified deposits. Frequently fragments of marine vegetation and the bones of marine animals, together with shells, are found in these ledges miles from the sea.

These bituminous sand-rock ledges have been up-

fineness of the sand usually depends the compactness of the rock, and upon the structure of the sand and the toughness of the bitumen depends its durability. The rock composed of finely divided, sharp, siliceous sand containing from 10 to 17 per cent of tough, elastic bitumen, free from oil, is commercially considered the best. The mine illustrated herein is nine miles west of Santa Cruz, three miles from the ocean, at an altitude of 800 feet. The chief use of the manufactured product is in paving city streets.

The "Life" of a Mine.

The duration of the "life" of a gold lode mine, and

calculations, though entirely independent of it, comes an article in the *Sud Afrikanische Wochenschrift*, with the conclusions of which American miners will, probably, be more inclined to agree. In summing up, our antipodean contemporary says: "The life of a mine depends on the capacity of the mill. The more stamps erected the sooner the ore contents of a mine will be exhausted. In the first years of the Rand mining industry the mills had five, ten, or, at the utmost, twenty stamps. Then the conviction became general that a long life was an economic disadvantage to the mine, and that it was in the interest of the shareholders to produce the gold, and, through the



SANTA CRUZ, CAL., BITUMEN MINE NO. 1.—"MEDIUM" ROCK.

lifted to elevations varying from a few feet to nearly a thousand feet above sea level. Ledges of compressed silt, "chalk rock," frequently overlie the bituminous rock. After this waste cap has been removed, laborers bore holes from 10 to 16 feet in depth, which are sprung with dynamite and blasted with black powder, slicing down the ledge to its base or the quarry floor. It will be seen that only those ledges approximately horizontal and having a minimum waste cap can be worked to advantage, as, while deposits of bituminous rock are numerous, comparatively few can be economically worked.

Examined under a microscope, the rock is found to consist of finely divided sand, each particle of which has a perfect envelope of bitumen. Upon the

determination of its present value, are two things that have long been the subjects of efforts at correct solution by metallurgists and mining engineers. The most pretentious efforts in this direction that have come under present notice form the subject of an extensive monograph to hand by F. Hellman, a South African mining engineer, who gives the matter elaborate discussion. By a system of algebraic equations based upon yield of ore, cost of working, and amount "in sight," he figures out the approximate values of unknown quantities in the various cases proposed in an ingenious though not wholly satisfactory manner. As an example of an effort to solve the impossible, Mr. H.'s figures furnish at least commendable example of zeal, however one may differ from his conclusions. Simultaneously with the appearance of Mr. H.'s

gold, the profits as quickly as possible. This consideration was the cause of the remarkable increase of the stamps. But now these same people find it, in the interest of their deep levels, more convenient to reverse the arguments, and say that the big mills must be unfavorable to the value of the shares because they decrease the life of the mine." There are several factors entering into the problem that are apparently ignored in both the noted instances—among these are the method of working, the skill of the manager, desire for dividends or immediate profit, and other general considerations that will readily suggest themselves to our readers, assuming that by "the life of a mine" is meant how long its active working or development will result in even the smallest net profit.

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THE war long since eclipsed the Klondike, and no amount of reference in newspaper columns to the great store of gold that is "going" to be brought out can renew the excitement of one year ago. Were a considerable amount of gold to arrive, it would attract attention; but newspaper prophecies are becoming ancient, and have ceased to interest. Nothing but the actual appearance of a heavy gold consignment from the Klondike will serve to occasion a recurrence of the acute Klondicitis so painfully resultant to many.

In the issue of the 13th ult. it was editorially suggested that the 25th anniversary of the completion of the first cable street railway in the world could with propriety be honored by the erection of a commemorative memorial in Portsmouth Square, San Francisco, the terminus of the old Clay St. line, and that in connection therewith could with equal propriety be placed fitting testimonial to the inventive genius of A. S. Hallidie, the inventor and first builder of that system of rapid transit. The 25th anniversary will be on the 1st prox. The Mechanics' Institute has petitioned the San Francisco city authorities for permission to erect such memorial, which petition will, doubtless, be promptly granted.

REFERENCE was recently made to casual comment on the "transitory" nature of mining, the point in reply being that mining partakes of the nature of permanency to the same extent of any other form of business, and that it is no uncommon thing to note the collapse and disappearance of old established and apparently prosperous businesses of every kind. A case in point occurred last week—the failure of the Boston Woven Hose and Rubber Co. Here was a long established, conservative, intelligently managed concern, paying dividends steadily for years at the rate of 8% per annum, and its stock above par—115. Yet it has been swept out of existence by some one of the many ground swells in the coming and going of commercial tides. This was a fair representative of "solid" business. Its owners and managers might possibly think mining unsafe and unreliable, a "transitory" proposition. Yet where in the history of mining is found instance where a mining corporation, paying regular dividends, its stock selling at \$115 on the \$100, and carefully managed and intelligently directed, collapsed in a similar way to this "solid" Boston concern? Failure is liable in any firm of legitimate business, mining, manufacturing or mercantile, in the former probably to a less aggregate percentage than in the latter two. As for permanence and continuity of mining, there are quartz and hydraulic gold mines in California that have been worked profitably and continuously for nearly forty years; recently the Eissenzecher Zug mine, near Siegen, Germany, celebrated the 400th anniversary of its continuous working; the Rio Tinto of Spain has yielded almost continuously for over 1000 years. The list might be extended indefinitely.

The International Mining Congress.

The second annual convention of the International Mining Congress closed its session at Salt Lake City, Utah, last Saturday. On the second day Louis Fade read a paper on "The Cyanide Process," which appears in full on page 56.

As heretofore stated, the proposed recommendation of new legislation elicited from the Committee on the Revision of Federal Mining Laws a majority and minority report.

W. B. Heyburn of Idaho favored the minority report. He opposed the proposition of the majority to abolish the apex law and to substitute in its place the "square" claim, giving the locator everything within and beneath his lines. He said he lived near British Columbia, where since 1891 the square claim has been the law. The people of British Columbia, he claimed, after an experience of laws based on the American laws, as well as of the square claim law, now desire to change back to the American system. He argued that a difficulty of location would arise after the adoption of the square claim law. "In order to make a location," he said, "the law requires first the discovery of mineral in place. The man who has the apex can do this without difficulty, but the next man will be required to sink a shaft until he taps the vein before he will be allowed to even make a location. If a poor man, he is simply barred. The square claim worked all right in British Columbia," he continued, "until the original locators and workers of the vein reached their end lines. Then they were compelled to stop, and a neighbor couldn't locate because he hadn't made a discovery."

Mr. Heyburn advocated the proposition of the minority report for the establishment of a base line: "The end lines of the first location made upon any ledge shall govern as to the direction of the end lines of all subsequent locations upon the same ledge."

He spoke of the expense to the prospector under the proposed law and declared that it would be so great that a man financially able to prospect would be so rich that there would be no necessity of his working. "It requires \$50 for a location," he added. "Now I know many locators who haven't had that amount in cash in five years who laid the foundations for the greatest camps in the world."

Mr. Heyburn concluded by urging that no recommendation be made to the national Congress to change a law that has stood the test of a quarter of a century during which it has been interpreted at a cost of millions of dollars.

In support of the majority report, W. S. Keyes of California said:

* * * * *

The first law, that of 1866, was not satisfactory, chiefly for the reason that it invited "jumping." The original locator was obliged physically to trace out any and all subsequent locators who, meanwhile, were robbing number one of the fruits of his discovery. If, for instance, the interloper were, say, several hundred or a thousand feet distant from the discovery it might take many months and much expense to demonstrate that the ore bodies were part and parcel of one and the same vein. Congress required six long years—viz: until 1872, to amend the law as it now reads. They succeeded in curing one defect, but fell into another nearly as bad. They gave the locator a right to follow the dip of his ledge at right angles to its course or strike, but now he is put into a straight-jacket in that he must follow his vein down into the crust of the earth within a space rigidly determined by his end lines. If, fortunately, the locator should have so laid his parallelogram that his end lines form an exact right angle with the course of his ledge, well and good—the coat fits—but if, unfortunately, after further development the vein happens to change its course and pass through one or both side lines, the vise-like grip of the law holds him to the conventional direction which he has selected and may even (as in the Flagstaff decision) cut him down to the mere width of his location and this, in certain districts, may be as small as 50 feet.

Our mining laws were originally made by miners who were not lawyers and by lawyers who were not miners. They built upon the foundation of the mining ordinances of old Spain, but the attempt to improve upon them has resulted in our present hodge-podge of chaotic confusion.

The old Spanish law, once universal in all Spain's colonial possessions, and now happily abandoned over the entire face of the earth with but two exceptions, gave a miner a certain amount of surface ground dependant on the angle of his dip. He was obliged to sink on his ledge ten varas, about 33 feet, which, when accomplished, entitled him to a certain amount of surface ground. The law provided that the commissioner, who marked off his ground by surface boundaries. The miner might follow on his dip, but could not go outside of his surface either on the strike or dip.

The new law—the law now in force in every Spanish speaking country, with one solitary exception, grants simply a surface varying in size from 100 meters by 100 meters, i. e., 328x328 feet in Mexico to 400 meters by 200 meters in most of the Central American States, i. e., 1312x768 feet. In the former case—an amount of land equivalent to nearly two and a half acres; and in the latter—equivalent to nearly twenty-two and three-quarters acres, which is a little more than our 1500x600-foot claims, which cover about twenty and three quarter acres.

All of these countries permit the locator to take as many locations as he chooses, but since the grant is contingent upon paying a cash royalty to the Government no locator takes more land than he actually needs to protect his dip.

It will be evident from the above statements that none of these countries permit the extralateral right and therefore have no need to take cognizance of its corollary, the apex. I look upon this extralateral permission of the law as the chief vice of our present mining code. It has caused more heartaches, more lawsuits and more money lost and property taken by the law than our British friends. I may give some few examples amongst the thousands which might readily be cited. On the authority of a former Surveyor-General of Nevada, Mr. S. H. Marlette, "there was expended in litigation on the Comstock lode during the years 1880-1885, inclusive, not less than \$9,000,000—one-fifth of the total product of the mines and considerably more than was declared in dividends during the same time."

Senator Stewart estimates the cost of litigation carried on by the Chollar and Potosi Mining Companies, prior to 1886, at \$1,300,000, and the expenses of the Ophir-Moscow war at somewhat less than \$800,000. The total costs of litigation in the Washoe district up to January 1st, 1886, he computes at \$10,000,000. As a part of the litigation there sprang up a horde of greedy, conscienceless "standing witnesses" ready, for pay, to swear to anything.

In this connection I may recall a conversation in my presence between a celebrated mining magnate, since deceased, and a man supposed to be familiar with all the facts in a contemplated mining litigation. Said mining magnate wished to learn something about the original location, amount of work, etc., etc., done upon a claim which he had bought or was about to buy, and to which there were several contending claimants. After diligent cross-examination the man was proved to be utterly stupid or absolutely ignorant as to the facts. Our mining magnate lost patience and began to reproach the man in rather rough language. After awhile the man himself lost patience and blurted out: "Just tell me what you want to prove, and I'll know it fast enough."

As an example of the evils of litigation due to the looseness of our earlier mining law, I may here interject a statement of Mr. Eliot Lord, as it appears on page 134 of the Fourth Monograph of the U. S. Geological Survey. The litigation on the Comstock, he says, "The cloud of uncertainty which rested on these claims grew blacker and heavier from month to month. Witnesses were manufactured by wholesale, and testimony to suit the requirements of the case was bought and sold with scarcely a pretense of secrecy."

On page 136, quoting from an address of Attorney-General R. M. Clarke, he says "Chicanery won more suits than eloquence and learning. A few years ago (1863) the practice of the law had, to some extent, degenerated into a mere art of victory."

Such a depth of infamy had been reached that even the ermine on the bench was soiled. I quote again from Mr. Lord, page 151: "The legitimate costs of this multitude of suits were enormous and the expenses of 'fighting fire with fire' were insupportable. The legal war culminated with the remarkable case of the Chollar vs. the Potosi M. Co. The suit was the immediate cause of the resignation of the honorable territorial bench and resulted in a contention without parallel in the history of the litigation of mining claims in its duration, fierceness and cost."

I quote from the speech of the Hon. Frank Tilford, delivered August 1, 1884: "A most potential cause of the present depression of mining is the deep and universal distrust of our judiciary. It is a sad, deplorable and notorious fact, that thousands and hundreds of thousands of dollars have been expended in obtaining corrupt decisions from infamous judges."

I quote further from Mr. Lord, on page 177. Speaking of the outcome of the Ophir-Burning Moscow litigation, he says: "To obtain possession of this section of the Comstock, 800 feet in length, nearly \$1,000,000 had been spent, but it was finally purchased by the Ophir Company at a cost of about \$70,000, while its market value at the time was only \$50,000. No further controversy is needed to disclose the folly of the laws which allowed a locator to follow the dips, spurs and angles of his ledge anywhere."

On page 77, he says: "The total number of suits instituted and defended by twelve of the principal companies of the Comstock, prior to 1887, was 245." Their cost, as heretofore stated, was over \$10,000,000. This vast sum was absolutely filched from the pockets of the owners of the mines, and would have sufficed for very respectable dividends in a certain very rich mine. All of this waste is justly chargeable to the mischievous "law of the apex."

On page 308, Mr. Lord says: "The most preposterous titles would be trumped up, as 'fighting' claims' so-called, and the discoverer of a bonanza might count himself fortunate if he recovered his original investment from the hungry mouths of contestants and lawyers."

"Jumping," perjury and crimes of violence were in the early days of our mining law as common as the locators and locators' agents were. Locations were often made by many ignorant and illiterate men, and even by men who had designedly sought to take advantage of "finds" made by more industrious prospectors who had preceded them? Even if the claim was originally properly located, then came the question of record. The District Recorder was not always honest, and, even if well intentioned, he was often careless. And, further, as I learn from what I believe to be competent testimony, the local land office in a certain very rich mine district, at some years ago deliberately set on fire in order to destroy the records."

I quote from the article of Dr. Raymond, "Mineral Industry," Vol. III, paragraphs on page 3, marked I and II. Also, paragraphs marked on page 4:

"Enough has been written concerning the curious, haphazard origin of our unique mining law, and the innumerable disputes which it has created. It is a law which is not only antiquated and out of date, but it is a law which is a constant source of trouble and expense to the mine owners, though, perhaps, all of this trouble will be reiterated again and again before they will be realized by all the parties whose co-operation is necessary to a radical reform."

"Enough has been written concerning the object lesson presented at this time by the mining districts of the world, including the greater part of the mining industry of the country, in which mining litigation is unknown, while in certain of our States and Territories such litigation is the result of the operation of the laws which give to mines and enriches only lawyers and experts. This lesson may also need to be enforced hereafter by repeated opposition; but only because of the slowness of the pupils who should have learned it long ago."

On page 712, Dr. Raymond writes: "The prospector is best rewarded by a grant of something definite which he can safely hold or easily sell, rather than of something so vague as to be forever uncertain."

On page 713, he says: "The actual expense of litigation under this law has mounted into millions. Is anybody silly enough to suppose that mines subject to such an extra risk can be sold as easily or at as high a price as if the purchaser was sure of getting what he thought he was getting, and sure of being protected in the rights thus definitely acquired?"

"It is plain to see that the all development of the mineral resources of the West will never come to pass until the capital it requires is better protected by definiteness in title and boundaries of mining property. And that cannot be done, in my judgment, by any amendment of the present law which shall leave it in the present abnormal, irregular, indefinite, precarious, and mischievous extralateral right."

"How many years longer will our Western fellow-citizens interested in mining continue to look upon the enormous investment of capital and labor in the development of the mining industry of the country, where mining rights are bounded by surface lines and vertical planes only and 'the law of the apex' is not known?"

"Let them take notice of the immunity from vexatious and ruinous conflicts over boundaries of mining rights enjoyed by placer mines and coal mines under their own eyes, and draw the obvious inference that a similar immunity conferred upon lode mines would be a boon to all concerned."

In view of Dr. Raymond's reference to the immunity from litigation in States where the "law of the apex" does not obtain, I may refer to the testimony of Mr. W. H. Stevens of Michigan and Colorado. I quote from page 307 of the Report of the Public Land Commission of 1880. Mr. Stevens said in relation to the status of mining laws in the States lying to the west and northwest of the Great Lakes:

"In Michigan only one case has been carried to the Supreme Court in the last twenty five years where the question of title to mining lands was raised. This was a contest between the Minnesota and National Mining Companies. The National Company held their title from a grant made by the State of Michigan under the provisions of the School Act. The Minnesota Company derived their title from the old law permitting location and pre-emption by authority of the War Department."

Hence the question at issue turned merely upon the decision of a conflict precipitated by two grants made respectively by the U. S. Government and by the State of Michigan. Such a or similar question might have, or, in fact, has, arisen as between claimants to agricultural lands. Our present mining statutes are a veritable Pandora's box of evils, a prolific source of woes intolerable to the legitimate mine worker. The crying defect is the "law of the apex"—the extralateral right." At the present time there are only three countries in the world which still maintain this absurd provision, which has been the cause of greater and more acrimonious litigation than all others combined. These countries are the United States of America, Bolivia, and Mashonaland in Africa—civilized, semi-civilized and barbarous.

There is no need to particularize as to the effect of this "right" as far as litigation in the first-named country is concerned, and as to the last I am not sufficiently informed. As to the second, however, I quote the testimony of Arthur F. Wendt, M.E., published in the "Trans. of the Am. Inst. of Min. Eng.," September, 1890, page 4. Speaking of certain mines near Potosi he says: "It is on record that in 1669 one Brigadier Montes, owner of the Guallabasi mine, lost a suit brought by Estevos, owner of the Flamencos mine. Montes had crossed from the Guallabasi to the Flamencos vein below the workings of Estevos, and claimed to be working another vein. The report says that 600 men were at that time at work extracting 150-junco ore for Montes. When the suit was decided against Montes he is said to have destroyed the mine. Be that as it may, neither the Flamencos nor the Guallabasi mine has been

worked for over a century, although both are claimed to be among the richest on the globe. It appears from this lawsuit that considerable depth had been attained by the mines of that period, and that the ridiculous law of following a vein, which then held good in all Spanish America and still obtains in the United States, was even then resulting in interminable legal controversies.

Now, assuming for the sake of the argument that our mining code is defective, let us seek for remedies. I can conceive of none other than an absolute wiping out of the extralateral right for all future locations and the substitution of the surface location; or if this seems too radical a departure, let us make it permissive as to all future locations, at the same time making provision that existing rights may not be lost unless the location itself be lost, and in that case to allow the nearest claim or claims to take the vacant ground—a practice which is in vogue in Mexico and works well.

Now, in order to put myself as to the mining customs of other civilized countries, I, as president of the Board of Trustees of the California State Mining Bureau, sent out an official request to the mining commissioners of every State in the world which pretends to keep a record of the production of its precious and useful metals and minerals. The responses were not prompt, although they were in the form of literature, and I was obliged to wait. I desired to learn their practice as to extent of location. I discovered that our neighbor to the north—British Columbia—originally adopted our own complicated and litigation-breeding extralateral right; but, after a long and painful trial, they, like good, hard-headed sensible men as they are, abolished the noxious thing. They found, as we find here today, neighbors and agents of litigation, investors were scared off, the poor men were unwilling to make locations. Now all is peace. Mines are at work and prospecting is vigorously prosecuted. Their unit of location is 1500x1500 feet, with no right of going outside of one's boundaries. The surface area is then a little over 51 acres. This is not too much for a serious mining venture nor, on the other hand, is it too little. In case the lode be vertical, this surface will include all of the dip as far as the lode is payable, and the vein will be found. If, however, the dip be as low as 45°, the locator would, of course, so lay his claim that his outcrop would be found at the point most distant from the direction of the dip, and this would give him 1500 feet perpendicular depth beneath the surface at the opposite side of his claim and about 190 feet in following the dip, which seems to be deep enough for ordinary deep levels. If, however, the miner be more ambitious, I have no objection to his claiming the entire dip in order to obtain all the advantages now theoretically granted under the present law; and further, I would forbid a second location on the line of the dip by any other claimant unless the first locator shall have declined the ground for a certain number of days or weeks, or shall have filed, with the proper authority, a written notice that he declines to locate when, of course, the ground would be open to any other person. If, however, the vein be in the center of a location with this dip (45°), the number of feet on the dip would be about 800 feet.

With the surface location, the miner knows he will escape the fangs of the "gentlemen of the black robe," and also of the expert witness. Next he knows what he owns and knows what he has for sale. Prospectors seldom or never develop their finds to any considerable extent. They do just enough work to give some idea of the value of the claim. A visitor to the mine, by taking along the surface location, can find out something definite—something tangible—and he knows his title is unassailable. If the surface be too small, he declines to buy until he shall have acquired land enough to warrant deep working. In this connection, I may mention a circumstance which occurred last spring in California. A representative of a strong foreign syndicate had found on the gold belt a property of which he approved; he stood ready to pay \$10,000 for the same. He had, however, his attorney investigate the paper title. This was found in order. He then made an examination of our mining laws, and, finding that we worked under our pernicious extralateral right, declared there was no certainty of title and declined the purchase.

I think no one will deny that the square or surface location will prevent ninety-nine out of a hundred of our litigation-will encourage investment and give us peace. It is bad enough to be obliged to take the usual mining chances, but when, in addition to this—to use the words of Chief Justice Beatty of California, long on the bench in Nevada—"we have the certainty of a lawsuit, provided the mine proves to be of any value, the outlook for the legitimate miner and the legitimate investor is far from encouraging."

From the standpoint of the prospector, who has nothing but his labor for his capital, I can conceive of no more so admirably known, further, that the all-powerful arm of the Government will protect him in his rights. He need not fear the combined wealth of the Rothschilds at the beck of neighboring claims. All he has to do is to honestly perform an amount of labor equivalent to \$100 per annum and he is safe. How has he fared in the past? Just recall the countless lawsuits from the days of Potosi to the existing Nevada. In one camp in one of these, I am, as I believe, credibly informed there are no less than thirty-seven suits now upon the docket. Can any system capable of such indebitness be considered as encouraging mining? Is it not a detriment both to locator and legitimate miner?

I have heard the square location attacked on the ground that it tends to a monopolization of the district. No! it does not. It does not do it the other nations of the earth use that system? Why do our fellow-citizens in the zinc and lead-bearing States to the east of us still cling to the dreadful monopoly-breeding system? I have no doubt there are quite a number of miners from these States here present who can inform us on this point. Why is it that so many men, both miners and others, testified before the Public Land Commission that they were in favor of a change in the laws, and that the vast majority of those who made answer were in favor of the square location?

Take this volume, "The Report of the Public Land Commission," and read almost anywhere, and since we are here in Utah and are the guests of the people of Utah, I read the testimony of witnesses from this State. Gen. Bane says, page 483: "I have been much impressed with the idea of making square locations." This would avoid litigation." Says Mr. Burgess, page 488: "I doubt very much if it is possible to retain in the mineral law any provisions by which locator would follow the dip of their claims outside their side lines without provoking litigation."

Mr. Noonan says, page 508: "I have been a miner fifteen or sixteen years. I think there ought to be a square location about 1500x1500 feet."

On page 512 Mr. Tiernan, Mr. Lynch, Mr. Colbath, Mr. Scott, Mr. Erb, etc., etc., twenty-nine in all, would make the unit of location 1000x1500 feet, without the extralateral right.

Again, on page 516, Messrs. Wilder, Bentley, Dickson, Bowers and Morton, all surveyors or engineers, agree to recommend 500x1000 and no extralateral right and no limit to the number to be taken.

And so we might go on, which is unnecessary, since it would be merely cumulative testimony. The great majority of witnesses who have ever been asked in a similar manner, and I would respectfully ask, Are all these people mistaken? Are they one and all monopolists?

In reading over the testimony of Mr. F. J. Wrinkle of Virginia City, Nevada, we find an opinion at variance with those of the proponents of the surface boundaries. Mr. Wrinkle is one of the best posted of all our mining men. He drew a most comprehensive map—namely, very much in the best of arguments against his own and in favor of the square location theory.

Intercalated between the pages 436 and 437 of the record appears this map, and by this very map—by the very lines he has drawn upon it—he himself shows that two parallel locations of 1500 feet each, and carried vertically downward, would include up to today every bonanza found in the Comstock and the big and the little, and the major portion of the deep ore body found underneath the Scorpio, a claim which commences nearly three-fifths of a mile to the east of the Union Consol idated outcrop.

If any further testimony be needed we can appeal to the attempt of Senator Stewart, the stalwart advocate of our present mining statutes upon the floor of the United States Senate. (From the work of Mr. Lord of the U. S. Survey, page 145.) Wm. M. Stewart proposed to end the Potosi-Chollar-Grass Valley litigation by defining the respective claims by surface boundaries.

He was convinced that the principal wealth of the Comstock would be found to the east, and although he did not disguise his opinions, he found few to agree with him. He formed a dashingly brilliant and sagacious plan, and he should be commended to the limits of the planes bounding their respective claims. All pending suits should be adjusted as soon as possible, and the main cause of litigation having been removed, he foresaw that the mining industry of the district would expand with natural vigor. Now,

this was substantially a relinquishment of the cherished but litigation-prone locator which followed the dip of his ledge indefinitely, and a substitution of the often derided Spanish or Mexican system of allotment; yet it was clearly the most expedient course to pursue.

The scheme, sound as it was, fell through, owing to the obstinate stupidity of a majority of the Chollar trustees.

That Senator Stewart was not the only advocate of surface locations, even on the Comstock, is proven by the testimony of Judge H. C. Whitman, given on October 11th, 1879, before the Government Land Commission. Judge Whitman was then the attorney of the great bonanza firm. They submitted to him the question of the "apex" or surface location, and he replied as follows (page 421 of the Report): "I think the square location, i. e., common law, would have no injurious effect upon deep mining. On the contrary, it would improve it, have a good effect, always provided that the United States survey and its monument. A man could then go in there feeling that he owned that piece of ground, and I think every prospector would be willing to avail himself of that and go to work on that supposition. The history, so far as I know, of every mine and mining company is continued litigation and expense by adverse locations. With a square location there could be no litigation. Mining men would be more willing to invest in a square location than they would in what we call ledge locations."

Heretofore it may be alleged that I have intimated that the members of the legal profession are not in sympathy with such an improvement in the law as will reduce litigation to a minimum. I have talked with many of them on this very subject, and to their honor be it said I have found but two attorneys who did not agree with me.

Students at the bar are as far as I have been able to learn, a unit on this question, and I am pleased to be able to repeat a few lines from one of them on this subject. I quote: "The methods provided for location and patent, to say nothing of the interminable confusion subsequent upon the recognition and attempted enforcement of extralateral rights, have involved mines and miners in a mass of litigation, the extent and expense of which is almost incredible. The present system should be repealed in toto."

The debate was also participated in by Chas. Mullen of Boise, Idaho; Thos. Smith, Tres Piedres, N. M.; H. E. Duncan, Oroville, Cal.; Prof. S. B. Christy, Berkeley, Cal.; L. Holbrook, Provo, Utah; Marks and Graves of Colorado, Morgan of Idaho, Read of Nevada and others. Upon the conclusion of the debate on the committee's report, C. E. Allen of Utah offered the following, which was unanimously adopted:

Resolved, That it is the sense of the International Mining Congress that the mineral laws of the United States should be so amended as to do away with the extralateral rights in mining claims.

Both majority and minority reports were virtually rejected in the forms presented.

There was not so much difference of opinion as to the necessity for a national Department of Mines and Mining. The following memorial to Congress as reported by the Committee on Resolutions was unanimously adopted:

WHEREAS, The mining interest produces the raw material which makes manufacture and commerce possible, and is the foundation of national prosperity; and,

WHEREAS, The miner makes a hand-to-hand fight with danger in depths of earth by which the whole country profits; and,

WHEREAS, In view of the difficulties and dangers which surround him and the fact that the scientific and executive aid which he needs can be understood and appreciated only by one who has shared his life and shared his difficulties, privations and dangers; and,

WHEREAS, The creation of the Department of Agriculture has already been of incalculable benefit to the agricultural industry, while the mining industry still languishes, a dependency of a department devoted to other interests and necessarily unable to understand and appreciate it needs; therefore, be it

Resolved, By the International Mining Congress, at Salt Lake assembled, that we do unanimously petition the Congress of the United States to create a new department, to be known as the Department of Mines and Mining, whose purpose shall be to aid, develop and foster the mining industry of the United States by every influence within its reach; and, further, be it

Resolved, That the president of this association is hereby directed to appoint such committees and take such action as shall bring this measure to the attention of every member of Congress and to stand firm in its support without compromise of any nature until favorable action has been secured.

A resolution by Delegate Frankenburg of Colorado was adopted recommending that the existing mining laws be so changed as to prevent the locator of a claim from amending his survey before the claim is patented.

Thomas Smith of New Mexico introduced a resolution, petitioning the United States Congress to restore to the public domain for entry the mineral portions of the confirmed land grants, which was not acted upon.

At the afternoon session a motion was adopted authorizing the president of the congress to appoint such committees as should be necessary to carry into effect the business transacted by the present session of the mining congress.

A resolution offered by Prof. Christy of the University of California was passed, recommending liberal increase in the appropriations for carrying on United States geological survey and the co-operation with surveys now carried on by the States independently.

The congress then adjourned to meet at Milwaukee Sept. 7, 1899.

There were present 230 delegates, representing Arizona, California, Colorado, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, New York, Nevada, New Jersey, New Mexico, Oregon, Pennsylvania, Peru, S. A., South Dakota, Tennessee, Utah, Venezuela, S. A., Washington, Wisconsin and Wyoming.

Concentrates.

The Tritle mine at Big Bug, Ariz., has been sold for \$5000 cash.

The new camp of Republic, Wash., wants a custom mill built there.

H. ASHTON, an old-time prospector and mine owner, died June 29th at Prescott, Ariz.

The prospector and his interests were not lost sight of in the Salt Lake Mining Congress.

The coining presses at the Carson, Nevada, mint are being shipped to the Philadelphia mint.

The June shipments of quicksilver from the Napa county, Cal., mines aggregated 899 flasks.

It is expected that the Gila Valley, Globe and Northern Railroad will reach Globe, Ariz., Dec. 1.

The Bradford Co. of Philadelphia have bought the Comer & Sons mine at Big Bug, Ariz., for \$15,000.

The pipe line from the new compressor to the Noble Five mine in the Siocan, B. C., will be 800 feet long.

The consumption of cyanide on this coast is increasing. One mine, the De Lamar, at De Lamar, Nevada, uses 900 lbs. per day.

At the annual election of the Miners' Union, Grass Valley, Cal., F. R. Bawden was chosen president and E. F. Whiting secretary.

Owing to the recent great fire at Park City, Utah, the Silver King mine will distribute a supplemental \$2000 dividend this month.

A DRIFT MINE that is not a hydraulic mine is that of the Golden Shaft at Dutch Flat, Cal., the gravel being taken out a 100-foot shaft.

DE LAMAR, Nev., reports so many men volunteering for the war as to leave vacancies for hard-rock miners in the De Lamar mine and mill.

FROM Kodiak island, Alaska, this week came sixty sacks ore, thought sufficiently rich to warrant shipment to San Francisco for treatment.

CRIPPLE CREEK, Colo.'s gold output for June was \$1,303,925, the largest in its history. The yield for six months ending June 30th was \$7,500,000.

J. B. CROCKER, the representative of the Rockefeller interest at Everett, Washington, says the Everett & Monte Cristo railroad will not be rebuilt.

G. W. COPLEY, a mining man of prominence, died July 3rd in Spokane, Wash. He was interested in mining properties in the Cœur d'Alene country.

THERE are no present applications to the California Debris Commission to work hydraulic mines, nor will there be any likely till the fall rains set in.

The Congressional Committee on Mines and Mining reported unanimously the Barham bill, creating an executive department of mines and mining.

FOR the week ending July 7 there had been filed 479 certificates of location of mineral claims, nearly all on the south half of the Colville Indian reservation, Wash.

The Mining Congress at Salt Lake City last week declared in favor of the abolition of extralateral rights and the creation of a Cabinet Department of Mines and Mining.

The director of mint's report for fiscal year ending June 30th shows coinage of \$64,634,865 gold, \$16,485,584 silver and \$1,489,484 in minor coins; standard silver dollars coined, \$10,902,730.

The big \$3,000,000 deal for the purchase of the Le Roi, B. C., mine is off. The London directors grew tired of the wrangle and gave the contracting parties till July 12th to deliver the mine over or quit.

The new Government assay office at Seattle, Wash., begins business to-day. The gold that comes to San Francisco will be minted here; gold received at Seattle will be sent to the Philadelphia mint.

THE Nelson, B. C., Miner says that the men at the Hall Mines smelter at Nelson are protesting against a reduction in their wages from 25 to 20 cents per hour, and as a consequence the plant is shut down.

In every company of soldiers that has sailed from San Francisco to Manila is a large proportion of miners, prospectors and mining engineers, from the States of California, Colorado, Utah, Oregon, Idaho and Montana.

COLORADO SPRINGS, Colo., capitalists have expended \$100,000 trying to bore the Strickler tunnel through Pike's Peak. Last week a heavy flow of water caused work to cease, and indications point to an abandonment of the project.

The product of the Champion iron mine at Champion, Michigan, has been contracted for by a New York concern. The Champion is supplying solid slabs of magnetic iron ore, which are used to replace platinum as anodes in the collection of chlorine gas.

IN an effort to substitute Chinese for white labor on the Grizzly mine, near Summerville, Cal., a miners and citizens committee waited upon the authorities of the mine, in consequence of which the Chinese were all discharged and the white laborers reinstated.

AT a miners' drilling contest at Prescott, Arizona, July 4, Evans and McDougall of McCabe drilled 28 11-20 inches through granite in fifteen minutes, winning \$250 and two championship medals. In the single-hand contest J. Lebart drilled 16.1 inches, winning \$125 and a championship.

THE \$300,000 option on the Republic mine expired last Wednesday. Had the deal gone through, the Colville reservation, which was only opened for mineral exploration a little over two years ago, would have had the credit of producing a mine that commanded the biggest price of any in the State of Washington.

SANTIAGO DE CUBA which surrendered to U. S. troops last Thursday, the first part of Cuban territory lost by Spain in this war, is the region first conquered for Spain by the invading forces of Diego Velazquez in 1511. The existence of gold mines, after which the invaders were so eager, in the immediate neighborhood of Santiago gave it prominence three centuries ago.

THE "Spanish privateer standing on and off the Vancouver Island coast to intercept the Klondike gold fleet" reported in the daily press dispatches is a "fake," a mere figment of the imagination. It is probably inspired by the Canadian Pacific S. N. Co., to induce belief that "gold laden" vessels from the Klondike are probable, and to scare traffic into British bottoms. Such lies are more than ordinarily stupid.

The Cyanide Process.

Following is a paper read by Louis Fade before the International Mining Congress at Salt Lake City, Utah, July 7th, '98, and specially reported for the MINING AND SCIENTIFIC PRESS:

For every ore, so to say, a special process must be worked out, based on a scientific investigation of the material to be treated. One of the first questions to present itself is, Which gold ores can be successfully treated by the cyanide process? So-called coarse gold is not acted upon by cyanide, or, at least, only so very slowly that it is not practical to apply the cyanide process to ores which contain the gold in a coarse condition. Experiments and experience gained have shown that the precious metals can be successfully extracted by means of cyanide from low-grade gold ores, in which the gold occurs in a very finely divided free or metallic state, and I believe I am safe to state that, in nearly all gold-bearing ores, the gold exists in a free and not in a combined state. By this, however, I do not want to say that every low-grade ore in which the gold occurs in a very finely divided state can be treated by cyanide with success; but, with very few exceptions, ores of this nature can be treated. The selective action of a dilute cyanide solution on gold ores in preference to

ore, or if it belongs to the class of pyrites. The percentage of other metals, and in what combination they are present, should be known. Further, it is of the greatest importance to know the amounts of silica, alumina, magnesia, lime, etc.

According to the result of this analysis, it is for the metallurgist to decide whether it is advisable to subject the ore to a number of practical experiments or whether the ore is unfit to be treated by cyanide at all. If, in the metallurgist's opinion, it is worth while to make further experiments in order to become better acquainted with the nature of the ore, the first, and, in my opinion, the most important, question to decide is: Which is the most practical way for crushing the ore—that is to say, what crushing apparatus or machinery is the most favorable to use? To what size should the ore be best reduced for leaching purposes?

The question of dry or wet crushing has to be ventilated. The answer to this question depends altogether on the nature of the ore. On the one hand dry crushing is the proper way, and, on the other hand, it is detrimental and wet crushing preferable. On first thought, one is inclined to believe that the finer the ore is crushed, the better it is for leaching purposes; but this is very often a wrong conclusion. It may be all right for very hard siliceous ore, but not for an ore containing, for instance, alumina and mag-

extractions known, about 85 per cent of the assay value of the ore, is gained.

During my last stay on the Rand, in 1895 to 1896, I had the opportunity to convince myself that the classification and separation of the ores, according to size and specific gravity, before the treatment with cyanide, was a great success. On my visit to the Transvaal in 1893, three processes were in use to recover gold from ore: First, amalgamation over copper plates, by which most of the free milling gold was recovered (about 50 per cent of the assay value); second, subsequent chlorination of the concentrates from the Frue vanners; and, third, cyaniding of the remaining tailings. In 1897 the total output of the mines on the Rand amounted to over 3,000,000 fine ounces gold, of which one-third—say 1,000,000 ounces—was recovered by the cyanide process. That the amount of gold recovered by cyanide has increased so considerably during the last few years, and that the cyanide process has become quite a strong competitor to the chlorination process on the Rand, is mostly due, first, to the above-mentioned classification of the ore, and, second, to the so-called double treatment of the ore.

I thought it well to say a few words about these two processes, as in some cases they may be applied with advantage in this country. They may either help to increase the extraction or may lead to the



SANTA CRUZ, CAL., BITUMEN MINE NO. 2.—"SOFT" ROCK. (See page 53.)

the sulphides of base metals, with which they may be associated, is so wonderful that, from a chemical view, we may say that it is possible to extract the gold from all low-grade ores by means of cyanide, with the exception of ores containing copper, zinc and antimony combinations. In these cases the treatment becomes difficult, if not impossible. It is rather unfortunate that cyanide has this selective action, more or less, also on ores containing the above-mentioned metals. If this were not the case, we could say that this excellent process with which the names of Messrs. MacArthur and Forrest are so closely connected, and to which gentlemen the whole mining industry of the world is indebted for having first introduced the process, could from a chemical standpoint be applied successfully to all classes of low-grade gold ores.

In many cases in which the cyanide process proved to be a so-called failure, this failure was by no means due to the chemical action of the cyanide on the ores, but more to the preliminary treatment of the ore. Before beginning the experiments in order to prove whether an ore could be successfully treated by cyanide, it is absolutely necessary to become thoroughly acquainted with the nature of the ore as to its chemical qualities, as well as to its general structure. In every case a quantitative chemical analysis of the ore should be made, in order to find out if the ore is an oxidized (so-called free milling)

nesia, which are apt to form slimes when coming in contact with the cyanide solution, and these slimes render the ore impenetrable to any solution, and, therefore, make good extraction impossible.

To give a very good example in order to show how important this question of crushing the ore to its proper size for leaching purposes with cyanide solution is, I only need refer to what occurred some years ago at the now world-renowned Mercur mine, not many miles from here. At this time, six to seven years ago, the former managers of this mine and cyanide extraction plant—which, by the way, was the very first plant for treating ore in this country by the so-called direct (cyanide) process—were advised to grind the ore to the size of about 600 mesh in order to attain the highest possible extraction. The result was an extraction of only about 40 per cent of the assay value of the ore. This for some time proved quite a puzzle and was of great trouble to the managers. After many and not very successful experiments had been gone through, it was decided not to crush the ore so fine on account of the porous nature of the ore and its considerable percentage of talc and alumina, which latter, of course, rendered the ore rather impenetrable for the cyanide solution. The results were that the coarser the ore was crushed the higher the extraction became, and to-day, while the ore is crushed only to the size of $\frac{1}{4}$ inch square, one of the highest

successful treatment of ores which were not treatable before.

On the Rand it was proved that, first, a decided separation of the sandy ore from the slimes is necessary in order to obtain a good extraction; second, that by classification and concentrating ore into different groups, of different sizes and specific gravity, a much higher extraction is gained.

This separation and classification of the ore is done by passing the ore as it comes from the plates through a system of so-called Spitzlütten and Spitzkasten apparatuses well known to all of you, and which I therefore do not think necessary to describe in detail.

There is no more doubt that an ore crushed to as even a size as possible is much better leachable than an ore crushed in various sizes. Even a very finely powdered siliceous ore can be leached successfully if the size of the very small particles is more of an even size. Ores crushed to different sizes do not leach as well because the finer particles will always fill out the minimum spaces left between the coarser particles, and render it therefore much more difficult for the solution to penetrate and to come in contact with the gold-bearing particles of the ore.

On the Crown Reef mine—one of the best managed mines on the Rand—for instance, the ore is separated into two sizes and slimes by means of Spitzkasten after leaving the plates. Each size is col-

lected into a different leaching vat and treated for itself. The extractions are very good, as shown by the following figures:

In February, 1895, 16,056 tons of ore were treated; 59.721 per cent pure gold of the assay value of the ore was recovered over the plates; the first size made, being the coarser and more pyritic ore, amounted to 1057 tons. The residues of this size assayed 1.5 dwts. per ton after treatment by cyanide and the amount of this gold recovered was 7.578 per cent fine gold of the assay value of the ore. The second size made, being the finer and more sandy ore, amounted to 10,152 tons (residues assaying 0.87 dwt. per ton after treatment with cyanide). Fine gold recovered was 17.829 per cent of the assay value of the ore. Slimes amounted to 4847 tons, assaying 3.07 dwts. per ton. This gives a total actual extraction of 85.128 per cent on the assay value of the ore and a loss of 14.878 per cent, of which, however, 8.687 per cent was contained in the slimes, of which again about 85 per cent was recovered by a process worked out and introduced by Mr. Williams, so that there was an actual loss of only about 7 per cent of the fine gold contained in the ore, or about 1.5 dwt. per ton of ore.

Before referring now to the above so-called double treatment, I should like to quote a remark made by Mr. MacArthur at a meeting of the Society of Chemical Industry in 1890: "Elsner has stated that metallic gold dissolves in cyanide of potassium only in presence of oxygen. Not having seen the original account of Elsner's researches, I am not in the position to criticize his experiments; but I never could find that the presence of oxygen was necessary either to dissolve gold by itself or from ores by cyanide. If a piece of gold be immersed in a cyanide solution, so that air to act on it would have to penetrate two or three inches of the solution, the gold will dissolve in its usual slow and steady fashion. The equation shows that either oxygen must be absorbed or hydrogen evolved. I have seen no evidence of the former and can adduce no proof for the latter; but I think the latter the more probable, because I cannot conceive oxygen penetrating even a film of cyanide solution without at once oxidizing the cyanide to cyanate, whereas in the other case, as suggested to me by my friend Mr. Ellis, the nascent hydrogen may be at once seized by the excess of cyanide present and ammoniacal compounds formed. However, we do not concern ourselves much with the reactions of pure gold, but, as a matter of fact, we cannot find that oxygen plays any part in the cyanide extraction of gold from ores. We have treated an ore with cyanide with free access of air, and then a parallel experiment was done with boiled water, the bottle filled to the stopper with a solution of ore and the stopper sealed. The extraction was the same in both cases."

To-day no chemist is in doubt any more that Elsner's formula is correct and that the presence of oxygen is absolutely necessary for dissolving gold by cyanide. That this is so was proven by many experiments, of which I will mention one as very striking. Take two small pieces of filter paper, put equal parts of precipitated fine gold in powder form on each of them. Make up a very dilute solution of cyanide into two beakers. Take one of the filter papers with the gold on and put it in one of the beakers, but so that it floats on the surface of the solution only. Take the other filter paper with the gold on it and bring it into the second beaker, but so that it is covered by the solution at once. Allow it to settle to the bottom of the beaker, and, if it does not do this by its own gravity, assist with a glass rod. You will notice that the gold on the first filter paper will be dissolved in a few seconds on account of the cyanide solution coming in contact only from below, while the gold itself is exposed to the oxygen of the air. The gold on the second filter paper which lies at the bottom of the beaker, and which is perfectly covered by the solution, therefore not being able to come in direct contact with the oxygen of the air, requires hours before it becomes dissolved.

The practical confirmation of Elsner's theory has led to the so-called double treatment, which, in fact, is nothing but an oxidation process in which oxygen of the air takes the part of an oxidizing agent. To apply this double treatment, two leaching vats are placed above one another, so that the contents of the upper one can be easily discharged into the lower one by means of Butters' patented bottom discharge.

After the ore is charged into the upper vat, it is moistened with a dilute cyanide solution. After several hours, the ore is discharged into the lower vat. By doing so, the ore, moistened by the cyanide solution, cannot help coming in contact with the oxygen of the air. The practical result is that the first leaching, followed with a very weak cyanide solution in the second vat, holds by far the largest percentage of the gold contained in the ore. Practically, the formation of the double salt cyanide gold cyanide potassium had already taken place, and it requires only several washes with a weak solution to extract the yellow metal.

Free-milling, sandy tailings do not require a double treatment. The oxygen of the air brought into contact with the ore at the same time with the solution is sufficient in these cases.

Double treatment has been worked with very good

results on pyritic tailings, and I do not see why it should not work well with a low grade pyritic ore as well.

In cases in which the gold contained in the ore is not very readily acted upon by cyanide, a so-called artificial oxidation may be applied with success. Experiments have proven that an addition of oxidizing chemicals accelerates the solution of the gold considerably. There can be no doubt that the oxidizing qualities of, for instance, permanganate of potash, ferri-cyanide of potash, peroxide of sodium and other oxidizing chemicals, may be of great advantage in extracting gold from pyritous and refractory low grade ores. It is certainly worth while in cases in which refractory ore is not treatable with success to make experiments in this line under the direction of a good and competent metallurgist.

I have perfect confidence that the extraction of gold from ores by cyanide will increase in this country for a good many years to come, and that many low grade gold ore deposits, which were regarded as not payable heretofore, will become possible to be developed and worked successfully by the cyanide process, the process by which it became possible to increase the gold output of the whole world considerably, and is one of the reasons that the United States takes the lead to-day of all gold producing countries, which, let us hope, will be the case for many years to come.

Scorification and Cupellation Without Muffle ---A New Furnace and Method for Gold and Silver Assays.*

NUMBER II.

By GEORGE A. KOENIG, PH. D.

The Blast.—Experience has shown that the best effect will be reached when the air current at the nozzle balances a water column of 10 inches. The aperture of the nozzle is $\frac{1}{16}$ of an inch in diameter. The nozzle itself is made from pure nickel wire $\frac{1}{16}$ inch in diameter, the block being $\frac{1}{2}$ inch long; the $\frac{1}{16}$ -inch hole is drilled. This block is driven into the iron nozzle-pipe (8), Fig. 1, while the pipe is hot. The pipe (8) is either straight or curved with a radius of 10 inches. My first nozzles were made by simply hammering together the end of the iron pipe to one-half its diameter. This answers the purpose for a time. But gradually the oxidation proceeds, reducing the orifice at first, and ultimately making a wider hole, irregular in shape from the peeling or breaking off of the magnetic oxide. The nickel is so much less subject to oxidation than, from present appearances, a very long duration of the nickel-nozzle may be surmised. The air supply for one or two furnaces is best obtained from a Catalan water blast when the water rate is low. I had a Richards pump on hand, and set it up under a head of 120 feet of water. The supply was not sufficient for one nozzle. But since this instrument is primarily intended as a vacuum pump, and for that purpose is very good, its deficiency as a blast producer cannot be well laid against it. I replaced the suction nozzle with a No. 3 boiler injector, and obtained a supply for three nozzles at 10 inches water pressure. To do this a very considerable consumption of water is required. For a single furnace or two a pair of bellows will answer, but in this case the assayer needs an assistant to do the treading or pulling. The new assay laboratory of the Michigan College of Mines, which is just now being equipped, will have sixteen Koenig furnaces. The air will be supplied from a balanced air holder, into which it will be forced by means of a compressor. The power comes from a 2 H. P. gasoline engine, which will also drive the rock crusher, rolls, and sifting and mixing drums, necessary in preparing the assay samples. At the assay laboratories of mines and smelters there will be no difficulty, of course, as these works are furnished with air compressors.

Firing Up the Furnace.—The phenomena are just as in a Hoskins furnace. At first there is incomplete combustion and dissociation of the complex carbide molecules. The very disagreeable acetylene is one of the products. But since the furnace is supposed to stand under a hood, the temporary production of that compound, which should not exceed three minutes in duration, is of very little consequence. The acetylene formation is quantitatively stronger when the hot vapors strike a relatively cool surface.

Let the pressure upon the tank be low at the beginning, and if possible keep an extra Bunsen burner, placed right against the rear wall of the furnace under the burner. Such a burner can be rigged up easily even at a laboratory where gas is not used. An Erlmeyer flask is filled with 50 cc. of gasoline and loose cotton. The stopper has two perforations. Through one enters a tube to near the bottom, and this tube connects by a rubber tube with one of the blast nozzles. The other connects with the Bunsen burner. A very strong and steady flame can thus be produced and maintained for a longer time than it will be needed. If such a flame be allowed five minutes to heat the burner disk, and the gasoline valve be then opened slowly, it will be possible to get the jet to burn at the mouth of the

burner at once, instead of burning inside of the tube, and the combustion will be perfect at once, no dissociation product whatever appearing. It is not necessary to retire the burner mouth from the furnace at starting. In fact, I have two furnaces mounted back to back, with the four burners in rigid position upon the same pipe cross; but each burner is supplied with an auxiliary burner. Should the flame strike back into the tube after the furnace is once heated up, the remedy lies in shutting off the supply valve for an instant, and then opening it very quickly; the auxiliary flame, being partly sucked in at the base of the burner disk, will then come into play as a ready igniter. In fact, I leave this flame, properly reduced, burning as long as the furnace is going, because, as will appear hereafter, it is desirable often to shut down the heat supply completely for a longer or shorter period in order to maintain the most advantageous temperature within. It is just this point which constitutes the superiority of the furnace without muffle over the old muffle furnace. After roasting one set of assays, for instance, the furnace is at bright red heat. The fresh samples do not want more than dull cherry red. Therefore we cut off the gasoline, open the lid, and in five minutes the temperature will be down to the required point. The same thing occurs when, after one batch of crucibles has been taken out, the temperature is bright yellow. To set the cold crucibles into this heat results generally in cracking one or more crucibles. With this furnace such a risk need not be taken, as the temperature can so quickly be reduced. In cupelling, however, this feature is of paramount importance. I find that from fifteen to eighteen minutes are required to bring the cold furnace to yellow heat.

The Roasting Operation.—I find cast iron roasting dishes preferable to the fireclay ones. They are square or rectangular, with the corners well rounded to prevent lodging of material. I have them made of one, two and three assay tons' capacity. Their depth is from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch. They are furnished with projections by which the tongs can get a good hold without touching the contents. There are covers provided for these dishes which prevent loss from the depreciation of the pyrite crystals and crystal fragments during the first period. During this period a slight caking occurs when FeS_2 changes to FeS . I leave the covers on until the blue flame around the further edge of the dish has disappeared. After the lid has been removed I pull out the tuyere plugs and induce a nearly horizontal air current by a proper position of the nozzles. The stop cocks being barely opened, the pressure at the nozzle is much reduced; the current can be made very gentle, and thus a fusion or semi-fusion of high sulphide ores can be easily avoided. Such a regulation is not possible in a muffle, because neither the heat supply nor the air supply can be regulated with any degree of nicety. The lid is the real thermostat. Its perfect balance in any position permits a play in depressing or raising the temperature as quick and unerring as the stop of an organ or the pedal of a piano. As the desulphurization progresses, the air current is increased and the temperature is raised first by lowering the lid, afterwards by turning on more gasoline, until finally the sulphates are destroyed at yellow heat.

The Crucible Fusion.—Each compartment will hold four Battersea F crucibles. With the diaphragm removed there is room for six, or twelve E, or four J, crucibles. The larger number of crucibles will melt down faster than the smaller number of equal size. This is owing to greater absorption in the first place, and increased radiation in the last stage when the high temperature is needed. Working in the usual way, with sodium carbonate as a flux, the operator has only to work the lid when the effervescence begins, in order to avoid overflowing of the contents. Watching through the observation hole, he will see the rising to the rim in one or more crucibles; and as they are all equally hot, or nearly so, the rising in one will be the rising in all. The opening of the lid fairly flings back the seething masses. Stirring is not needed in any ordinary case. The time is about the same as in a Hoskins furnace, always shorter than in a coke or charcoal wind furnace, but not very much shorter. I have lately experimented in the direction of discharging sodium and potassium carbonates as fluxes in crucible fusions. The success has been gratifying and warrants further effort with good promise. The results are not yet ready for publication, because the entire field is not covered. I will say at present only this, that I have put a charge of one ton of quartz ore, one ton of litharge and three tons of flux into an F crucible, having put it into the furnace at dull red heat, closed the lid, given full flame, and not looked at it for fifteen minutes. It was then found at quiet fusion. The condition of the crucible showed that the liquid had never risen beyond an inch below the rim. I gave it three more minutes; then poured, and found perfect fusion with easy liquidity, leaving no pellet of lead either in the crucible or in the slag. Every assayer will recognize the technical importance to himself of such a method of fluxing, which gives him an important quarter of an hour to weigh out a fresh lot of samples, or to attend to other necessary work, instead of blistering his face over an ordinary wind

*Atlantic City meeting of the American Institute of Mining Engineers, February, 1898.

furnace with a stirring rod, trying to keep the "blasted things" from running over—and often without success even at that, for whilst he stirs one crucible, the others will go over. The future flux will be nearly universal; the difference in the charges will be simply more or less, according to the acid or basic character of the ore. A few exceptional or extreme cases only will remain, in which other fluxing material will have to be added.

That I should have found the new furnace serviceable for lead assay work may be expected. The crucibles may either be set upon the bench or on the floor. It might be merely indicated here that I propose to investigate the old Clausthal method by alkaline flux and oxidation; for if its theory be correct, the blow-pipes will give the means for the decomposition of the sulpho-salts. I intend also to try cast iron crucibles instead of the unwieldy wrought iron ones; they would be much cheaper than the clay crucibles, but some experimentation will have to precede, in order to establish the proper mixture between white and gray pig.

The Scorification Assay.—I have reached now the special field of the new furnace and method. The accumulated experience of many generations of assayers leads to the conclusion that, everything else being equal, the assay for silver will come nearest the true amount when the melting down of the charge is brought about in the shortest time. My special experience with the new method brings affirmative evidence towards that doctrine. For in every instance the parallel assay has given a heavier button in the new furnace as compared with the muffle; and since I have found the loss in cupellation to be practically the same in both methods, I am forced to account for the higher result by attributing it to smaller loss in scorification, and here again to the more rapid melting down of the assay. This is, of course, only hypothesis. Perhaps the explanation lies partly in the shorter duration generally. My method in teaching assaying is to give the students half a dozen type mixtures, mixed up artificially with the greatest care, each sample containing exactly the same quantity of silver (300 ounces per ton), but in a different state of combination, such as chloride, nitrate, sulpharsenate, sulphide, sulphantimonide, mixed with quartz, pyrite, blende, galenite, chalcopryite, barite, fluorite, calcite, etc. The student puts these samples through until the buttons from each fairly tally. Then he acquires a real knowledge as to the limits of the method in the special and typical cases. He finds that the loss of silver is not at all the same, but that this loss can vary from 3 to 16 per cent with the best work possible. The very first assay is made with clean sand, the 30 mgr. of silver, wrapped in lead foil, being placed on top of the charge, sand and test-lead. This gives the minimum loss. During the last spring course the new furnace was first used by the students. There being only one in commission, each man could have it only for one day. A valuable number of data were, however, collected, aside from my own experiments; and upon these data I ventured the previous assertion that the average in all parallel muffle and non-muffle assays was higher in the latter. The first furnace was not mechanically as perfect as the later ones, and I look therefore with special interest toward the coming spring campaign. The fact, however, that the new laboratory will contain sixteen of these furnaces seems to give sufficient warrant that I do not bring this subject before the profession prematurely.

The following is a description of the process:

The furnace is at yellow heat; the bench and the bottom plate have been covered with fine ground brick (less than forty meshes), which I prefer to bone ash. The scorifiers have been placed upon the bench, so that each one stands centrally before a tuyere. The bench stands $\frac{1}{2}$ inch back from the tuyere wall; the rim of the scorifier touches the wall; the tuyeres and the observation holes are plugged. In three minutes from the closing down of the lid the charge is melted down, forming a steaming bath. Very refractory ores will show, at this stage, floating islands or peninsular formations (the ore charge being 0.1 A. T.). The tuyere plugs are removed, and the blast nozzles are brought into position, so that the jet will strike the circumference of the bath at an angle of about 35°. A very energetic reaction follows, so much so that the fuel supply has to be cut down about one-half. It will be nine to fifteen minutes before the bath disappears under the slag. The oxidation, of course, decreases in intensity as the bath becomes smaller, and the flame must be turned up, corresponding to this decrease. The blast nozzles are now withdrawn, the plugs inserted, and borax glass is added to the scorifiers, either wrapped in paper or preferably poured from a scorifier used as ladle, held with the tongs. Two minutes later the scorifiers are poured out in the well-known manner. Thus the scorifying process has occupied altogether, in the mean, seventeen minutes. The most refractory arsenides and antimonides are thoroughly decomposed in this time. I have not observed in any case the formation of matte or speiss, so common in ordinary muffle work. The A. T. of test lead has become reduced to a button of from ten to twelve grammes. With dry ores it is quite unnecessary to keep up the scorification until the bath is covered

with the slag. For such ones a duration of twelve minutes is quite sufficient and even desirable. For it is better to remove the lead on the cupel than in the scorifier; the chances of mechanical loss are less.

The Cupellation.—The cupels have been, in the meanwhile, thoroughly ignited, having been disposed on the furnace bottom between the bench and the back wall, and also piled up in the corners, during scorification. In the matter of cupels I have lately obtained what seems to be a decided improvement, though, to others, it may not appear in the same light, and this, perhaps, explains why the simple notion has not been adopted in practice long ago. The fact that boneash alone will not make a cohering cupel necessitates the employment of some cementing material, in the choice of which there is not much latitude. This suggests at once the idea of holding the boneash together in a metallic ring. In the English method of test cupellation this idea has long been made practical on a large scale. I do not know whether any assayer has tried to apply the iron ring to an ordinary cupel, and hence do not claim any special originality for giving the notion a trial. It may, perhaps, give to others the same satisfaction which it was given to me. The use of sugar or molasses solution I have discarded many years ago, for I consider the inherent viciousness of the practice almost criminal, from a scientific standpoint. We all know that carbon and lead oxide at red heat will either make carbon monoxide or carbon dioxide. We are most careful to ignite our cupels, so that no gases or vapors shall rise from them when once the work lead is upon them. Yet we put into the very interior of them this multitude of carbon particles, for, indeed, you must ignite a 1.5-inch cupel for many, many hours in an oxidizing atmosphere before the innermost carbon is oxidized. It has been my practice to mix the dry boneash with 1.5 per cent of dry pipe clay, then to moisten the mixture to the proper degree, and, in moulding, to cover the cupel mass with pure boneash. Whilst this makes a well-cohering cupel, it has the drawback of fissuring if not beaten to the exact point. The present practice is to cut a 1.5-inch gas pipe into lengths of 1 inch, to file or grind off the bur, and the containing ring is ready. Moisten the boneash very little, press it into the ring with the thumbs, even full, then set on the die, and drive it in even with the rim. One pound of boneash makes ten cupels. They can be used at once. They do not fissure, at least I have not yet observed a crack. No danger of breaking of the top rim with the tongs; no mishap has occurred to an assay office since I introduced them. At each service a film of black oxide or scale forms on the outside. When the saturated boneash is worked out this film cracks off alone. My experience is not long enough yet to say how many heats a ring will stand, probably between 50 and 100. The cost of the ring does not enter, therefore, as an item of appreciable expense. I find these cupels better absorbers than ordinary cupels, perhaps because the ring acts as a heat storer and regulator.

Now, suppose the cupels have been placed upon the bench, centrally to the tuyere. They should stand off from the wall as much as $\frac{1}{4}$ of an inch. They are at yellow heat when the buttons are placed upon them and the tuyere ports are plugged. A 30-gramme button requires about two minutes to make a smoking bath; smaller buttons less time in proportion. Now the ports are opened, the nozzles are adjusted, and a gentle blast is initiated, until the right point of impact has been found by turning the handle first from right to left, then up or down. The flame is turned off altogether. The correct impact, as well as strength, of the blast will be indicated by the appearance of the bath. The latter looks bright yellow, almost white; it evolves evenly without any oscillations backwards and forwards. The rim of the cupel is dark. This indicates the proper intensity of the reaction. After the operator has gained some practice, a few seconds only are consumed in this adjustment. Passing from one tuyere to the other with the proper adjustment, the proper time distance is gained for the glancing. It would not be convenient to have several buttons come to the glance simultaneously. What goes on in the cupel at this stage cannot be expressed by a more appropriate word than "Bessemerring." The lead proves itself a fuel and disappears, as silicon and carbon disappear in the Bessemer blow. The lead fumes pass out of the vent in brown clouds. The lead diminishes its volume, as if it were running through a crack in the cupel. Thirty grammes of lead with ten milligrammes of silver have come to the glance in four and one-half minutes, and all this time the heat was shut off from the furnace. This rate of speed, however, is not commendable. Though I have obtained satisfactory results with the high speed, in the general run the silver results are too low. Buttons from gold assay fusions may be run at this speed without fear of loss. The rate of oxidation is greatest at the beginning, as may be expected, because the air has a larger surface to work on. In the meantime the operator sits on a low stool and watches the progress through the tuyeres. He is not allowed to be idle, however. He keeps pulling the cupels forward by means of hooked $\frac{1}{4}$ -inch wire, operating through the tuyere, and at the same

time depresses the nozzle. If the buttons are neglected by the operator, the furnace will be at once too cold, and the buttons will wallow in liquid litharge. They do not freeze, as they would invariably do in the muffle under similar conditions. A turning on of the flame will re-establish the proper gait in a few moments. I find that the best speed for 30-gramme buttons is from seven to eight minutes to the glance. How long a 30-gramme button requires in the muffle every assayer knows, and the large gain in time afforded by the blast method is evident, not to mention the comfort arising from looking through a 0.75-square-inch aperture into a dull red heat, as against 13 or more square inches of bright redness. To appreciate this, however, one must have felt the difference; words cannot convey the sensation. As soon as the glance is observed the operator, holding the tongs in his hand, tilts back the lid and lifts out the cupel without rising. The opening of the lid brings with it a lowering of the temperature, and just when the other buttons are nearing the glance this loss is dangerous to their safety. All danger is avoided by turning on the flame at, or, better, somewhat in advance of, the glancing of the first button.

The following may be set down as the essential and distinguishing features of this Bessemerizing of the work lead:

- (1) The cupel is relatively cool.
- (2) The lead oxide vaporizes, instead of soaking into the boneash.
- (3) The speed is from four to six times greater than in the muffle.
- (4) The personal comfort of the assayer is greater.
- (5) The loss of silver, the so-called cupel draught, is apparently the same.

In regard to the fifth point, I have proposed to myself a future communication to the Institute, in which I shall attempt an explanation of the evident anomalies in the assay results, both from muffle work and from working with my new furnace— anomalies which undoubtedly have occurred to all assayers, without having been accounted for, either to themselves or to the assaying fraternity.

Sizes of Wire Screens.

So far as known there is no uniform standard for gauging wire or punched screens for battery use. Following is a compendium of what recent writers on the subject say:

| NUMBER OF NEEDLE. | 1.* | | 2.* | | 3.* | 4.* | 5.* | |
|-------------------|--|-------------------------------|----------------|-------------------------------|--|-------------------------------|---------------------|-------------------------|
| | No. of Mesh corresponding to No. of Needle | Diameter of Orifice in Inths. | Number of Mesh | Diameter of Orifice in Inths. | Number of Mesh: Diameter of Orifice not given. | Diameter of Orifice in Inths. | Woven Wire Screens. | Width of Mesh in Inths. |
| 1..... | 18 | .0438 | ..... | ..... | ..... | .057 | 12 | .055 |
| 2..... | 18 | .0392 | ..... | ..... | ..... | .048 | 14 | .049 |
| 3..... | 20 | .0374 | ..... | ..... | ..... | .041 | 16 | .042 |
| 4..... | 20 | .0340 | ..... | ..... | ..... | .035 | 18 | .037 |
| 5..... | 24 | .0320 | .02 | .029 | 20 | .029 | 20 | .035 |
| 6..... | 24 | .0284 | .25 | .027 | 25 | .027 | 24 | .030 |
| 7..... | 24 | .0261 | .30 | .024 | 30 | .024 | 30 | .024 |
| 8..... | 30 | .0228 | .35 | .023 | 35 | .022 | 35 | .020 |
| 9..... | 30 | .0203 | .40 | .020 | 40 | .020 | 40 | .017 |
| 10..... | 35 | .0178 | .50 | .018 | 50 | .018 | 50 | .013 |
| 11..... | 40 | .0154 | .55 | .016 | 55 | .016 | 55 | .011 |
| 12..... | 40 | .0148 | .60 | .015 | 60 | .015 | 60 | .010 |

- *1—Given in an article written by Luther Wagoner.
 2—Page 27, Bulletin No. 6, State Mining Bureau, by E. B. Preston.
 3—Page 40 of "Metallurgy of Gold," by Eissler.
 4—Page 125 of "Handbook of Gold Milling," by Henry Louis.
 5—Page 128 of Handbook by Louis.

THE question of placing electrical conductors in or near powder magazines has been submitted to a committee of the French Academy of Sciences, who make these recommendations: All underground electrical conductors, as well as gas and water pipes, must be kept at least 30 feet from the magazine. Aerial lines should not be allowed within 60 feet, and must be arranged so that no broken wire can fall upon the magazine. If light is required inside the magazine all wires are to be in strong metallic pipes, and all switches, fuses, etc., are to be on the outside of the building. Only fixed lamps, protected by a second envelope of glass, may be used, and no current should have a voltage higher than 110. Electric bells, only those using a very small current to be allowed, should be at least 12 feet from the powder. As all wires are liable to be struck by lightning, no distinction is made between telegraphic conductors and those carrying the powerful currents needed for light and power.

A RUSSIAN COMPANY is being organized to build a pipe line from the Grosni oil field to Astrachan, 300 miles, and will call for the necessary supply of pipe, the value of which is estimated at 12,000,000 roubles, or about \$6,000,000. The contract will be let either to one concern or divided among no more than two. Prices on both iron and steel pipe, together with connections, are to be quoted f. o. b. Novorossisk on the Black sea. Prices should be given for 8, 9, 10, 11 and 12-inch pipe. Dates for delivery have not yet been fixed.

Coast Industrial Notes.

—M. Lee of Baker City, Or., last week sold 12,000 sheep for \$27,000.

—The Lewiston, Idaho, branch of the Northern Pacific Railway is finished.

—About 500 tons of Columbia river salmon are on cold storage in Astoria, Or., for shipment to Europe.

—The amount of wool stored in Baker City, Oregon, is 550,000 pounds. Its estimated value is \$55,000.

—The wages paid on the Southern Pacific Railroad system averaged \$2.57 a day for the year ending June 30th, '97.

—Our new Hawaiian possessions in the Pacific have an area of 6740 square miles. A cable thereto is next in order.

—A cable is again urged between San Francisco and the Farrallones within a year. The cost would be about \$100,000.

—The California Canneries Co. of San Francisco have made a shipment, overland, to Liverpool of ten carloads of apricots.

—The City Council of Santa Barbara, Cal., will buy a pumping plant at a cost of \$6000 to draw sea water for street sprinkling.

—The North Pacific land department during the year ending June 30 sold 616,679 acres of land, of which 500,000 were in Washington.

—The amount of money put into circulation in Grant county, Oregon, by sheep and cattle buyers this year is estimated at \$100,000.

—The Santa Fe oil wells near Fullerton, Cal., are producing an average of 200 barrels a day. The payroll for labor is \$3000 a month.

—The statement of the Canadian Pacific Railway earnings for May, 1898, is as follows: Gross earnings, \$3,252,999; working expenses, \$1,326,337; net profits, \$926,662.

—It is said that the production of oil in the Los Angeles, Cal., field for June will show a shortage of 2000 barrels as compared with shipments and local consumption.

—The new union ferry depot at San Francisco was opened to the traveling public on the 13th without ceremony. It is considered to be the finest building of the kind in the country and cost nearly \$1,000,000.

—According to a Marysville paper the electric power company that put in a plant on a branch of the Yuba, near Brown's Valley, Cal., is furnishing electric incandescent lights there for 25 cents a month. This includes a twenty-four-hour service.

—T. Marshall, Twenty-eighth and Smallman Sts., Pittsburg, Pa., has been notified that he was the successful bidder on the San Francisco postoffice contract. The order calls for iron and steel structural work and shapes for the building. His bid was \$154,915.

—The Canadian Pacific Railway Company has sent up from Vancouver to the Kootenay two steel boats, which were intended for the northern service. One is to be put together at Nakusp, for work on Arrow lake, and the other at Nelson, for work on the Kootenay.

—Hawaiian banana growers bitterly regret the present war; the government demand for transports interrupts the regular steam communication between San Francisco and Honolulu, and most of the fruit intended for shipment will be unfit for sale before vessels can be secured to convey it to market.

—McLean Bros. of Redding, Cal., have a \$150,000 contract for railroad building for the Canadian Pacific Company in British Columbia. The company will build a branch line 400 miles in length to tap the Kootenay mining region. McLean Bros. have a contract to grade seven miles of roadbed and run a 3000-foot tunnel.

—The price of horses suitable for cavalry and artillery has doubled within the past three months. Cavalry horses have risen from \$60 to \$120 and the standard has been slightly lowered as to age and height. The United States Government never buys a horse whose tail is docked or otherwise changed from its natural shape.

—Upon his arrival at Manila, and when the city is in possession of the United States forces, Major General Merritt will act as military governor of the Philippines and declare that port open to commerce. When this is done President McKinley will make public the schedules which have been prepared fixing tariff duties that must be paid on goods imported into the islands.

—The American River Land and Lumber Co., Folsom, Cal., will make a log drive this fall. The capacity of the mill will be increased to 125 M. feet per day; steam will be used throughout, displacing the dynamos. The company intends to build a dam at Salmon Falls, a receiving reservoir for the logs, to cost \$20,000. The log drive for the season of '99 will consist of 20,000 M. feet.

—The San Francisco and San Joaquin Valley Railroad is filling in on Taylor street, Stockton, Cal., the site on which it will build its passenger and freight depots. Grading and embankment building are being rushed on the line between Stockton and San Francisco bay. Dredgers are working in the swamp, and seven miles of this style of roadbed will be completed before the big tunnel in the Contra Costa range is finished. Railroad building across the marshes is slow work, but the dryness this season aids considerably.

—Fleets of colliers are still rushing coal to San Francisco from the British Columbia collieries, Washington and Newcastle, N. S. W. During the last week 46,517 tons were landed at San Francisco. There were six arrivals from the Vancouver island collieries, with 16,134 tons; five from Washington, with 15,300 tons; one from Oregon, with 475 tons; and three from Australia, with 9864 tons. Notwithstanding that the coaling of the many transports has called freely on the stock, the supply keeps up with the demand. There are

thirteen vessels en route from Newcastle and Sydney, with 33,000 tons, all of which are due this month.

—It is understood that the coal which up to the present has been found in the Philippine islands is lignite, probably of the Tertiary period, and can scarcely be distinguished by the eye from true coal. There has been no systematic search made in these islands for coal. In the island of Masbate a local steamship owner drew his supplies from a bed of coal which is so tilted as to have the appearance of a vein. He supplied himself as long as his native laborers could get the coal with crowbars.

—The Oregon Telephone Company is closing the gap in its long-distance service between Portland and San Francisco. The completion of the line between Portland and San Francisco will connect the long-distance systems of the Northwest and California, make one system covering the whole Pacific coast, forming one of the most extensive and complete long-distance telephone systems in the world. It will connect Portland by telephone with every town of importance from Vancouver, B. C. to San Diego, Cal., and via Spokane and Boise City, Idaho, as far as Salt Lake City, Utah.

—The Santa Fe railroad is credited with intention to build the sixty-eight miles between Bakersfield, Cal., and its present California terminal. The Santa Fe shows renewed enterprise. It is now having built the biggest locomotive in existence designed for mountain climbing. The boiler will be of 1-inch boiler steel and cylinders whose dimensions will be 12x32 inches. It will have no "pops," as they will not be required. No fireman living would be able to build a fire that would create enough steam to burst the boiler of this mogul. The engine will have ten drivers, and it is estimated that it will be able to haul a third larger load than any engine the Santa Fe now has.

—Large sums are being expended in San Francisco by the Government in supplying the military camp there. From June 2 to July 2 Depot Commissary Bootes bought:

| | Pounds. |
|---------------------|---------|
| Fresh beef..... | 804,016 |
| Bacon..... | 78,176 |
| Flour..... | 300,875 |
| Baking powder..... | 13,898 |
| Beans..... | 3,474 |
| Rice..... | 1,158 |
| Potatoes..... | 277,958 |
| Onions..... | 69,489 |
| Roasted coffee..... | 27,708 |
| Sugar..... | 5,312 |
| Vinegar..... | 3,474 |
| Salt..... | 13,898 |
| Pepper..... | 869 |
| Soap..... | 13,898 |
| Candles..... | 5,312 |

This list represents only a small part of the quantity purchased during the time the troops have been in camp, and is suggestive of what is additionally bought for the expeditionary forces.

Recently Declared Mining Dividends.

Silver King, Utah, \$37,500; July 9.
Bullion-Beck, Utah, \$10,000; July 15.
Grand Central, Utah, \$31,250; July 15.
Mercur, Utah, \$25,000; July 15.
Pennsylvania, California, 5 cents per share, \$2575; July 16.
Victor, Cripple Creek, Colo., \$1 per share, \$100,000; July 1.
Jamison M. Co., California, 5 cents per share, \$19,500; payable Aug. 15.
Modoc M. & M. Co., Colo., 4 cents per share, \$20,000; July 15.
Associated G. M. Co., Colo., 1 cent per share, \$12,500; July 15.
Portland, Colo., 1½ cents per share, \$45,000; July 15.
The Cariboo M., M. & S. Co., British Columbia, 2 cents per share, \$16,000; July 1. The total dividends since organization are \$228,965.

Books Received.

"Present-Day Metallurgical Engineering on the Rand," by John Yates, to which is appended a treatise on the economics of the Transvaal gold mining industry, quarto, 136 pp., profusely illustrated, technical description of the engineering connected with the gold industry of the Witwatersrand district, South Africa. Several of the larger plants are described with minute detail of construction, operation and result. There is also a general review of the Rand practice. The exhaustive treatise regarding the status of the Rand mining industry at the time it was written is also a valuable contribution to expert statistical knowledge on that subject. The work is published by the Mining Journal, London, England; price 21 shillings, postpaid.

Catalogues, Etc.

The third edition of Catalogue No. 2, "Gold and Silver Quartz Mining and Milling Machinery," of the Joshua Hendy Machine Works is issued, an up-to-date description of the various forms of milling apparatus manufactured and for sale by this company, handsomely illustrated by sectional scale drawings and electros. In addition to the detailed description appears what are practically treatises on mine economy. A six-page article on "Practical Suggestions to Mine Owners, Managers and Superintendents of Mines," is a sensibly written article of value to any miner or mill man. A five-page article "Suggestions to Amalgamators and Millmen" embodies many practical points and information that could be read with profit by many. The last fourteen pages of this 168-page book are devoted to tables, standard rules, etc. It will be sent postpaid anywhere by addressing the Joshua Hendy Machine Works, 38-44 Fremont St., San Francisco.

Personal.

W. S. KEYES of San Francisco has gone to New York city.

WALTER HOVEY HILL's present address is Lewiston, Idaho.

R. H. POSTLETHWAITE of San Francisco is at Smartsville, Cal.

J. LAZINSKI a mine owner at Globe, Ariz., is in San Francisco.

CHAS. BUTTERS has returned from Kennett, Cal., to San Francisco.

C. H. SOHEN, Gen. Mgr. Cigale Co., Cigale, Utah, is in San Francisco.

H. McDONNELL of San Francisco has returned from New York City.

J. H. TIMBETS of San Francisco is examining mining property near Angels, Cal.

W. B. MARTIN, owner Mayflower mine, Nevada City, Cal., is in San Francisco.

R. C. WALRATH, Mgr. Reward mine, Nevada City, Cal., is in San Francisco.

R. MUIR, a mine owner from Nevada City, Cal., has returned from San Francisco.

R. DILLER, Supt. Dix mine, Magalia, Cal., has returned home from San Francisco.

HON. J. H. NEFF, Pres. Cal. State Miners' Association, has gone to Bartlett Springs.

D. MCINTOSH a mine owner from Weaver-ville, Cal., has returned from San Francisco.

J. C. DIAMOND, Supt. Limpensel mine, Placerville, Cal., has returned from San Francisco.

J. O. RUSBY, Supt. Risdon Iron Works Hydraulic Co., Oro Fino, Cal., is in San Francisco.

J. C. STEELE, Supt. Grizzly mine, Trinity Center, Cal., has returned from San Francisco.

W. T. WATTS of the Cal. State Mining Bureau is exploiting southern California oil fields.

A. WARTENWEILER has returned to San Francisco from his Red Banks mine at Mariposa, Cal.

H. S. MCKAY of Boston, Pres. Boston & Mercur Milling Co., will arrive in Salt Lake July 31st.

L. R. POUNDSTONE, Supt. Big Canyon mine, Shingle Springs, Cal., has returned from San Francisco.

J. S. GOODWIN, managing owner Red Dog mine, You Bet, Cal., has returned from San Francisco.

J. WEISSBEIN, managing owner W. Y. O. D. mine, Grass Valley, Cal., has returned from San Francisco.

CAPT. J. R. DE LAMAR is in Paris, France. He expects to return to Salt Lake City, Utah, in two months.

C. C. BARR of the Geological Survey is arranging for government work in the vicinity of Missoula, Montana.

GEO. A. ANDERSON, Gen. Mgr. for the MacArthur-Forrest Cyanide Co., at Denver, is in Salt Lake City, Utah.

J. F. WEBB, managing owner Pocahontas mine, El Dorado, Cal., has returned from St. Louis to Placerville, Cal.

T. W. DUFF, London, England, is visiting the Poorman mines, in which he is interested, at Silver City, Idaho.

P. C. STROES of Spokane, Wash., is examining mining properties in Alaska for the B. C. Development Co. of England.

A. H. TRIGIDOO left Dawson City, N. W. T., June 20, and expects to reach San Francisco the latter part of this month.

H. F. BROWN of Chicago, who has been putting in roasting furnaces at the Golden Gate, Utah, mill, is recuperating at Auburn, Cal.

C. M. WELBY is Supt. of the Golden Eagle and Ida May properties at Republic, Wash. He is also developing the Transit and Micawber claims.

A U. S. TOPOGRAPHICAL surveying party—R. B. Marshall, E. G. Hamilton, S. F. Hooper—are at work in the high Sierras west of Yosemite Park, Cal.

C. H. JAMES, who recently returned from South Africa, is in Shasta Co., Cal., securing a lease from the Sierra Buttes Co. to work the old Uncle Sam mine.

DR. CAPELL WHITEHEAD, assayer for the bureau of the mint, treasury department, is in Seattle, Wash., establishing the Government assay office in that city.

BARON E. DE LA GRANGE of Paris, president of the LaGrange Hydraulic M. Co., near Weaverville, Cal., has returned to San Francisco after a visit to the mines.

F. A. HUNTINGTON, the mining engineer and manufacturer of the widely known Huntington roller mill, has moved his office to room 1, third floor, Mills building, San Francisco.

W. E. BARROWS of Philadelphia and D. T. Day, statistician of the United States Geological Survey, were at Weaverville and Junction City, Cal., last week, looking for platinum and iridium.

MR. A. S. HALLIDIE has returned from an extensive inspection of industrial schools on the Atlantic slope, in the interests of the projected Wilmerding school in San Francisco, and has embodied the results of his trip in a report to the regents of the University of California.

MAJOR A. J. MYERS of Siskiyou Co., Cal., is in San Francisco to secure the acceptance of the company of Siskiyou county riflemen that he organized. The fact that cavalymen are needed at Manila encourages the Major to hope for an early acceptance of the Siskiyou Rough Riders.

DR. GEO. S. BECKER of the U. S. Geological Survey sailed yesterday on the City of Puebla, which left San Francisco as part of the fourth Manila expedition. He will make a

geological reconnaissance of the most important of the Philippine group, to be incorporated in a Government report on the mineral resources of that region.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING JULY 5, 1898.

606,986.—PROPELLER—Carter & Buhles, S. F.
606,712.—AIR BRAKE—F. L. Guillemet, S. F.
606,718.—WRITING TABLE—E. W. Hill, Corte Madera, Cal.
606,730.—RAILWAY SWITCH—W. McCaffery, Tyler, Wash.
606,677.—PIPE COUPLING—Morrison & Hansen, Seattle, Wash.
606,823.—TREE PROP BRACKET—G. S. Myers, Riverside, Cal.
606,934.—SPRING WHEEL—M. O'Brien, Fresno, Cal.
606,810.—SAVING GOLD—J. W. Pack, S. F.
606,815.—MECHANICAL STOKER—F. A. Stevens, S. F.
607,003.—MANUFACTURE OF GLASS—C. G. Van Fleet, Los Angeles, Cal.
606,905.—SLEIGH AND BOAT—L. Weber, Roslyn, Wash.
28,005.—DESIGN GAME BOARD—Minnie Goldstein, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co. by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AIR COMPRESSING WAVE MOTOR.—John H. Leonard, Leonard Station, Cal. No. 606,561. Dated June 28, 1898. This invention relates to an apparatus which is designed to utilize the movements of waves or swell of the ocean, and in connection with this feature is a combination of air compressing pumps and other connected mechanism. The invention consists essentially of a float or floats hinged or journaled at one end to a vertically adjustable framework and having the other end free to move up and down by the action of the tide. Air compressing cylinders are situated in the line above the movable end of the float guides and slides with which the piston rods of said cylinders are connected, and a pitman connects the slide with the float so that its movements act to compress the air within the cylinders. From this compression the air is conveyed to a second set of cylinders which take the partially compressed air and further compress it into suitable receivers. By means of racks, and pawls which engage these racks, the rising and falling of the float by variation in the tide is compensated and the movement of the pistons in the air compressing cylinders is maintained in proper relation thereto. The compressing cylinders have balanced valves interposed in the passages between the receivers, with springs pressing upon them to close them against the passage of air from one receiver to another until the pressure in the first receiver has reached the desired tension, the valves being opened by any surplus pressure so as to equalize the tension between the adjacent receivers.

MECHANICAL STOKER.—Fred A. Stevens, San Francisco, Cal. No. 606,815. Dated July 5, 1898. This invention relates to a device which is especially applicable for use upon locomotive engines, although it may also be employed for any form of boiler furnace, and it is designed to feed fuel in a pulverized form into the furnace and to spread and regulate it from side to side and front to rear. It consists essentially of a vertically journaled chamber standing in front of the firebox, with a pipe projecting therefrom and delivering into the firebox, steam and air passages discharging into the chamber and through the discharge pipe, a mechanism by which the chamber and pipe are oscillated transversely, a receiving passage above the chamber and a crushing device through which the fuel is passed and delivered into the hopper and chamber. In conjunction with this is a vertically oscillating apron over which the discharge from the chamber takes place, and by means of which the fuel is distributed from front to rear of the furnace, and this in conjunction with the side oscillations of the chamber serves to spread the fuel perfectly and in a thin sheet throughout the whole furnace.

PROPELLER.—S. W. Carter and W. C. Buhles, San Francisco, Cal. No. 606,986. Dated July 5, 1898. This invention relates to a novel construction for propellers. The object is to employ the propulsive force of water ejected upon the edges of the propeller blades under high pressure so that the propeller is rotated by the action of the water upon the surrounding medium. The propeller has a horizontal shaft with passages through the blades which connect with the hollow shaft and thrust bearings formed of balls. Outside of the hollow shaft is a sleeve with means for adjusting it so that the openings in the sleeve may be brought into line with a set of passages in the propeller blades which will act to drive the vessel ahead, or it may be reversed so as to cause the vessel to back.

Recent California Mining Incorporations.

Sonora Mines Co., San Francisco; capital stock \$100,000, subscribed \$52,500; J. McNab, J. D. McGilivray, J. R. Hall, J. Reid, R. Park.

Methods for Preparing Proof Gold and Proof Silver.

TO THE EDITOR:—I submit to you for publication the following methods for preparing both proof gold and proof silver. After a number of trials I have finally developed these methods to my entire satisfaction, and find the results are accomplished in a much shorter time, and with a greater degree of accuracy, than by the old methods.

After assuring myself of the correctness of these methods I have continued to use them, and in 1896 I wrote the Director of the Mint, giving to him a full description of the results I had obtained in this manner. As this may be of interest to others who are called upon to prepare their own proof metal, and knowing your paper has a large circulation among those engaged in this class of work, I am confident it will reach many of them through your columns, and possibly be of some service to them. JOHN W. PACK, Assayer U. S. Mint, San Francisco. July 11th, '98.

In the preparation of proof gold, after having dissolved several ounces of fine gold in nitro-muriatic acid, allow to stand several days that any silver chloride present may settle, filter the solution, then evaporate to crystallization as usual. The manner of converting the gold from chloride to metallic constitutes the difference between this method and the old. After diluting copiously with distilled water, I place the solution in a receptacle from which it is allowed to pour slowly into a glass jar containing several pieces of pure aluminum; the gold is at once converted from chloride to metallic, a great amount of heat being generated. Remove the larger pieces of aluminum, pour off the solution, wash the gold precipitate several times to remove any acid. Then add muriatic acid, and heat to dissolve any small particles of aluminum, after which wash well till free from acid; then dry and melt the gold, which should be proof 1000 fine if proper care has been exercised.

In the preparation of proof silver, I select silver as free as possible from any gold, dissolve in nitric acid and allow to stand for several days that any traces of gold may completely settle; precipitate the silver as chloride, stirring well as precipitation takes place, thus causing the silver chloride to be finely divided; then pour off the acid solution and wash the precipitate well with water.

Place several pieces of aluminum in this chloride of silver precipitate and add sufficient water to cover, then add a small amount of muriatic acid to start reaction; in a short time the chloride will be converted to metallic silver. Remove the larger pieces of aluminum and wash the silver, then add more muriatic acid, and heat to dissolve any small particles of aluminum; wash again well till all acid is removed, then dry and melt the silver, which should be 1000 fine.

An Electric Brake.

To get over the difficulties experienced with hand brakes, the Kubierschky electric brake has been invented. It is composed of four steel segments and coils enclosing one of the car axles, the segments being bolted together and acting as a brake shoe, thus forming a rigid system that is bolted by means of a projecting shank to an arm arranged in the under frame of the car. In front of the shoe is an iron disc, fixed and keyed to the car axle, which forms the armature to the shoe. This is held at its proper distance from the shoe by springs. On a current being passed through the coils the friction surface of the brake shoe is brought into contact with the disc, checking the rotation of the axle and the progress of the car. At Dresden the application of the brake to a seven-ton car traveling at fifteen miles an hour brought the car to rest within a distance of 40 feet.

THE British government, says the *Inventive Age*, has adopted successively

three different American guns for its army, and paid liberally for the patent in each case. The first was the Schneider-Enfield gun, by which the Enfield muzzle loader was converted to a breech-loader. The second was the so-called Martin-Henry, which was the Peabody gun simply changed from rim-fire to center-fire, and last the Lee-Metford, which is the Lee gun with some slight alteration of the breech bolt suggested by Colonel Metford. Germany, Switzerland, Austria and the other European governments simply appropriate inventions, make some slight alteration, give them a German, Swiss or Austrian name and never recognize the inventor at all.

Glass Fenceposts.

A dispatch from Muncie, Ind., says that a glass firm there has received an order for 500 glass fenceposts, to be of the usual size and grooved for the reception of wire. It is added: "The order has caused some speculation and is probably an introduction of an important article of trade." It is an interesting illustration of the tendency of modern science and inventive genius to discover new uses for old materials. One day it is the conversion of the pith of the cornstalk into a valuable article of commerce, and the next the application of glass to a practical purpose hitherto unthought of. The twentieth century may be the age of glass. It has not been very long since the metals or hard woods were regarded as the only fit material for use where strength and durability were required. Now paper is converted into materials for house building, furniture, railway car wheels, boats, and utensils of various kinds. Glass is used for even more purposes, and its increasing cheapness and improved methods of working are likely to bring it into still wider use. No other material invented by man can be compared with it in the service it has rendered, both in common life and in chemistry, astronomy and other sciences. Pure beyond the possibility of contamination, indestructible by any chemical agency, the right hand of science and the foundation of the telescope, the material for thousands of utensils and ornaments, and now to be utilized for fenceposts, it comes as near being the keystone of civilization as anything that can be named. It is a long reach from oiled paper windows to the myriad uses to which glass is put to-day. As late as the sixteenth century in England only the dwellings of the wealthy had glass windows. It is reasonably certain that Shakespeare, who was born in 1564, first saw the light through lattice windows or oiled paper, and he was probably a grown man before he looked through a glass window.

Antidote for Cyanide Poisoning.

The journal of the Chemical and Metallurgical Society of South Africa reprints the following from a German exchange: "Practical experience has shown that peroxide of hydrogen may be considered a powerful antidote for cyanide poisoning. It has recently been applied successfully in 2½ to 3 per cent solution as subcutaneous injections, which were performed every four minutes at different parts of the body. At the same time the stomach was washed out with a 2 per cent H₂O₂ solution.

"Peroxide of hydrogen forms with hydrocyanic acid oxamide, which is a harmless compound: 2 HCN + H₂O₂ = 2 CONH₂ = oxamide."

THE Spanish soldier is a frugal liver, his commissariat allowance being two meals a day—one at 9 A. M., the other at 5 P. M. In some corps coffee and soup are served out in the early morning. A pound and a half of bread a day constitutes the Government ration; any food beyond this must be bought by the private at the canteen. He gets little meat, and keeps in excellent condition on a chunk of dry black bread, a little oil, and a clove of garlic

a day. If to this he can add a pint of wine, which tastes like vinegar and water, he feels happy. There is one thing he cannot go without, and that is his cigarette.

Changing the Form of Stone Under Pressure.

Experiments conducted by Adams and Nicholson at McGill University, Montreal, have resulted in the discovery that by pressure marble can be molded into any desired form while retaining its strength.

This shows however brittle a rock may seem to be, it is in reality a plastic substance, capable of flowing into new shapes. The experiments so far have been made with marble. Columns of marble two centimeters and two and one-half in diameter and four centimeters in length are accurately turned and polished. Heavy wrought iron tubes are then made, imitating the plan adopted in the construction of ordnance, by rolling long strips of Swedish iron and welding the strips to the bar as they are rolled around it. When the welding process is completed, the core of soft iron around which the Swedish iron has been wound, is drilled out, leaving a tube of welded Swedish iron six millimeters thick, and so constructed that the fibers of the iron run around the tube, instead of being parallel to its length. The tube is then accurately fitted on to a column of marble, by giving a slight taper to both the column and the interior of the tube, and so arranging it that the marble will pass only half way into the tube when cold. The tube is then expanded by heating, so as to allow the marble to pass completely into it, and at the same time leave about three centimeters of the tube free at either end. On allowing the tube to cool, a perfect contact between the iron and the marble is obtained, and it is no longer possible to withdraw the latter. Any very slight failure to fit at any point, if such a failure exists in any case, is rendered harmless by the fact that, under a comparatively low pressure, the limestone is found to be sufficiently elastic, not only to fill up any such minute space, and, on the pressure being relieved, to contract again to its original form, so that it will drop out of the tube which has been thus enlarged.

When the marble has been firmly placed in position in the tube, an accurately fitting sliding steel plug is inserted in either end, and by means of these the marble is submitted to a pressure far above that which would be sufficient to crush it if not so enclosed. The machine employed in obtaining the pressure is so arranged that it (the pressure) might be maintained for weeks, or even months. Under these circumstances, the conditions of pressure to which the marble is subjected are those to be found in the "zone of flow" of the earth's crust.

Under pressure applied gradually, and in some cases continued for weeks, the tube is found to slowly bulge until a very marked enlargement of the portion surrounding the marble takes place. The tube is then cut longitudinally, along two lines opposite to one another. The marble within is found to be firm, so that it holds the respective sides of the iron tube so tightly that it is impossible without mechanical aids to tear them apart. By means of a wedge they can be separated, the force of the blow frequently splitting the marble through longitudinally. In one experiment a column of marble was reduced from forty to twenty-one millimeters in height. The deformed marble differs from the original rock in having a dead white color, the glistening cleavage faces of calcite being absent. Although not so hard as the original rock, it is still firm and compact, especially so when its deformation has been carried out slowly. No accurate measurements as to its strength have yet been made, but it will withstand a very sharp blow, and fragments of it weighing ten grams have been allowed to fall from a height of over 8 feet on to a wooden platform, rebounding without breaking.

Limestone and marble, even when

dry and at ordinary temperatures, possess a certain degree of plasticity and can be made to flow, the movements set up developing many structures characteristic of rocks which have been squeezed or folded in the deeper portions of the earth's crust. The average pressure employed in molding the marble is 80,000 pounds to the square inch.

Depreciation of Tools.

In estimating the value of a manufacturing plant, either for inventory purposes or for a statement of assets, one of the most uncertain elements to be considered is the real value of the tools. In the case of a machine shop, for instance, large sums have been expended for machine tools, lathes, planers, drill presses, etc., while the motive power, engines, boilers, shafting, pulleys and other details, all represent investments which, while at work, are returning interest upon their cost, but which are also constantly depreciating at an unknown and variable rate. Investigation of the practice of existing shops reveals almost infinite methods of treating this feature, each shop having its own method and no two systems being exactly alike. Some make no attempt at system, merely estimating the value each year, practically only another name for guessing. Others keep an elaborate record, based on the first cost of each machine, depreciating at a fixed percentage rate every year, quite regardless of the fact that the value may bear but small relation to the cost in the first place, and none at all after a few years.

A tool or machine may be obsolete in a short time, and although in perfect condition the owner may simply be unable to afford to use it in competition with rivals possessing machines of later design, greater capacity or more economical performance. Even when no radical advance is made, the steady improvement in capacity, speed and perfection of product of modern tools is a factor which has a most important influence on the relative value of older machines. In such cases the question is not "how much is the old machine worth?" but "how soon will it be obligatory to us to replace it?"

One way of meeting this question which is in vogue in certain shops is to work a tool for all it is worth, putting only such repairs on it as are absolutely necessary, and driving it to death, so to speak, before it becomes superannuated. The increased product under such a method provides for the rapid rate of depreciation. The tool wears out rapidly, indeed, but by the time it is worn out it has repaid its first cost on the increased output, and can properly be sunk as an asset. In certain lines of work this system is not only possible, but justifiable, but it is only a busy shop, and a management with the moral courage to refrain from passing the increased output to profit account, which can use the method to advantage.

It is evident that different parts of a plant depreciate at different rates. A boiler, for example, is steadily wearing out from the time it is first installed until the day when the inspector cuts down the working pressure below the shop requirements; while an engine of good make, with an occasional reboxing of the cylinder, and facing of valve seats, will outlast many boilers, and be a good asset still. The same is true of tools, and any system which includes all under one fixed depreciation rate must be only a crude approximation of the truth.

By taking the valuation of standard tools at the price for which they could be replaced, with a reasonable reduction for wear and tear and by making large depreciations for special tools, or those only occasionally used, a reasonably correct inventory may be made. The "weather eye" should always be kept well open, however, for the progress of improved tools and methods, and machines which are likely soon to be superseded should be compelled to work their own destruction as the only means to their own salvation.

Mining Summary.

CALIFORNIA.
Amador.

A meeting of the stockholders (J. B. Haggin holds 99,000 of the 100,000 shares) of the Amelia G. M. Co. has been called for July 19th to vote upon a proposition to sell the property of the company. The meeting has been called in the name of Mr. Haggin.

Republican: Repairing and sinking at the Zella, Jackson, has begun, and mining proper will be carried on as a secondary consideration during the time required to make the contemplated improvements. At present about eighteen of the forty stamps will continue in operation. The shaft at the Amelia mine is down about 650 feet, and sinking continues. Prospects are favorable. Work continues at the Anita mine. The south extension of the old Keystone mine, Amador City, has a shaft down 225 feet. A 160-foot crosscut has been run. At the Good Hope mine little work is being done. Talk of renewing work at the Alma mine has died out.

Record: The new hoisting machinery at the Lincoln mine at Sutter Creek has started up. Everything is in satisfactory working order. A full crew was put at work in the shaft; it is timbered to a depth of 108 feet. E. C. Voorheis is Supt.

Ledger: Mr. Brunt, who has secured the Wheeler mine and 5-stamp mill at Plymouth, has opened up the property and will put in fifteen additional stamps. At the Oneida Supt. Truscott will make a mill test of 500 tons.

Butte.

J. M. McClung has bought the interests of Titus & Fitch in the Mammoth mine, near Enterprise, and will develop the property.

The Reed Co. has purchased the Parsons mine, near Rackerby, and are putting up a 5-stamp mill. The Little California mine and five stamps, near Buck's Ranch, are working steadily.

A 4-stamp mill is in operation on fair grade ore at the Braselton mine, near Robinson Mill.

The *Mercury* says that 40,000 pounds of machinery were taken to the North Fork of Feather river, to be used in prospecting the river bed. The company controls eight miles of river bed, much of which is believed to be virgin ground. D. M. DeLong, who is interested in the enterprise, will be Gen. Mgr. At the Green mine, near Buckeye, the new mill has been started and is running on good ore.

The *Honcut Times* says that the Cascade mine, near Bangor, will soon resume operations. A crushing from the Buffalo mine, at Oregon House, yielded \$18 a ton. M. Van Leight contemplates putting a mill on his Sky-high mine, near Merrimac. J. Flood has begun work on a quartz property near Enterprise. M. Spencer of San Francisco, who is interested in the Butte King and Queen mines, near Gravel Range, will resume work.

Calaveras.

Wm. H. Clary has bought the Haggin and Hearst interest in the Sheep Ranch mine for \$60,000. He recently put in new machinery and an electric plant, incorporated a company and intends to place the property in producing condition.

The Royal mine near Copperopolis is increasing its number of employees under the new management, and also its plant capacity. Underground surveying has been in progress at the Gwin mine for several days. The old shaft has been cleaned out and getting ore out of the new shaft continues.

Colusa.

A. A. Gibson is placing in his Wide Awake mine near Williams a blower that weighs 24,000 pounds. With the blower there is 400 feet of 24-inch pipe and several hundred feet of 16-inch pipe. Instead of using the machine to force air into the tunnel he will use it as a suction to draw the foul gasses out of the mine. The shaft is over 300 feet deep.

El Dorado.

(Special Correspondence.)—Work on the old Wheeler mine, near Placerville, has been started by J. Melton. The Gentle Annie mine, owned by Melton & Parlow, has been bonded to F. G. Lathrop of Minneapolis, Minn. The property is fairly well developed and is operating a 10-stamp mill. A. H. S. Bird of Salt Lake City, Utah, has bonded for Salt Lake men the Marguerite and adjoining claims. Some development has been done on the property. It is three miles south of Placerville, adjoining the old Tin Cup and Larkin mines. J. J. Crawford of San Francisco has applied to the supervisors for a franchise to erect poles and stretch wires on the roads and streets of the county and the privilege of putting in an electric plant for power and lighting. The Crown Point mine, on which work was begun recently, has thirty men employed at sinking a shaft and running a tunnel.

Placerville, July 12, '98. The Stony Point mine has been leased and work will begin July 15th.

A company has been organized at Placerville to operate the gravel properties of T. H. Pennock at Pacific House. The Columbus mine at Cold Springs closed temporarily. A large pump will be put in and work resumed.

Republican: The Big Canyon mine shut down for the first time since it was started by the present management. The cause is shortage of water. It will probably not be started again for six months or till the next rainy season supplies water. The chlorination works will be operated ten days longer and then close for the summer. Work continues successfully in the Umatilla gravel mine at Coyoteville.

Democrat: A. Shettell, of Salt Lake City, has bonded the Lone Star mine near Nashville and also the Monitor. He is preparing for extensive development. Roberts Bros. have bonded the Sharp mine and the ranch of

J. Maffey and are developing the property. The ledge is from 60 to 100 feet wide. Claessee & Padilla are operating on the Adams Gulch mine and taking out good rock.

Kern.

The Hard Cash mine, near Randsburg, contemplates building a concentrating plant. W. W. Tinker is managing owner of the property. The Yellow Aster M. & M. Co. has brought suit against the Henry M. Co. to recover possession of 3000 tons of tailings or value, \$4000, with \$5000 damages and costs. Work is about to be resumed on the Desert Queen mine.

Mariposa.

(Special Correspondence.)—Work was resumed on July 5th on the McAlpine mine, on the line between Mariposa and Tuolumne counties. The property, which has a record of producing over \$400,000 above the 300-foot level, has been closed for many years, and, though many efforts were made to arrange for its reopening, they all failed for one reason or another. The pay ore in the old workings was in two shoots about 400 feet apart and consisted of from a few inches to 3 feet of white quartz lying upon and frozen to the main vein of ankerite which is here 100 feet in thickness. This ore averaged over \$100 per ton. The new development will be below the old workings and will be continuous from one chute to the other.

Mariposa, July 13th, '98. **Gazette:** J. Muller is opening a slate quarry near Hornitos. The quarry covers 160 acres. He intends shipping the slate to San Francisco.

Nevada.

The Wait for the Wagon ground, which has been in litigation, was bought by the Olin people, headed by M. Blaskower and L. Leviston of San Francisco.

T. B. Gray is pushing the tunnel of his Willow Valley claim, near Nevada City, and is in 300 feet. The Stanford mine is being operated by J. Thomas & Co. under a lease. A. R. Dahlberg, French Corral, has bonded the Slide and Sunset mines to Dr. Webb and other capitalists of Los Angeles. They will commence work at once developing the properties.

The Champion Co. at Nevada City, to obtain a reliable water supply, will rebuild the reservoir which broke a few months ago.

Transcript: Hackett & Ellis are sinking on the Keystone quartz ledge near Rough and Ready. They have an 18-inch ledge, the last crushing from which went \$10 a ton in gold.

J. Deasey is putting down a shaft for San Francisco people on the Holbrook drift mine. The shaft has a depth of 80 feet; it is expected that the channel will be bottomed at 140 feet. Torpie & Co. will resume sinking on their quartz ledge. During the past year they have, in prospecting, taken out several bunches of ore that yielded from \$100 to \$900. Supt. Graham is crowding work on the Odin drift mine, near Nevada City. It is expected that by Jan. 1st the shaft will have reached the bottom of the channel at a depth of 500 feet.

Union: The Live Oak mine, near Columbia Hill, resumes work in a week. Dr. McMahon of San Jose has interested with himself H. C. Bush, C. V. Colby, P. E. Valentine and H. R. Sterne, who are inspecting the property. The Live Oak has considerable development work done; there are four tunnels in on the ledge; in all of them there is ore which runs from \$7 to \$30 per ton, the vein being of good size.

Placer.

The Dardanelles mine of Forest Hill, which has been idle for years, is said to have been sold to L. L. Chamberlain. The transfer also includes the Oro claim.

Plumas.

At the Plumas-Eureka mine, Johnsville, twelve men are employed working on tribute.

Plumas Independent: R. L. Erwin sold the tailing claim of the estate of M. Teboul on Rabbit creek for \$300 to J. Jones of La Porte. Mr. Allen, who has been driving a tunnel on the Bushman quartz ledge, has struck an encouraging prospect. He has gone to San Francisco to buy a quartz mill, which he intends to have in operation early in August. At the Golden Ancient mine on Bear creek the shaft is down 70 feet and into pipe clay.

San Bernardino.

M. Bigler proposes building a cyanide plant at Victor. The Lucky Star mine is pushing development with good results.

Shasta.

The National Con. M. Co., near Redding, shipped a carload of sulphur, to the Selby Smelting Works. The Milkmaid mine at French Gulch is shipping sulphurets in carload lots.

Democrat: Considerable development work is being done in the neighborhood of Copper City. The Minnesota mine in Flat Creek district has reached a depth of 700 feet and has a vein of fair-grade ore. At Bully Choop Crawford, Kidder and others are operating the old Byron Thompson mine and mill.

A. Temple is taking out shipping ore in small quantity. W. B. Smith is said to have sold his quartz property on Sunny Hill to a San Francisco buyer. The property is partially developed. W. Lee of Igo is running a tunnel on his claim and is said to have a favorable showing.

Free Press: Desmond Bros. at Whiskeytown made a run of six weeks and their cleanup is stated to be \$7000. Brown & Enos are taking out good rock from their claim on Noble gulch. J. P. Davis is developing a property known as the Mad Dog mine, in which he has a 5-foot wide ledge of fair grade ore. The tunnel in the Golden West mine near Muleton has reached 110 feet on a 3-foot ledge of paying ore.

Redding Free Press: The Butters chlorinating plant at Kennet, which has been idle for a number of years while its owner was in South Africa, is to be extensively improved and put in condition to resume operations.

Chas. Butters has given orders to his foreman in charge to overhaul and repair the flume and ditch. This waterway is four miles in length and the flume is 2 feet broad on the bottom. All of the buildings at the works will be repaired.

Slacktown.

News: Corey Bros. mine on French creek has been bonded to a San Francisco company. The Risdon Iron Works have closed down the Wright and Eastlick hydraulic mines at Oro Fino after a successful run, considering the scarcity of water. They will put in five elevators this fall and make other preparations for an extensive run next season. The Wademan & Williams mine, on the North Fork of Humboldt, had a crushing of ten tons of ore which yielded \$17 to the ton.

Fort Jones Reporter: Stephens & Hathaway on Sugar creek are meeting with good results in the development of their quartz property. The tunnel has reached 350 feet. They have a large ledge, which yields \$8.24 a ton. They contemplate building a mill.

Trinity.

M. Van Matre of Lewiston is shipping 500 sacks of high grade ore to San Francisco.

The Deaken mine in the Coffee creek section is said to have a ledge 6 feet wide, carrying an average of about \$10 per ton in gold and a fair per cent sulphurets.

Journal: The Mountain Boomer mine, at New River, has been bonded to J. Frank, C. A. Hamilton, Dan Burns and M. Gunst of San Francisco. Surveyors have mapped out the summer's work. The mine will be thoroughly opened up and prospected by development tunnels and shafts. A large amount of work will be done. Young & Sprague have purchased the old Hitchcock gravel property, near Weaverlyville. In drifting under the old bank they struck pay dirt in good quantity, taking out as high as \$4 to the pan. The gold is coarse.

Tuolumne.

The 10-stamp mill at the Providence mine, near Sonora, will be in operation in two weeks. Sixty-five men are employed. The Grizzly mill is running on high grade ore. The shaft in the Tarantula has reached 300 feet and will be continued to the 600 mark. Good ore is being taken from the first and second levels.

The Boston directors say that the earnings of the Santa Ysabel mine for the six months ending June 30 will show a small balance after deducting operating and construction expenses.

Near Jamestown the Peoria Gravel Mining Co. is handling at a profit the cement gravel in Table mountain, working from 300 to 350 tons daily with 2 miners' inches of water. The rifle tables have a side motion, which keeps the pulp agitated and allows the fine gold to settle.

Magnet: The Kendall mine, near Stent, is being examined by Philadelphia people. The ledge is 11 feet wide, charged with sulphurets.

Independent: A 10-stamp mill is building at the Mt. Jefferson mine, near Groveland. J. M. Meigham is Supt. The mine is owned by a company incorporated under the laws of Maine. The property is being developed by three shafts, which are 95, 100 and 135 feet in depth. Sinking will be continued until 400 feet is reached. The Longfellow mine, Big Oak Flat, will resume work immediately. The Mexican group of mines at Big Oak Flat will soon build a mill. The shaft at the Moody mine is going down, with encouraging prospects.

Magnet: Barton & Co. have bonded the Arctic group of mines, near Jamestown, to a Boston company for \$50,000. Work began July 15th. The Excelsior and Sweeney claims, near Sullivan's, have been bonded to New York mining men. Eckel & Goodwin have bonded the Green & Tibbitts mine and have begun work. In the Mt. Jefferson about 400 tons were milled, showing an average value of \$18 a ton. A 10-stamp mill will be in operation in about five months. Work on the Bown mine was resumed last week.

Yuba.

The Marysville *Democrat* says that work in the mine of the Good Title Co. at Indiana Ranch has ceased. The quartz is low grade.

Marysville Appeal: The Pennsylvania mine at Browns Valley will resume operation after the respite awaiting the introduction of electric power. Pumping will begin in a few days and as soon as unwatered Mgr. Campbell will place 100 men at work in mine and mill. On the 800 level is a ledge that will mill \$10 per ton. The ore body averages from 8 to 11 feet in thickness. From 1861 to 1870 this ledge produced several million dollars to a depth of 800 feet, where, owing to primitive pumping facilities, it was abandoned until opened recently by the Webb M. Co.

NEVADA.

The Dexter mine of Tuscarora shipped \$120,000 last week, consisting of a brick of \$6500 and auro-cyanides from which \$5500 was derived.

The Diamond mine at Eureka employs sixty men. C. Read is the Gen. Mgr. There are over 1000 tons of ore at the Gold Crown mine at Siegel awaiting teams to haul to Oasis, on the Oregon Short Line. The price paid for hauling is \$12 a ton.

Lyon County Times: M. J. King will work the black sand that he catches while sluicing for gold in his property in Gold canyon. This sand carries with it the fine gold that is washed out by hydraulicking, and some of it worked in the Silver City mills has returned from \$40 to \$60 per ton. Repairs are being made on the Washoe mill near Silver City. When completed the mill will start up on ore from the Justice mine. The Washoe mill will handle custom ore when not running on Justice rock.

Pioche Record: The proposition of the miners and millmen of the Nevada M. Co. to work the property themselves until they paid their way out, after several days discussion of details, ended in an agreement satisfactory

to all concerned and work at the mine and mill has resumed.

OREGON.

Neff & Wright have built 700 feet of wing-dam near Gold Hill, and will soon commence mining the bed of Rogue river.

Democrat: The reduction of 100 tons of ore from the Collateral mine, an adjoining claim to the Virtue, near Baker City, was finished at the Virtue mill, and, while the exact yield per ton has not been made public, it is known that the returns were satisfactory to Col. Thompson, holder of the bond on the property. Col. Thompson has under consideration a plan that will likely result in the resumption of work in the Virtue camp. It is understood that he intends running a crosscut tunnel to get depth on the Collateral vein. When the crosscut is finished, it is proposed to get the Virtue mill plant and operate the Collateral in a practical manner.

Times: The Seattle M. Co. is enlarging its ditches in Watkins district, near Jacksonville, and will resume piping at an early date. W. B. Comstock has struck a small seam of high grade ore. The Sterling mine is making its annual clean-up.

WASHINGTON.

The Northern Stake placer mine at the mouth of the Salmon river, near Boundary, reports striking a pay streak and that a \$30 clean-up was the result of three days' washing. These bars are above the workings of forty years ago.

A strike has been made by Johnson & Barton near Cedar canyon that assays 270 ounces silver. Work has been resumed on the Deer Trail No. 2, after having shipped all ore from the dump. There is a 4-foot body of ore. At Republic the Little Cove will resume drifting. A shaft is down 140 feet and a drift run same distance, but water caused work to be suspended. When work ceased the drift was in solid ore averaging \$20 per ton in gold. At Meyers Falls the Acme mine discovered ore 7 feet wide of silver-lead and of high grade.

The Horace G. M. Co. have begun work on the Horace claim, near Belleville. The Republic M. Co. shipped ten carloads of ore of twenty tons each during June. Returns have been received from the smelter for the first five carloads, which yielded 11.88 ounces gold and 9.3 ounces silver each.

BRITISH COLUMBIA.

The ore shipments from Rossland for the week ending July 9 were 1431 tons.

Since the smelter at Trail went into possession of the Canadian Pacific Railroad Company, that concern has reduced the cost of freight from Rossland to Trail, and of treatment at the Trail smelter from \$11 to \$7.50 a ton. The smelter is being changed from a two to a five-furnace plant, to handle 750 tons every twenty-four hours, and treat sulphide and silver-lead ores from the Slocan.

The electric plant of the West Kootenay Co. has been completed and 1000 H. P. transmitted thirty miles to the mines about Rossland.

The Silver Queen M. Co. is putting in a compressor and water power plant near Rossland at a cost of \$8000, and a matting plant is contemplated at a cost of \$15,000.

Smelter returns from the ore sent from the Mollie Hughes at New Denver netted \$98 per ton. The ore ran 554 ounces in silver and \$10 in gold.

The Arlington mine near Slocan will resume work Aug. 1. A meeting of the Lardo-Duncan Association was held at Kaslo to consider a proposition from H. Sutherland, representing the Ore Reduction Co. of London, Eng., to erect concentrating works, tramways, etc., in the Lardo-Duncan region. Resolutions were passed endorsing the plan. It is reported that \$5000 was the result of the recent cleanup after a run of twenty days of the 10-stamp mill on the Joe Dandy mine at Fairview.

Rossland Miner: The tunnel on the Paris group, White's camp, in the Boundary country, is in 200 feet and will have to be run 600 feet before the ledge is tapped at a depth of 275 feet. An air compressor plant is contemplated. At Old Ironides twenty-five men are employed. Work is being pushed on the Royal Banner in Summit camp, which is bonded to an English company for \$30,000. The shaft is opening a body of quartz sprinkled with iron, copper pyrites and copper. Arrangements have been completed to expend \$30,000 on the Oro Dinero property, in Summit camp. The Oro Dinero is owned by J. M. Burke and others. The vein on the Boston, one of the Bannison group, East Kootenay, has widened from 12 feet to 40 feet.

Kootenai: In the Whitewater Deep mine near Kaslo the first tunnel taps the lead at a distance of 800 feet and at a depth of 1000 feet. Above this point, and before it is cut off by the Whitewater side line, there is an average of 300 feet the entire length of the ore chute, which has been demonstrated above to be more than 1000 feet. No stopping has been done. The plan is to push development with a view to uninterrupted shipping operations from the beginning. Three shifts make an average of 4½ feet per day. A force is engaged in clearing a site for a power and compressor plant. A tunnel will be run 1800 feet and 500 feet below the present workings. Sixty men are employed. R. E. Brown is Gen. Mgr.

ALASKA.

The Secretary of the Interior has approved instructions for the guidance of local officials in their administration of the Act extending the homestead laws and providing for the right of way for railways in the district of Alaska. These instructions were prepared by Commissioner Herrmann of the General Land Office and constitute the first promulgation of the Act approved May 14, 1898. An important ruling is to the effect that the section is inoperative which extends to citizens of the Dominion of Canada the same rights as are ex-

tended to our citizens in British Columbia in regard to mining lands. A roadway 60 feet in width, parallel to the shore line as near as practicable, is reserved for the use of the public as a highway. The shore line is held to mean high-water mark. This reservation will not prevent the location and survey of a claim down to the shore line, for in such cases the claim will be subject to this servitude, and the area for highway will be computed as a part of the area entered and purchased. The Interior Department may authorize the sale of timber under certain conditions, but no timber taken from the public lands and sold in this way can be exported from the district of Alaska. Actual settlers, miners, etc., may use not to exceed \$100 worth of timber from public lands each year free of expense. Land offices have been established at Sitka, Nulato and Circle.

THE KLONDIKE.

The usual ridiculous falsehoods continue to be put out by the transportation companies and others about the gold "coming down." First it was \$40,000,000, then \$30,000,000; now it is \$20,000,000. Eighteen men recently arrived at Seattle from Dawson. It was immediately wired broadcast that they brought \$500,000; then they had surely \$500,000. The *Times* of Seattle, which had been "booming" these things, became disgusted at the falsity, and in its last issue more sensibly says:

"Has anybody been able to find out what those eighteen Klondikers really brought out from Dawson City, either in gold or drafts? The captain of the vessel declared that the least had \$500 and the highest not to exceed \$2,000, or an aggregate of about \$15,000 all told. While, of course, \$15,000 is not \$500,000, the difference represents only the difference between honesty and cheating, between truth and falsehood. Still, when one considers that these eighteen men all told could not have earned and saved \$10,000 above their living expenses if they had stayed at home, the fact that they were able to clean up \$15,000 ought to have been satisfactory—and, indeed, is satisfactory to all honest men. The captain of that same boat held a letter from the Gold Commissioner of the Yukon country to the effect that there was '\$20,000,000 ready to be shipped from Dawson City,' and that all of this gold had been taken out by about 5,000 men. This would represent \$4,000 in gold to each individual on the average, and certainly is a most wonderful report. Then why not tell the truth about the returning Klondikers and the money they bring instead of lying about the same a thousand fold, especially when the truth is good enough?"

UTAH.

The Horn Silver mine at Frisco last week shipped six cars of silver and lead ore.—The West Argent at Stockton made an ore shipment of good values. The Honoria made a shipment from the same locality.—The Lone Pine mine at Bingham has made its fourth shipment for this season.—Capt. J. R. De Lamar says he will expend \$150,000 in the enlargement of his mill at Mercu.—The Buckeye mine at Tintic has been bonded to Judge Green for twenty-one months for \$75,000. The property has been prospecting to a depth of 400 feet and good ore has been found. Pumping machinery will be put in and sinking continued.—L. Holbrook, Mgr. of the Grand Central mine at Mammoth, says the company will acquire a reserve of \$100,000, and after that he will advocate the payment of extra dividends.—Mgr. Derrn of the Mercur reports the new strikes in Nimrod ground as important as any that have been registered by the company, and in a few days ores from them will be going to the mill. At the lower point at which the ore was encountered the vein is heavily impregnated with cinnabar and assays show the ore to be of good quality.—From Bingham it is reported that the Old Jordan and Galena, the Old Telegraph, the Niagara and Eighty-Nine are making good showing and at no time in years has there been as much development work in progress.

At the Queen of Sheba group, in Deep Creek, work has resumed under the management of C. D. Rooklidge. The company will adopt the concentrating system.—The Cyclone No. 3, Lone Star, Wild Cat and Cotton Tail, of the Jack Rabbit group, and Black Bear and Van Dyke are all silver-lead properties of more than ordinary grade, showing assay values varying from 21 to 56 per cent lead, and from \$1 to \$4 in gold. The Tea Cup and Tin Cup lodes of copper, gold and silver ore have an assay record of from 8 to 10 per cent copper, from \$12 to \$30 in gold, and from 50 to 200 ounces silver. The silver in this property appears in the shape of chlorides.—At Richfield the Advocate mine has opened a large ore body which gives good assay values.

From Alta the Darlington mine shipped 30 tons of ore and W. Green shipped 150 tons.—The Ophir Hill M. Co. shipped 200 tons of concentrates. Their mill is producing 35 tons of concentrates daily from 100 tons of crude ore. The product runs high in iron, with a percentage of copper, some silver and gold.—Two carloads of concentrates were shipped last week from the Swan Bemis mill at Bingham.—At the Dalton & Lark there are 200 tons of shipping ore on the dump and 20 to 30 tons being hoisted daily.—S. F. Mount shipped a carload of silver-lead ore from Fillmore.

Tintic Miner: It is reasonably certain that the Centennial-Eureka mine will build a mill for the reduction of the low-grade ore uncovered the last few years. The company is in good condition financially, having been hoisting 400 tons of ore a month for some time past that has paid a good margin.

Mercur Mercury: Figures on the output of the district show an increase in the amount of ore treated and the amount of dividends paid. In the past six months the mines of Mercur have paid dividends aggregating \$256,000. The amount paid during the corresponding period of last year amounted to \$165,000. In the past six months the shipments of cyanides have aggregated about \$600,000, as against \$360,000

for the same period last year.—The Horn Silver, Frisco, shipped six cars of crude ore.—Shipments from Tintic last week were forty-four cars of ore, eight of concentrates and seven bars of bullion.—The Washington at Frisco made its first shipment of concentrates amounting to forty tons.—The Midas mine, Deep creek, owned by Jno. Derrn and associates, will build a mill, and cyaniding will be begun this season.

IDAHO.

H. A. Keyms has been inspecting the properties of the Green Creek M. Co., near Harper. If his report is favorable, a mill will be erected upon the property. W. H. V. Richards is Mgr. of the mine.—The Cumberland mine at Silver City employs seventeen men. The mill is running on custom ore.—The Black Cloud concentrator, near Wallace, is nearly completed. It will be ready to run some time this month.—Work on the General Custer, near Wallace, is being done for the Kansas City Smelting Co., the secretary of which holds a bond on it. The plan is to run a tunnel 1200 feet long, which will cut the ore about 400 feet below the No. 2 tunnel. It is contemplated to put in a bucket line from its mouth to the level of East Nine Mile, one-third of a mile distant, and build a narrow-gauge road from there to the mill, two and one-half miles down the creek.

MONTANA.

The concentrator on the Park mine, near Elkhorn, has started on silver-lead ore with a daily capacity of four tons. The ore carries some gold and copper.—Work will be resumed within sixty days on the Kennett mine near Madison. The shaft will be sunk 200 feet deeper and a railroad built from the mine to the mill.—Water at the Leiter mine, at Twin Bridges, is interfering with operations this season more than ever before. The pumps have been inadequate to keep the levels clear, and recently the pump on the lower level was lost, and operations have ceased for the present.—Two carloads of concentrates from the Snowshoe, at Libby, were shipped to Great Falls last week.

At Clancy the Overland mine is making a weekly output of 100 tons. Some of the ore smelted nets about \$1400 per carload, or \$70 per ton, gold. The mill is run on second-class rock exclusively.—McAssey & Co. have taken a lease on the London mine near Neihart. The shoot of sulphide ore in this mine is about 800 feet long and in some places 9 feet wide. Much of it appears to be of low silver value.

The Anaconda mine is averaging a daily output of 500 tons.

The south drift of the 500-foot crosscut tunnel of the Keystone at Sylvanite is in nearly 100 feet on the lead and shows the best ore found in the mine. About 12 feet of the vein is exposed. The ore is of superior quality.

Lee & Co. have bonded their mine near Twin Bridges, to Wright & Hayes for \$30,000.

The Whitehall Zephyr says that Armour & Baker shipped a carload of ore from their mine at Waterloo that will net \$500 a ton.

Thompson & Oleson have begun work on the North Boulder mine, near Bernice.

At the Tiger-Poorman mine from June 1, 1897, to June 1, 1898, there were 113,607 tons of crude ore mined, producing 16,628 tons of shipping ore. The mine made a profit of \$64,604.46 during the year.

It is reported that the Hope mine at Basin will resume. They will sink the shaft to the 600-level and put in additional concentrating machinery sufficient to handle the mine on a large scale. The Hope has produced \$600,000 to the 300-foot level.—Work has been resumed on the McCauley M. & M. properties at Crevasse. The property was recently secured by J. Work and associates of Livingston. They will work on an extensive scale. A force is at work developing the several leads. There are two 10-stamp mills on the property which will be started at an early date.—Elkhorn is showing activity. The old Elkhorn mine is employing 175 men.

Basin Progress: The last car of ore shipped from the Ruby mine netted \$4000.

Independent: The Kennett mine in Madison county remains closed with no definite assurance of being opened, although it is rumored that after building a tramway for transmitting the ore from the mine to the mill, the company will again resume operations.—The old mill at Sterling has been converted into a cyanide plant and is running from seven to ten tons of ore per day.

SOUTH DAKOTA.

Work at the Gilt Edge mine, near Deadwood, is progressing. There are five teams hauling ore to the smelter. The ore is good grade and is netting the company close to \$1200 per day.—The Great Northern shaft at Two Bit has reached a depth of 200 feet. The Chicago and Two Bit shaft is down 340 feet.

WYOMING.

At Grand Encampment Mr. Cox has been throwing an iron-looker ore over the dump. Recently it occurred to him to have a sample of it assayed, and he found that it ran \$370 in gold. He is now carefully going over the dump and sacking the ore. The streak is 6 inches wide.

Development work on the gold and silver deposits at Sunlight basin, in the northern part of Big Horn county, is being pushed, backed by Montana and Eastern capital.—It is said that the Centennial lead, near Laramie, has been rediscovered by W. Barker and two other prospectors. The Centennial lead was discovered years ago, and proved to be rich. Before any development had been done, however, it was lost, and has been an object of diligent search ever since.—J. H. Lezeart will develop his uranium property at Evanston. The ledge is reported to be from 9 inches to 3 feet wide, the tests showing from 8 to 28 per cent uranium.

MINNESOTA.

Minnesota now comes to the front as a producer of iron. Her total shipment of iron ore

during the season of 1897 amounted to 5,552,161 tons, an increase over the previous year of 1,588,992 tons.

COLORADO.

BOULDER COUNTY.

In the Camara mine, in Ward district, the pay streak has increased to 9 inches of peacock iron. The lead has been carrying ore running from \$40 to \$280 in gold per ton.—In the Old Sol, a body of shipping ore has been opened.—The Franklin at Wall Street is taking out twenty tons of ore a day.—Ewing & Brannon have given a two years lease to A. Gregg Sr., at Ward, on the Success group for \$12,000. He will put a steam plant on the property, a boiler, air compressor and drills.

EL PASO COUNTY.

The Gold Coin M. & L. Co. sold to D. F. Richardson the Jefferson Lode mining claim in Victor, for \$18,500.—Eight tons of ore running from one and one-half to two ounces, were shipped from the Scott sublease of the Specimen property, Cripple Creek.—Fifty-two tons of ore were shipped from the Pharmacist mine, thirty-two tons of which gave an average value of an ounce and a half and twenty tons yielded five ounces per ton.—The lessees on the Morse group are making regular shipments. The best grade of ore is being mined on the Colorado City. The last shipment averaged \$145.60 per ton.—A strike of 2 feet of sylvanite ore that runs from twenty-five to thirty-five ounces is reported from the Burbridge lease on the Christmas.

Investor: A good strike has been made in the Baltimore lease on the Vindicator, where a vein 5 feet wide of \$40 ore was encountered. A trial shipment of 20 tons showed an average value of \$38.

GILPIN COUNTY.

Lessees of Champion mine, Bellevue mountain, while working in the 420-foot level, struck a body of ore 24 inches wide. A shipment of the smelting ore gave \$100 in gold per ton and the milling ore ran \$17. The shaft is down 900 feet and several levels have been run.—A number of leasers are developing properties in the Quartz Hill district, and keeping up steady shipments of milling ore and some smelting ore. The mill ore plates \$5 to \$10 in gold per ton.—The Gold Chollar mine in Frosser gulch, is shipping smelting ore that runs \$75 per ton, and milling ore that yields \$20. The ore treated last came from the 200 and 270-foot levels. At less depth the smelting ore was worth \$43 per ton.

GUNNISON COUNTY.

On the Burke claim, Mineral Point, a vein over 200 feet in length shows a varying width from 6 to 15 feet, that carries values in lead carbonates and copper. A tunnel is in over 100 feet on the vein.

HINSDALE COUNTY.

Boston capital is making an examination of the mineral resources in Hinsdale county with a view of erecting a custom mill at Lake City.

LAKE COUNTY.

The Hill Top mine of Leadville recently reduced their force as the ore bodies that had been opened were nearly exhausted. Development work was continued and the property is opening up larger bodies of ore than they had before and averages better than shipments from the old ore bodies. Seventy men will soon be taking out ore.

The property on Long and Derry hill, that has been prospecting by the Preston Company, has furnished ore which carries thirty ounces silver, 15 per cent lead and small values in gold. The company will crowd work.

The importance of the strike in the Mab mine, Leadville, is becoming more apparent. From the 1000-foot level the drift ran 600 feet in constantly enlarging stringers and opened into a large body of ore which is pronounced the Mahala chute.

LA PLATA COUNTY.

The Tenderfoot mine, in East Mancos district has three shafts in which the vein shows 24 inches wide. The free milling ore gives a net profit of \$5 per ton.

SAN JUAN COUNTY.

The San Juan M. Co. has begun shipments from their property near Silverton. The first car gives 56.87 ounces silver, lead not reported; two carloads are at the smelter.—The Toltec group of claims, in Picayune gulch is being put in shape for extensive development. The ore carries 60 per cent lead and eighteen ounces silver per ton.

SAN MIGUEL COUNTY.

About 400 ounces of gold reefs were shipped last week from the Shoemaker group of mines at Ophir.

SAGUACHE COUNTY.

Since January the ore shipments from Creede district have been 48,705 tons, having an aggregate value of \$1,719,286.50. The shipments were from four mines, the Chance, Amethyst, Commodore and Ridge. There are 600 miners earning \$1800 per day.

NEW MEXICO.

The Santa Rita copper mines at Santa Rita have 150 men employed, most of them working under the tribute system, every one making good wages, besides profits for the company.

ARIZONA.

At Prescott on the 13th a mining suit of interest was decided by a Territorial court. In '92 H. H. Warner contracted with Wells & Lawler for the purchase of the Hillside mine for \$500,000, paying over \$200,000. Warner stocked the mine under the name of the Seven Stars Mining Co. for \$3,000,000, selling stock in the Eastern States and Europe and giving a personal guarantee that the mine would pay 15 per cent a year dividend. He failed and the Seven Stars Mining Co. collapsed with him. Wells & Lawler offered a complete sale and to give a deed on receipt of the balance agreed upon, although the conditions of Warner's contract provided for the

forfeiture of all money paid and all improvements placed on the property if final payment was not made in a stipulated time, long since past. The stockholders brought suit against Wells & Lawler for the recovery of money paid for stock of the Seven Stars Mining Co. and judgment has just been rendered in favor of the plaintiffs for \$180,000, to act as a lien against the mine until paid. The case will be appealed to the Supreme Court of the Territory and probably to the Supreme Court of the United States.

The King of Arizona mine at Mohawk has introduced the MacArthur-Forrest cyanide process.—Two carloads of ore from the Blue Jay mine, near Tucson, netted \$1200.—The Dave Denver Co. bought the Old Shelton group of mines at Big Bug for \$40,000.

The railroad to the Old Dominion mine at Globe is completed to the Gila river, twenty-six miles from Globe, and trains are in operation to that point.

There are 110 men employed in development work in the Buttes mines, near Saginaw.—J. Potter, associated with Salt Lake capitalists, has bonded a group of claims at Dos Cabezas and will begin development without delay.

A. F. Penrose has bought the Juniper mines in Cochise county for \$75,000.—Gibson & Bartleson are opening up Las Amarrillas, near Nogales, and will soon have ore enough out to start up their mill. The mine has a large body of gold ore that will average \$15 per ton, and the mill has a capacity of twenty tons a day. There are twenty men at work. The cyanide company that worked 400 tons of tailings from this mine realized \$12 a ton from them.

Phoenix Republican: A body of copper has been discovered in Park county, near Fairplay. It is reported to run 8 per cent copper and a little gold and silver.

Yuma Sun: A trial run of 100 tons of ore from the Sheep Trail mine, in Mohave county, is being made.—Place & Overton have begun the development of the Overlook mine, near Prescott.—By development of the Elkhart mine, in Mohave county, water has been struck sufficient to run the concentrator ten hours per day, during which time half a carload of concentrates is turned out. It is proposed to sink the shaft 500 feet.—J. T. Dongine of Chicago has bought the Sultan group of mines in Santa Maria district, Yavapai county.

LOWER CALIFORNIA.

Surveys are completed for a ditch and pipe line on the Buena Vista placer mines, near Escondido. Operations are to begin shortly.

The Californian says that H. Cannon of the San Jose mines will leave for San Francisco to purchase a mill for the property.—The Socorro placers, after two months' sluicing, are making a clean-up.

Californian: Work on the Aurora and Moccutezuma mines near Alamo will be resumed immediately. The Moccutezuma has a good body of ore, while the Aurora is one of promise. The Viznaga mine at Mexican gulch, a property on which Harrison & Godbe have obtained an option, will begin work. While operations at the Viznaga mine have never entirely ceased, a change in the character of the ore, combined with other features which make greater development necessary, has somewhat retarded work. They will sink the main shaft to greater depth and continue the drifts. The Trinidad M. Co., owning the Trinidad group in the Jacalitos district, which includes the Piedra mine, contemplates beginning extensive development within a fortnight.

MEXICO.

Craaz Bros. have bought a group of mines near Alamos, Sonora, and propose building a 10-stamp mill. The ore carries gold and silver.

The El Plomo M. Co., near Cerro Colorado, Sonora, is working the Colorado, Plomo and Blanca mines and also has a lease on El Tirol mine. The ore is hauled seven miles and worked with a profit. It runs \$20 a ton on the 200-foot level and the lead is from 2 to 4 feet wide. The mill is run in connection with the cyanide plant. It has a capacity of forty tons daily.

The Las Animas mine near Puerto, Sonora, has been bought by Los Angeles men, who will begin working the property. B. Salazar of Los Angeles will be Gen. Mgr.

Two Republics: According to W. E. Emmons, its president, a company organized by Detroit and Milwaukee capitalists under the name of the Detroit and Mexican Smelting & Refining Co. has bought for \$100,000 the mining properties at Sultepec, owned by A. Blanco. The company will work the property on a large scale. A smelter to cost \$100,000 is to be erected and to be connected with the mine by a ropeway, about two and one-half miles in length.

Oasis: At Nacosari the Copper Queen Co. are pushing work at their reduction works, about six miles from the mine. The mine has on the 500-foot level a ledge 185 feet wide in its narrowest part, all in good ore. Seven hundred feet below this tunnel, 8000 feet long, follows the vein and a railway from the reduction works, six miles away, will traverse this tunnel, taking ore to the smelters.

RUSSIA.

United States Consul Smith at Moscow reports that a telegram from Tomska announces the finding of a gold nugget weighing seventy-five pounds in the Spasso Preobrajensk mines, situated on the river Chibkey, in the district of Yeansay. The nugget, says the consul, will be found to take the eleventh place, as far as size is concerned, among the nuggets of the world, and the second among those found in Russia. The first was found in the South Ural mountains.

SOUTH AFRICA.

The use of candles by the mining companies is very large. In 1896 there were used by eighty-one companies 119,135 cases, value \$382,630. The imports for the first four months of 1897 amounted in value to \$232,765.

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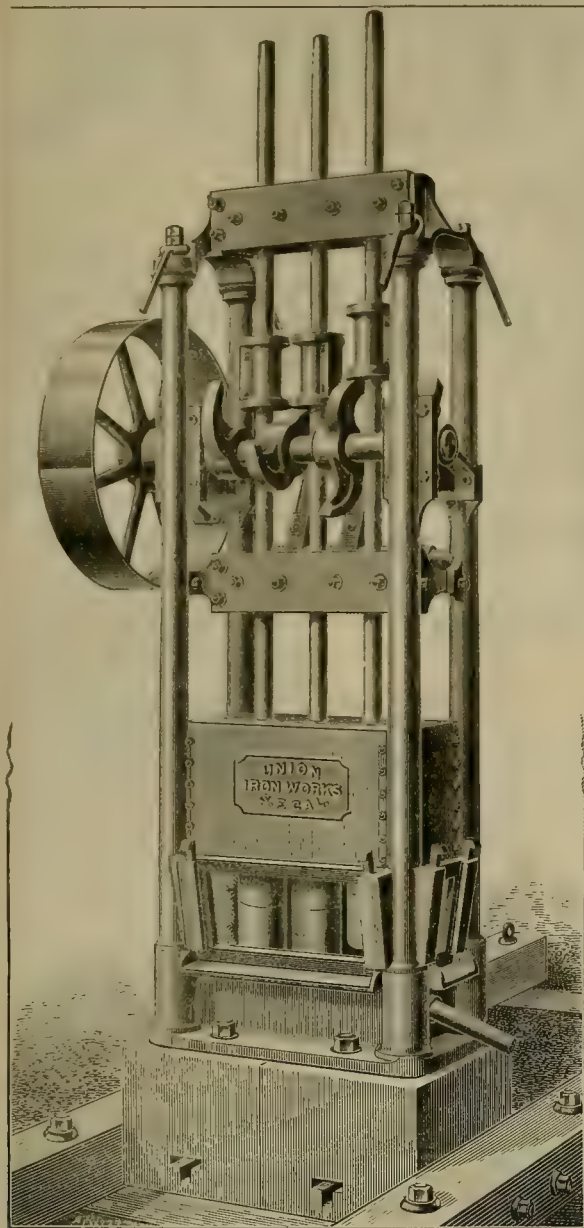
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The total weight of the battery is 5000 lbs.

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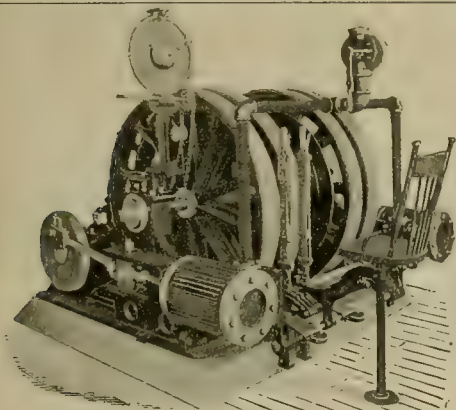
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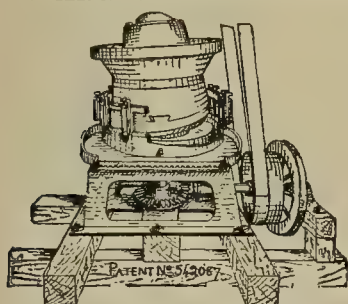
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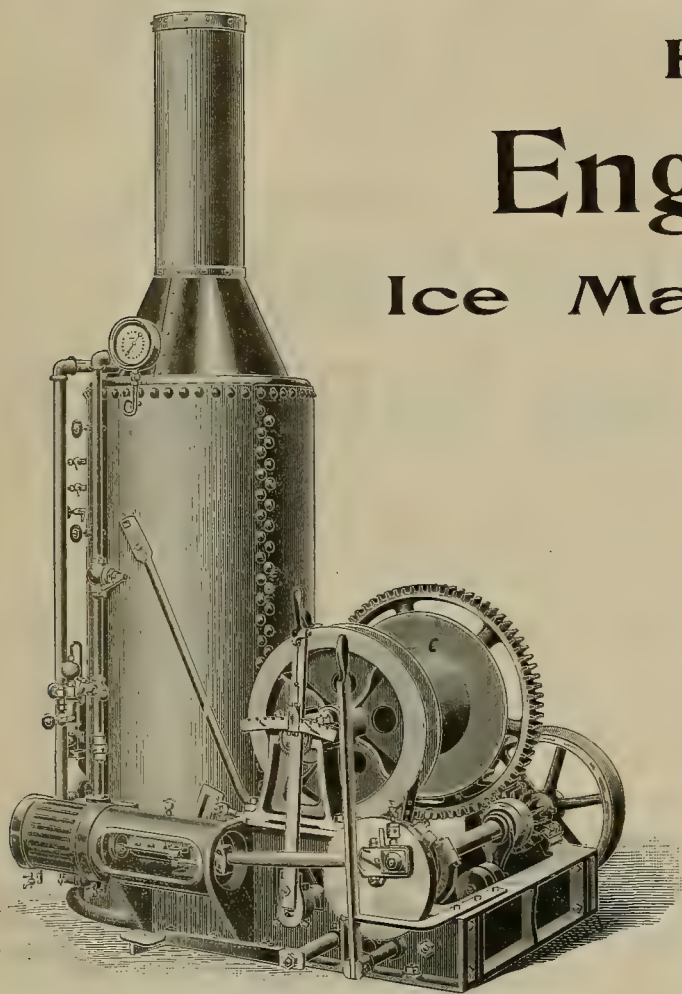
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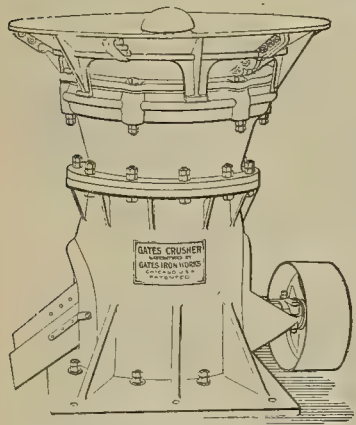
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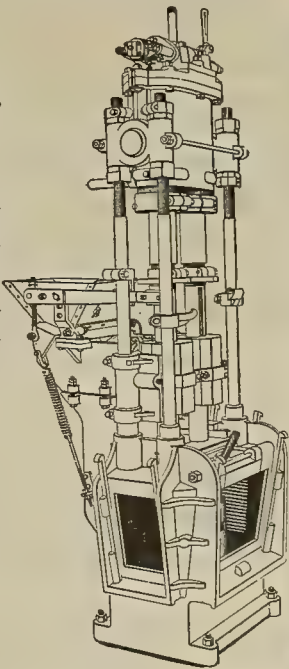
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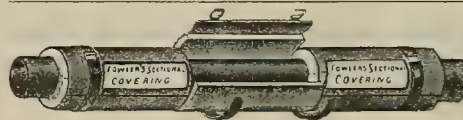
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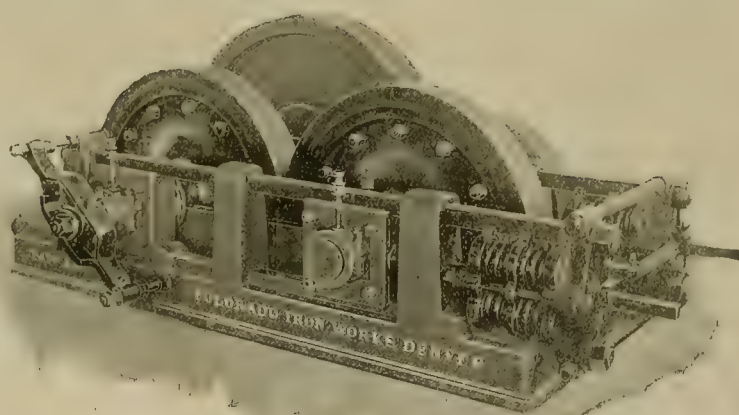
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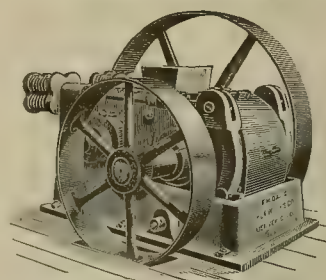
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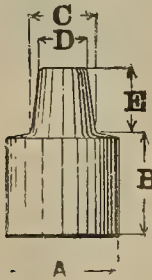
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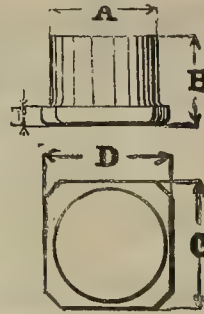
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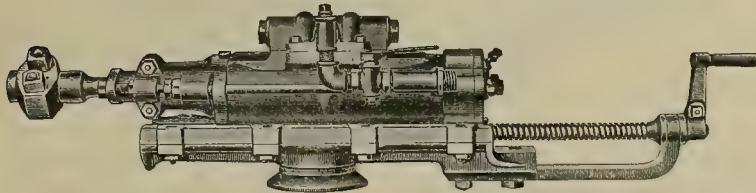
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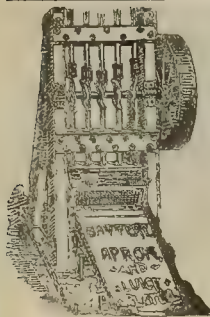
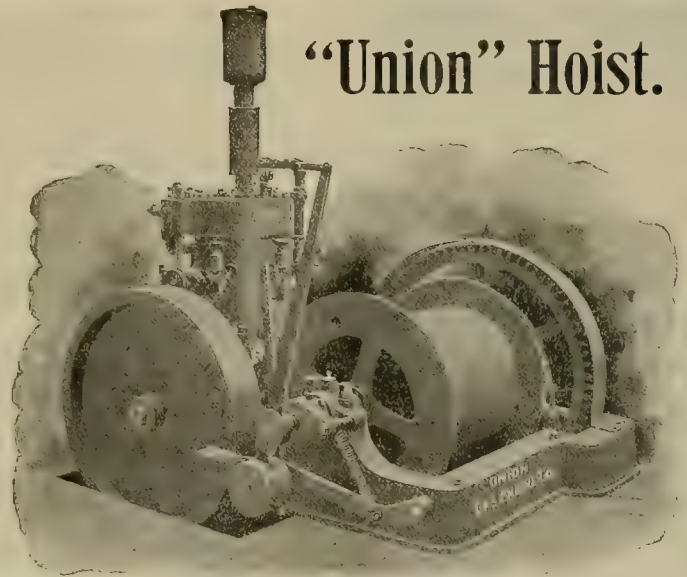
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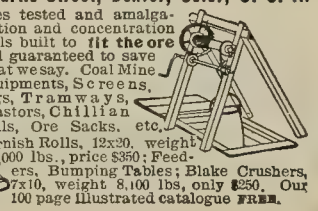
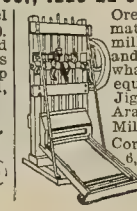
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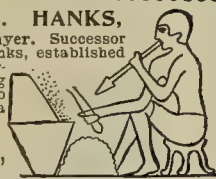
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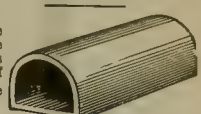
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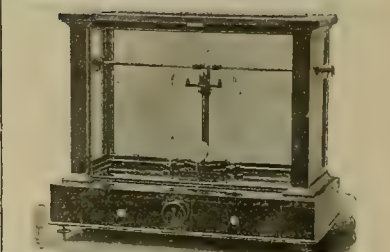
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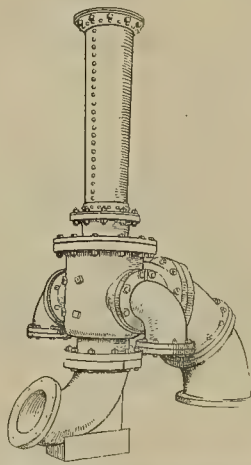
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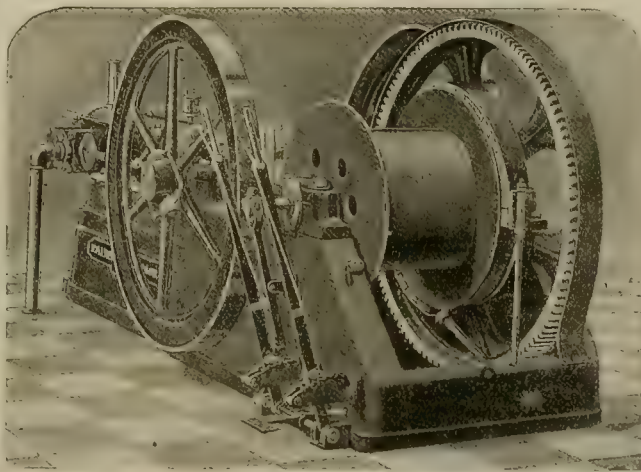


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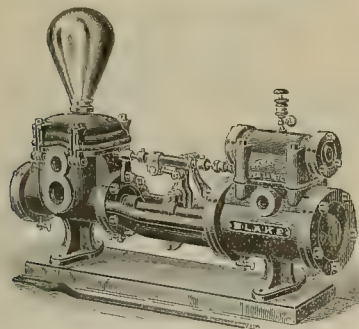
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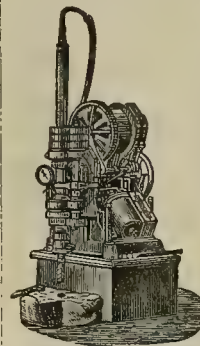
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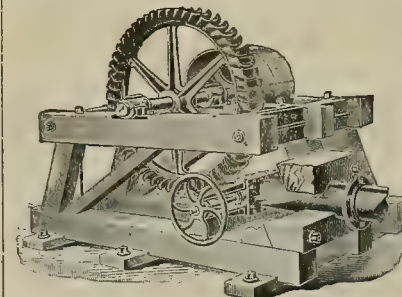
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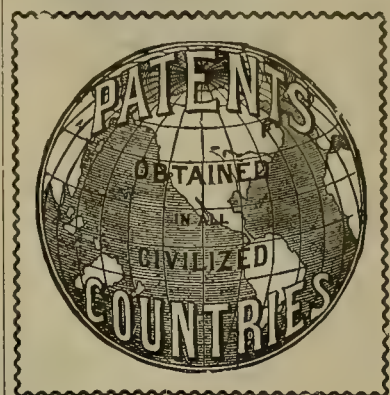
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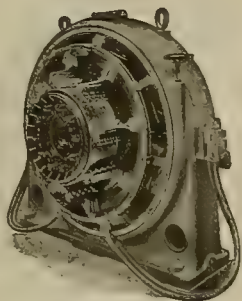
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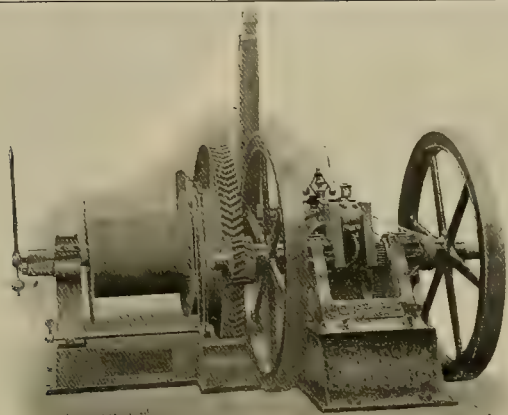
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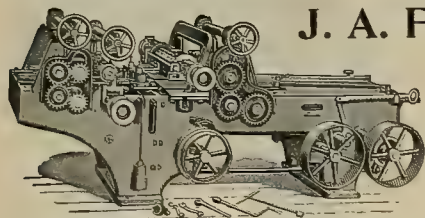
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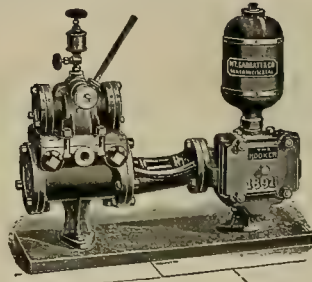
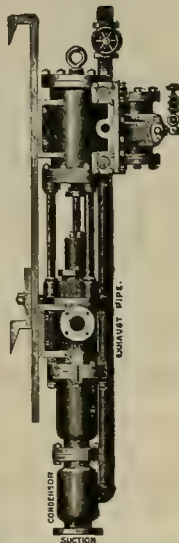
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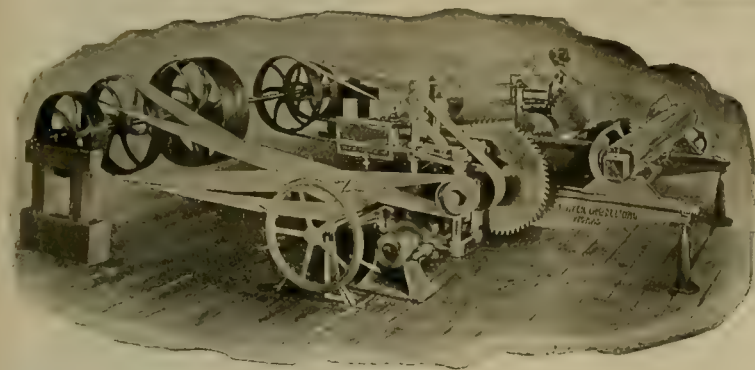
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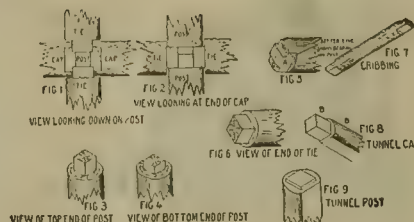
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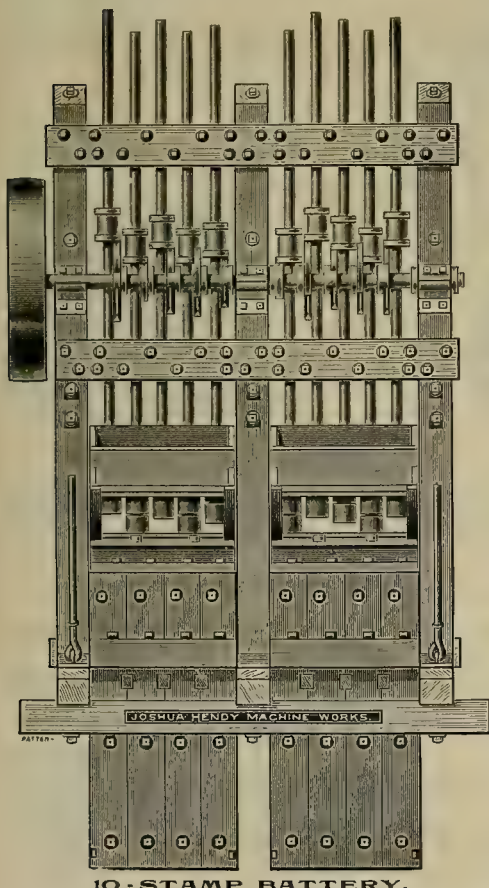
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Office and Salesroom.....38 to 44 Fremont Street.

Works.....Cors. Bay, Kearny and Francisco Streets.



10-STAMP BATTERY.

MINING AND MILLING MACHINERY.

Stamp Mills;

- "Hercules" Ore Crushers;
- "Challenge" Ore Feeders;
- "Triumph" Ore Concentrators;
- "Hendy-Norbom" Ore Concentrators;
- "Triple Discharge" Two Stamp Mills;
- Hydraulic Mining Machinery;
- Hoisting, Pumping and Irrigating Plants;
- Boilers, Engines and Pumps;
- Tangential Impact Water Wheels.

PLACER AND RIVER-BED MINING

WITH THE

Electrically Operated Shovel, or Dredge, and Amalgamator.

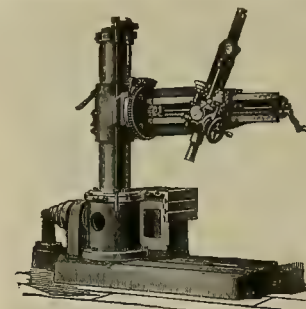
Capacity 2,500 to 10,000 yards of gravel per day.
Operating cost 2 to 3 cents per cubic yard.
Extracts the INFINITELY FINE, as well as the coarser gold.
Adapted to all sorts of conditions and every locality.

SEND FOR ILLUSTRATED CATALOGUE AND SAMPLE.

Cable "Bennetts," Denver.
P. O. Box 558, Denver.

BENNETT AMALGAMATOR M'FG CO.,

36TH AND WAZEE STS., DENVER, COLO., U. S. A.



Full Universal Radial Drills.

The special features which have so highly recommended this style of Drill are our double columns, steel gearing, roller bearings, rack feeds to spindles, back gears, power and hand feeds, quick return motion to spindle.

Furnished in three sizes, with large variety of tables, adapting the drills for every class of work possible.

BICKFORD DRILL & TOOL CO.

CINCINNATI, OHIO, U. S. A.

HENSH W, BULKLEY & CO., Agents, San Francisco, Cal.

THE (MINE PUMPS) IN THE BEST WORLD.

0000000 OUR SPECIALTY. 0000000

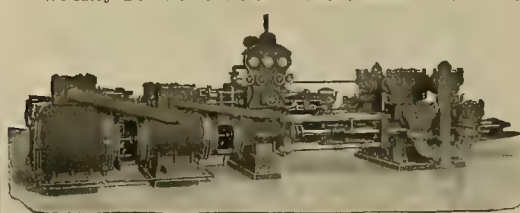
We carry in our Denver store a stock of Cameron Pattern Sinkers and Duplex Station Pumps.

Write for Catalogue and Estimates.

Jeansville Iron Works Co.,
JEANSVILLE, PA.

Western Office,
Columbia Hotel Building,
1328 17th St.
Denver, Colo.

A. MIDDLEBROOK, Manager.



TRIPLE EXPANSION.

DEWEY, STRONG & CO., Patent Solicitors, 330 Market St., San Francisco, Cal.

RIVETED SHEET STEEL WATER PIPE
For Placers, Water Powers, Irrigation, Etc.
THE WEIGLE PIPE WORKS
2949-51 Larimer St. DENVER, COLO.

LEVIATHAN BELTING

WHICH FOR STRENGTH AND TRACTION POWER HAS NO EQUAL.

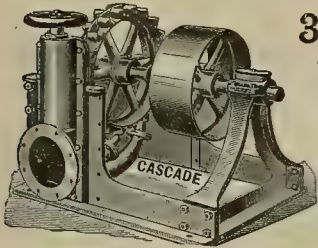


Especially Adapted for
MINING MACHINERY
AND
MAIN DRIVING BELTS.
It Is Unaffected by Water, Heat or Steam.
EVERY BELT GUARANTEED.
Write for Prices. Samples Free.

Main Belting Co.,

Factory at Philadelphia, Pa. 55-57 Market St., Chicago, Ill.

TURBINE AND CASCADE WATER WHEEL



Adapted to all Heads from
3 Feet to 2000 Feet.

Our experience of **33 YEARS** building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

Send for a Pamphlet of either Wheel and write full particulars.
JAMES LEFFEL & CO.
SPRINGFIELD, OHIO, U. S. A.



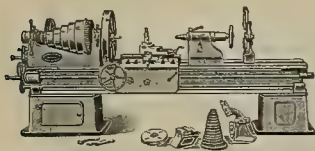
Washburn & Moen
M'f'g Co.

WIRE ROPE

Of Every Description
Manufactured at

PACIFIC WORKS,
SAN FRANCISCO.

Patronize Home Industry.



NEW HAVEN
MANUFACTURING COMPANY,
NEW HAVEN, CONN.

Iron : Working : Tools.

ENGINE LATHES, PULLEY TURNING LATHES, IRON PLANERS,
SLOTTERS, UPRIGHT DRILLING MACHINES,
HORIZONTAL DRILLING AND BORING MACHINES, Etc.

HENSHAW, BULKLEY & CO., Agents, - San Francisco, Cal.

RAND DRILL CO.



Rock Drilling, Air Compressing, Mining
and Quarrying Machinery,

100 Broadway, - - New York, U. S. A.

BRANCH OFFICES IN UNITED STATES AND CANADA:

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| Butte, Montana. | Toronto, Canada. |
| Wallace, Idaho. | Spokane, Wash. |
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MORRIS & TREGLOAN, Agents, 141 First St., San Francisco, Cal.

Mining Machinery.

Stamp Mills

Of the Latest Improved
Design for

Gold Milling.

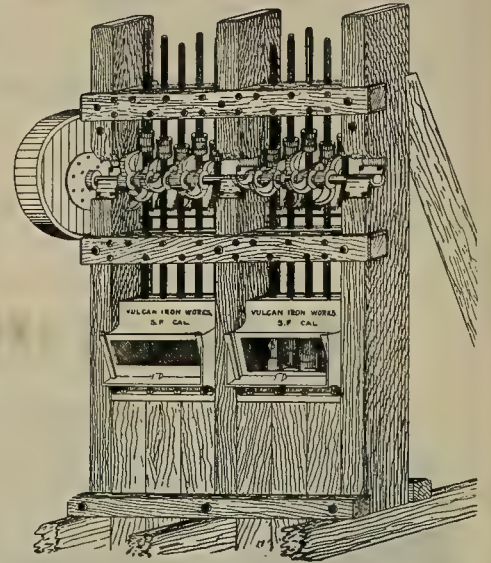
VULCAN

WIRE ROPEWAYS

For Conveying Ore, Etc.

Vulcan Iron Works,

Office: 505 Mission Street,
San Francisco, Cal.



P & B Roofing

Is superior to shingles or iron, and is especially
adapted to mill construction on account
of its resistance to

WATER, FUMES, GASES AND FIRE.

SEND FOR INFORMATION AND CIRCULARS.

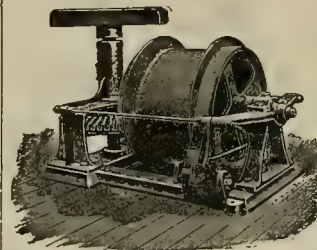
PARAFFINE PAINT CO., Manufacturers,
116 Battery Street, 524 South Broadway,
SAN FRANCISCO. LOS ANGELES.

JOSHUA HENDY MACHINE WORKS,

No. 42 FREMONT STREET, SAN FRANCISCO, CAL.

—BUILDERS OF—

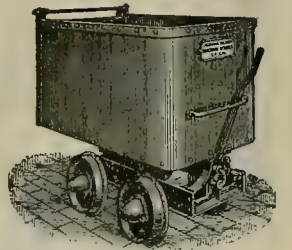
“Davis” Horse Power Whims. Ore and Rock Cars.



Specialty of
**PROSPECTING,
MINING and
MILLING
PLANTS.**

**ORE AND WATER
BUCKETS.**

“T” RAIL OF
USUAL WEIGHTS,
EITHER NEW
OR SECOND-HAND,
FOR SALE
CHEAP.



ADAMANTINE SHOES AND DIES

—AND—

***** CHROME CAST STEEL *****

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.

STAMP DIES.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by **CHROME STEEL WORKS, Brooklyn, N. Y.**

MORRIS & TREGLOAN,

141 and 143 First Street, San Francisco, Cal.,

Pacific Coast Sales Agents.



Stamp Cam.

Morris & Tregloan, DEALERS IN MINING MACHINERY AND SUPPLIES.

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IN STOCK:

AIR HOSE,
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL,

308-312 REQUENA ST., LOS ANGELES, CAL.

Market Reports.

The Markets.

SAN FRANCISCO, July 14, 1898.

SILVER.—London, 27½d; New York, 59½; San Francisco, 59½, nominal; Mexican dollars, 45.

COPPER.—Lake, 11¼@11½; quiet and unchanged.

LEAD.—Firm. New York quotes 4.02½ asked; smelters quote 3.80; local, pipe, 6@6½; sheet, 6½@7c; pig, 5½c.

IRON.—American, soft, \$20 and \$22 per ton.

SPELTER.—5 and 5½.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c.

ANTIMONY.—9½, 10.

BABBITT METAL.—16c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.25; cut, \$2.00; 10 to 20d, wire, \$2.30; cut, \$2.05; 8d, wire, \$2.35; cut, \$2.10; 6 and 7d, wire, \$2.45; cut, \$2.20; 4 and 5d, wire, \$2.55; cut, \$2.30; 3d, wire, \$2.70; cut, \$2.45; 2d, wire, \$2.95; cut, \$2.70. In carload lots, 10c per keg less.

QUICKSILVER.—Domestic, \$42.50@43; export, special rates. Foreign advices say that the output of the Rothschilds' quicksilver mines in Spain, which produce a little less than two-thirds of the total production of the metal, is at present running behind normal figures; complications with the United States are stated to be without noticeable effect. California quicksilver ore is now running about 1½.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1** 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 725 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—8x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8 00 Coos Bay, \$5 00 Seattle, \$6 00 Southfield, \$7 50

Cargo lots, Eastern and foreign: Wallend, \$7 50 Cumberland, \$10 25 Brynbo, \$7 50 Canine, \$10 00 Pennsylvania, \$14 00 Welsh Anthracite, \$12 50 Scotch, \$8 00 Rock Springs, \$7 60

COKE.—Foreign, \$13; domestic, \$11 per ton.

CHEMICALS.—Cyanide of potassium is quoted jobbing, 32@33c per lb.; carloads, 29c; sulphuric acid, 2½c per lb. for 60%; nitric acid, 12½c; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½c per lb.; blue vitriol, 4½c per lb.; borax, refined, 50c per lb.; chloride of potash, 9½@10c; roll sulphur, 2½c.

LUMBER.—Retail: Pine, ordinary sizes, \$17@18.50; redwood, No. 1, \$18@20; No. 2, \$16@18.

As the trustee of civilization, the United States is at present quelling barbaric savagery in the East and West Indies and acquiring dominion in the Pacific. This costs life and treasure. Some are doing the fighting; those of us who stay at home can at least aid by paying our share of the tax; technical evasion is not patriotic.

Mining Share Market.

SAN FRANCISCO, July 14, 1898.

When to the untoward condition of the Comstock is added the "face" value clause requirements of the war tax, it is little wonder that the San Francisco stock market is at present lifeless. This matter was discussed at length in last week's issue, and considerable of value not published elsewhere given. Since then nothing of additional interest has transpired. All the official rulings on the bill so far as mining stocks are concerned are confirmatory of what appeared herein on the 9th inst.

Regarding the question asked, "Where shall stamps be placed on transfers of mining stock, on the new certificate, the cancelled certificate, the memorandum of sale, or the books of the company?" the Commissioner of Internal Revenue decides that when the transfer is endorsed on the back of the original certificate the stamp should be placed on the endorsement. When a memorandum of sale only is made the stamp may be affixed to that, and the memorandum attached to the original certificate. When no such evidence of sale exists, then the stamp must be placed on the company's books.

The Commissioner of Internal Revenue's ruling that the full amount of tax on a transfer of 100 shares of stock of a less par value than \$100 per share is \$2, or the same as on stock of \$100 per share par valuation, is questioned. A telegram to Secretary of the Treasury Gage, asking him what the tax would be on a certificate of stock of the par value of \$1 per share, has not yet been answered, and has, probably, been referred to the Attorney-General. As it now stands the law will secure no revenue for the Government, as it practically destroys the business relied upon to produce revenue in the case of low-priced mining stocks, which, evidently, was not the intention of the framers of the bill.

San Francisco Stock Board Sales.

SAN FRANCISCO, July 14, 1898.

9:30 A. M. SESSION.

| | | |
|----------------|----------------------|----|
| 300 Belcher | 11 400 Ophir | 08 |
| 550 Cal & Va. | 07 300 Union | 12 |
| 100 Occidental | 55 300 Yellow Jacket | 08 |

Commercial Paragraphs.

THE Transcript says C. R. Loyd paid \$20,000 for the San Bernardino, Cal., Gas Company's plant and now controls the entire lighting system of that town. It also hears that Mr. Loyd intends selling the electric plants of the city to the Southern California Power Company of Redlands.

Mrs. MIDDLEBROOK of Denver, of the Jeanesville Iron Works Co., writes that the Denver office is removed to 1328 Seventeenth street. He now has a stock of Cameron pattern sinkers and duplex station pumps. The shops are building one 24 and 42x16x45-inch stroke compound condensing and several smaller ones.

THE California State Fair of '98 will be held at Sacramento from September 5th to 17th, inclusive. The industrial display will be of commercial interest. Manufacturers will find this central point a good place for exhibition. Mining machinery and irrigation plants, pumps, etc., are in general demand, and those who attend are usually of a class who have money to spend. The railroad company will carry all exhibits free. Mr. Edwin F. Smith, the secretary at Sacramento, will furnish full information to any one contemplating placing an exhibit therein.

THE Pelton Water Wheel Co. of San Francisco have under construction a power plant for the British Columbia Railway Co. at Gold Stream, twelve miles from Victoria. The water supply is furnished from the Esquimalt Water Works. The plant consists of two 35-inch D. N. Pelton wheels, 600 H. P. each, running at 600 revs., under 500-foot head. The wheels are direct connected by insulated couplings. The power is to be submitted to Victoria at a pressure of 10,000 volts, and used for running the railway system of that city, lighting and general power purposes.

FRANCIS SMITH & Co., the pioneer manufacturers of riveted steel pipe in this State, are putting up the most extensive plant in their line on the Pacific coast. The new building covers a ground space of 275 feet square and is located on Townsend street between Seventh and Eighth. Being close to the main line of the Southern Pacific (coast division), sidetrack facilities will be ample and convenient. The new establishment will be equipped with the latest improved machinery adapted to the heaviest kind of work, and will be ready for occupation August 1st. The down-town office will be at No. 46 Fremont street, San Francisco.

TO MINING INVESTORS.

The Advertiser holds the Controlling Interest in the Capital Stock of a

Developed, Patented Mine on the Mother Lode

IN AMADOR COUNTY,

In the immediate vicinity of the most productive mines of the district.

Mine Well Equipped with Hoisting Works, Necessary Buildings, Machinery, Tools, Etc.

THREE-COMPARTMENT SHAFT, 1150 FEET DEEP, with large bodies of free-milling ore exposed upon different levels.

The ore is of fair average value, sufficient to yield a good profit, with high-grade ore in the bottom of shaft.

IT IS DESIRED TO FORM A COMBINATION with a responsible party for the legitimate operation of the mine.

Amount of Cash Required Will Probably be from \$5000 to \$8000, payable in easy installments, to be refunded with interest from first dividends.

Money to be applied to the development of the property, security furnished therefor, to be repaid should future developments not meet expectations of the investor.

A Satisfactory Party Can Secure One-Fourth Interest in the Property upon terms which will in the near future practically give the interest at little or no cost.

Address, appointing interview: P. O. BOX 87, OAKLAND, CAL.

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage.

Money loaned mines.

Mining companies organized, their property experted, financed and managed.

Mines, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

Examine mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

EDW. N. BREITUNG, Marquette, Mich., U. S. A.

Cable Address: EDBEE.

Codes:

LIEBER S. BEDFORD MCNEILL'S. A B C UNIVERSAL COMMERCIAL.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

INVENTORS, Take Notice!

L. PETERSON, MODEL MAKER, 228 MARKET ST., N. E. Corner Front (Up Stairs), SAN FRANCISCO. Experimental machinery and all kinds of models. Tin and brasswork. All communications strictly confidential.

AN ASSAYER AND CHEMIST of long experience, who is also an Amalgamator and Practical Millman, desires a position with a mining company. Address W., care of Mining and Scientific Press.

WANTED.—Position as Mining Engineer and Assayer. Have had four years' practical experience in mining and milling in Mexico. Can speak the Spanish language. Address A. B., care of Mining and Scientific Press.

WANTED.

Position as Machinist or Engineer in Quartz Mill. Mexico Preferred.

First-class references. C. W. G., care this office.

AMERICAN MINING ENGINEER, in the employ of a wealthy syndicate, wants a good gold, silver, lead or copper property in the Western States or Northern Mexico, upon which considerable development work has been done. Will take up on lease and bond or put up a plant for an interest; or, if considerable ore is in sight, will buy on equitable basis. Send full particulars of mine, amount of water, timber and fuel available, transportation facilities, standard wages, etc.

Address A. N., Mining and Scientific Press.

Position Wanted as

AMALGAMATOR.

By a man who has had eighteen years' practical experience. Is willing to go anywhere and is not afraid of work. Can give the best of references. Address "K. L.", care of this office, by mail or telegraph.

WANTED.

A First-Class Diamond Drill Operator.

Address:

THE MOUNTAIN COPPER COMPANY, LTD., Keswick, Cal.

FOR SALE.

5-Stamp Quartz Mill. Shafting, Pulleys and Belting, 25 H. P. Engine and Boiler, Hoist, Pump, Steam Pipe and Fittings, Blacksmith, Carpenter and Mining Tools.

Located near San Andreas, Cal. Enquire of DR. W. G. WALLACE, 636 Sutter St., San Francisco.

FOR SALE.

HOISTING MACHINERY, ENGINE, BLACKSMITH OUTFIT, 120 ACRES MINING PROPERTY, U. S. Patent. Some Development.

Will sell as a whole, or in parts to suit. Address J. F. HOLLING, 113 Crocker Bldg., San Francisco.

Mining, Mill, Driving, —AND— Locomotive Headlights.

SIZES ON HAND:

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| 24-inch, |
| 20 " |
| 17 " |
| 14 " |
| 12 " |
| 10 " |
| 8 " |
| 6 " |



Boesch Lamp Co.,

585 MISSION STREET, SAN FRANCISCO.

ORES! ORES!

Gold, Silver and Lead Ores and Concentrates

PURCHASED AT REDUCED RATES FOR TREATMENT.

SELBY SMELTING & LEAD CO.

416 Montgomery St., San Francisco.

Consign shipments to Vallejo Junction, Cal.

THE KINKEAD MILL.

The Latest and Best.

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| CAPACITY | 10 to 15 tons. |
| POWER REQUIRED | only 2-horse. |
| TOTAL WEIGHT | only 2½ tons. |
| TOTAL COST F. O. B. | only \$750. |

NO NOISE—NO VIBRATION—NO JAR.

More than double screen surface with one-quarter power and less than one-half wear and tear of ordinary Stamp Battery. Can be set up in 24 hours.

KINKEAD MILL CO.,

69 NEVADA BLOCK, SAN FRANCISCO.

SANTA FE ROUTE

The Most Comfortable Way to Travel ACROSS THE CONTINENT.

EVERY day in the year Pullman Palace Sleeping Cars and Pullman Tourist Sleeping Cars leave Oakland Mole for Chicago and the East.

HARVEY'S DINING ROOMS

And Lunch Counters Offer Good Food Well Cooked and Decently Served at REASONABLE PRICES.

THE altitude of the plateaus and mountains crossed renders the trip cool and pleasant after the desert is passed. No matter which way you go the desert must be crossed and there is less of it on the Santa Fe than on other lines. It is a popular mistake to suppose it is a hot line. Close connections are made in Chicago and Kansas City for all Eastern cities.

Ticket Office, 628 Market St., San Francisco, Cal.

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| Gen. Agt. Pass. Dept. | Gen. Pass. Agt. |
| San Francisco, Cal. | Los Angeles, Cal. |

— MANUFACTURES THE —

Standard Electric Mining Apparatus OF THE WORLD.

SAN FRANCISCO, CAL., Claus Spreckels Building.

DENVER, COL., Kittredge Building.

PORTLAND, OR., Worcester Building.

Mines Operated by Our Apparatus are Operated Economically, Safely and Satisfactorily.

California Vigorit Powder Co.

— Manufacturers of —

Dynamite High Explosives and "Vigorit Low" Blasting Powder.

OFFICE: 208 California Street, San Francisco, Cal.

WORKS: Point Isabel, Contra Costa Co., Cal.

Assessment Notices.

CONS. ST. GOTHARD GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 9th day of June, 1898, an assessment (No. 14) of 5 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 113 Crocker building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23d day of July, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 18th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. F. HOLLING, Secretary.

Office—113 Crocker building, San Francisco, Cal.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of June, 1898, an assessment (No. 10) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 237 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 4th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 3d day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

F. METTMAN, Secretary.

Office—237 12th street, San Francisco, California.

The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 29th day of June, 1898, an assessment (No. 4) of Two Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 14, Nevada block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

WILLIAM McPHERSON, Secretary.

Office—Room 14, Nevada block, No. 309 Montgomery street, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of July, 1898, an assessment (No. 84) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 60, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of August, 1898, shall be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

AUBREY K. DUBROW, Secretary.

Office—Room 60, Nevada block, No. 309 Montgomery street, San Francisco, California.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of June, 1898, an assessment (No. 10) of 2 1/2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of July, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 8th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. F. PREY, Secretary.

Office—Room 44, Phelan building, San Francisco, California.

MARINA MARSHANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 9th day of July, 1898, an assessment (No. 14) of 2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 19th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 7th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHARLES BOYDNE, Secretary.

Office—217 Sacramento street, San Francisco, California.

MICHIGAN COLLEGE OF MINES.

Supported by the State of Michigan. Practical work. Electric system. Special advantages for men of age and experience.

DR. M. E. WADSWORTH, President.

Houghton, Michigan.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 16th day of May, 1898, an assessment (No. 1) of 1 1/2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 7, fifth floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. L. CHENEY, Secretary.

Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 3d, 1898.

R. L. CHENEY, Secretary.

Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to August 6th, 1898, and the day of sale to MONDAY, September 2d, 1898.

R. L. CHENEY, Secretary.

Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

CONSOLIDATED CALIFORNIA AND VIRGINIA MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia Mining District, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of June, 1898, an assessment (No. 12) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 24, Nevada block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 22nd day of July, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 13th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAYENS, Secretary.

Office—Room 24, Nevada block, 309 Montgomery street, San Francisco, California.

DELINQUENT SALE NOTICE.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice—There are delinquent upon the following described stock on account of assessment (No. 5) levied on the 16th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | Shares. | Amt. |
|----------------------|-----------|---------|--------|
| Charles Rehn..... | 75 | 2,000 | 100 00 |
| Charles Rehn..... | 76 | 1,000 | 50 00 |
| Charles Rehn..... | 77 | 1,000 | 50 00 |
| Charles Rehn..... | 78 | 500 | 25 00 |
| Charles Rehn..... | 81 | 499 | 24 95 |
| Charles Rehn..... | 82 | 1 | 05 |
| Charles Rehn..... | 161 | 150 | 7 50 |
| Adelheid Rehn..... | 176 | 250 | 12 50 |
| W. J. Patterson..... | 207 | 200 | 10 00 |

And in accordance with law, and an order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, room 57, No. 116 Market street, San Francisco, California, on SATURDAY, the 23d day of July, 1898, at the hour of 12 o'clock M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

GEO. W. FLEISSNER, Secretary.

Office—No. 916 Market street, room 57, San Francisco, California.

NOTICE OF DIVIDEND.

Jamison Mining Company, rooms 50 and 54, No. 120 Sutter street, San Francisco, California. June 20th, 1898. Semi-Annual Dividend No. 2.

At their meeting of June 20th, 1898, it was resolved by the Board of Directors of the Jamison Mining Company to pay to the stockholders of the company from the surplus funds in the treasury a dividend of Nineteen Thousand Five Hundred Dollars (\$19,500.00), being five (5) cents per share on the capital stock of the company.

The dividend will be payable at the office of the company on the 15th day of August, 1898, to all stockholders of record on the 5th of August, 1898. Transfer books will be closed at the close of business on the 5th of August and reopened on the morning of the 16th of August, 1898.

SAM. W. CHEYNEY, Secretary.

ANNUAL MEETING.

The Regular Annual Meeting of the Stockholders of the Tuscarora Water Company will be held at their office, No. 310 Pine street, rooms 15 and 17, San Francisco, California, on WEDNESDAY, the 27th day of July, 1898, at the hour of 1:30 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year and the transaction of such other business as may come before the meeting.

J. W. FEW, Secretary.

Office—No. 310 Pine street, rooms 15 and 17, San Francisco, California.

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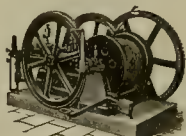
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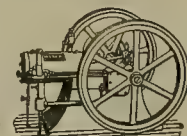
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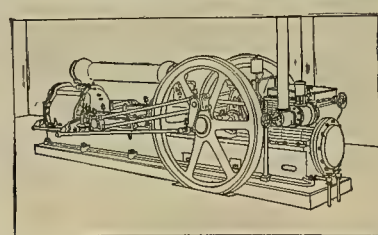
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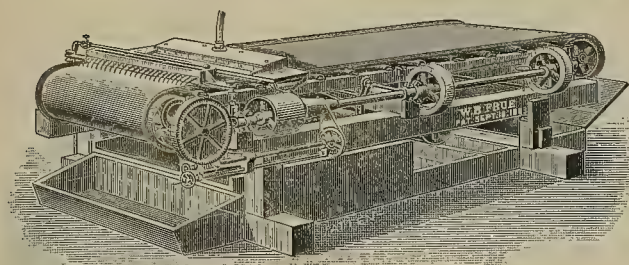
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The results obtained by this machine are the "acme" of concentration, and several cheap and untried machines that have lately come on the market compare by it. The manufacturers will tell you that they are "just as good, and cheaper," etc. The facts are that no other concentrator made has an equal capacity, or will yield as clean a concentrate with as small loss in the tailings as the Frue Vanner. The amount saved from the lower first cost of an inferior machine counts little in the year's results, when compared with the increased output from a Frue. This machine not only gives better results at both ends of the belt (i. e., clean product and poor tailings), but is operated at less expense and requires less attention than any other machine on the market. At the Alaska-Treadwell mine, where they have ordered over 350 Frue Vanners, one man attends 48 machines for 12-hour shift.

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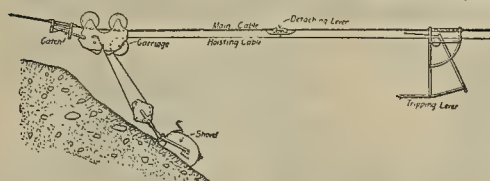
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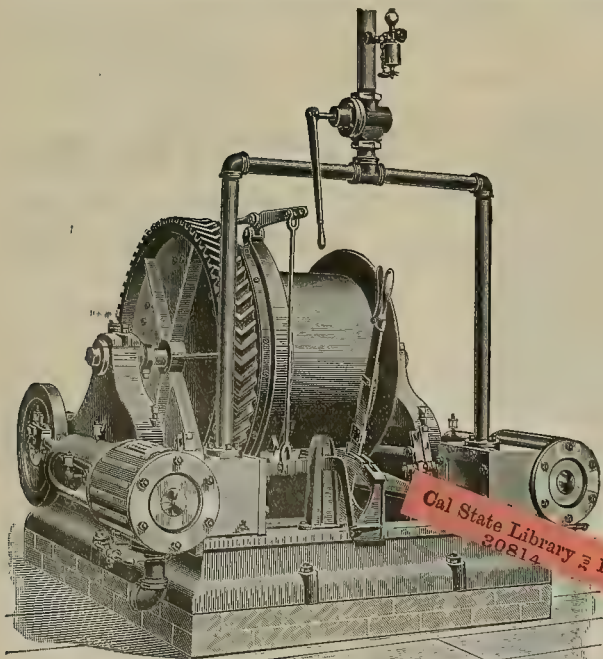
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FIXED DRUM ENGINE.

MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1985.—VOLUME LXXVII.
Number 4.

SAN FRANCISCO, SATURDAY, JULY 23, 1898.

THREE DOLLARS PER ANNUM.
Single Copies, Ten Cents.

New Style Gates Crusher.

In the issue of June 18th appeared an illustrated description of the plant at the new Golden Gate mill, Mercur, Utah. Mention was made therein of the Gates crushers. The crushing department of the mill consists of two No. 6 crushers, three sets Gates rolls 36"x16" and four sets Gates rolls 26"x16". The guaranteed capacity was 500 tons per day, but according to General Manager Cohen the crushing installation will handle nearly 2000 tons daily, so that in their crushing department they are ahead of the other departments of the mill. Through one set of 36" rolls they passed 300 tons in twenty-four hours, crushing it from 1½" to ¼" or less. Much of the ore is crushed down to 20 or 30-mesh.

Herewith the "H style fine crusher" is illustrated. This is designed and built for fine crushing and to take the place of roughing rolls. It is calculated to take material that has passed an ordinary gyratory breaker or jaw crusher—3" ring size—reducing it so that 90% will go through a ½" screen. With a view to economical wear of the head and concaves, a removable ring is used for holding the concaves (which are but 7" long), admitting of being reversed. The use of a top shell is dispensed with, the spider being directly bolted to the lower shell or frame, the concave ring being enclosed within the two parts and held by clamping those parts on the ring with bolts on the side. The discharge diaphragm is independent of the frame and while in place can be shifted so as to discharge in front or either side.

In a flat diaphragm near the lower end of the bottom shell is journaled the upper end of the eccentric box, the space forming an oil chamber and containing the bevel gear and the pinion which rotates it. Continuous oiling of the eccentric and main shaft journal is effected by utilizing the force of the oil flung from the teeth of the pinion, a part being carried above the top of the eccentric, there discharging into the cup formed by the inside up-raising flange of the dust and water seal, thence returning to the oil chamber through the journal of the eccentric and main shaft and by other passages. Fastened to the gyrating shaft and turning with it is the seal above mentioned, a downwardly projecting flange, and, whether the machine is being used for wet or dry crushing, protecting the oil chamber and actuating mechanism below the diaphragm from possibility of damage.



NEW STYLE GATES CRUSHER.

The Brown Bear Mine, Deadwood, Cal.

At Deadwood, Trinity Co., Cal., is the Brown Bear quartz mine, an illustration of which is given below, with a record of \$6,000,000, most of which was taken from two parallel ledges on the Last Chance and Monte Cristo claims. There are twelve miles of tunnels, drifts and crosscuts; the greatest depth is 600 feet on an incline. A noticeable feature of the ore is that it is either very rich or not worth milling, there being practically no "average rock." Since prospecting below the mill level cut off the water supply from above, Supt. Dobler put in a Dow triplex pump, transmitting power from the mill 850 feet by wire rope traveling 1200 feet per minute, and pumping 5 inches of water per minute, raised 175 feet. About forty-five men are constantly employed.

It is interesting to note from official reports that for the first time in American history our exports of manufactured articles now exceed our imports of manufactures. During the twenty business days of last May were sent abroad American manufactured goods to the value of \$27,000,000; during the same time \$18,000,000 worth of foreign manufactures were brought in. This exportation of 50 per cent more than importation, and that, too, in the existence of a foreign war, is striking illustration of our prosperous trade conditions.

AMONG the 20,000 U. S. soldiers arriving in San Francisco during the last ninety days is a battalion of volunteer engineers, now encamped at the Presidio, a 1500-acre Government reservation on the northwestern ocean line of San Francisco. Two regiments of volunteer engineers have enlisted, the men being mostly electrical, civil, mining and steam engineers, master machinists, etc. Among them are many of the regular engineer corps, U. S. A. The four companies now here were recruited in San Francisco, Portland, Or., Salt Lake City, Utah, and Denver, Colo. Scattered through the other regiments is a considerable percentage of engineers, but the two regiments referred to are wholly made up of such skilled recruits.

IN marked contrast to the dullness in some branches of industry, the activity in mining is shown by the continual incorporation of new mining companies—an average of ten a day being noted in the various gold mining States and Territories of this west half of America.



THE BROWN BEAR MINE, DEADWOOD, TRINITY CO., CAL.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

Office, No. 330 Market Street, San Francisco, Cal.
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J. F. HALLORAN.....Publisher

San Francisco, July 23, 1898.

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In accordance with recent editorial suggestion herein the twenty-fifth anniversary of the building of the first cable road in the world, the Clay-street line of San Francisco, is to be suitably recognized, the supervisors agreeing to set aside space in Portsmouth square, the former terminus of the first cable road, for a monument. The design is to be submitted by the directors of the Mechanics' Institute, which offers the Institute bronze medal for the best design. Competition will be open to all artists.

Few things ever got more or better deserved notice than the battleship Oregon is now receiving. All round the world our contemporaries are commenting upon the great vessel built in San Francisco and largely manned by Pacific coast residents. Her 14,000-mile trip around the Horn, in readiness for active service the day afterward, was a wonder; then her efficiency as a fighter in the Santiago affair, and, lastly, her ability as a swift-going vessel to overhaul the Spanish warship Colon, have aroused enthusiastic admiration of naval engineers everywhere. As an all-round sea going fighting racer the Oregon is in the van. Not since that day in March, 1862, when the Monitor and Merrimac met, has any vessel made such a record in naval history.

In his address as president of the International Mining Congress at Salt Lake, L. B. Prince referred to the organization having changed its name, having been called together at Denver a year ago as the Gold Mining Convention. He said: "I doubt if all appreciate what an enlargement that was, and how vast is the interest now represented. As a gold mining convention it represented only the \$55,000,000 or \$60,000,000 of annual output of that one metal, but now it stands for a yearly product more than twelve times as great, exceeding \$750,000,000 and embracing every form of mineral wealth. There are the ten great commercial metals, among which iron is by far of the largest value, and the wide variety of other products, where coal stands pre-eminent, with an annual value almost four times that of gold."

An article by an Australian geologist, B. J. Skertchley, succinctly shows how scant is the distribution of tin ore. While the known gold fields of the world cover more than 1,500,000 square miles, the tin fields have an area of less than 12,500 square miles. There are seven tin districts in Europe, producing about 8300 tons yearly, of which the Cornish mines yield about 8000 tons. Asia has two tin areas—Hunan, in China, estimated to produce 2500 tons, and the Straits Settlements and adjacent principalities, yielding 58,000 tons yearly, the richest yield in the world. Africa has no known tin mine; North America no payable mine, though South Dakota and California have made some efforts in that direction; South America one limited tin area—Bolivia and Peru—yielding less than 4000 tons a year, and Australasia, the youngest, furnishing about 6000 tons a year.

Mining Incorporations, Stock Sales, Etc.

The business of the issue, sale and transfer of mining stock, which the first rigid ruling of the revenue collector threatened with extinction, can go on, a more favorable and just construction of the law having been authoritatively secured. The first arbitrary ruling meant prohibition of nearly all business in ordinary mining corporation stock, and, amid a storm of protest, Commissioner of Internal Revenue Scott has reversed his original rulings thereon. The question for existing mining incorporations is now mainly whether to reincorporate with par values diminished, or to reduce the present nominal capital stock and the par value of shares. The California Civil Code limits the amount of any one assessment to 10% of the capital stock after one-fourth has been subscribed. In accordance therewith, special meetings of several of the Comstock companies have been called for September next to act upon a kindred proposition; for instance: the Con. Cal. & Virginia M. Co. will hold a special meeting of stockholders on Sept. 21st, to act upon a proposition to diminish the capital stock from \$21,600,000, divided into 216,000 shares of the par value of \$100 each, to \$540,000, divided into 216,000 shares of the par value of \$2.50 each.

In other States, in the incorporation of new mining corporations, the effect of the new war revenue is equally apparent. In Spokane, Wash., was incorporated this week the Hecla Mining Co., "capital stock \$250,000, divided into 1,000,000 shares," making the par value 25 cents per share; other companies are incorporating there, "par value 5 cents per share." In Salt Lake City, Utah, this week, was incorporated the R. G. W. M. Co., "capital stock \$20,000, divided into 20,000 shares, par value 10 cents per share."

In connection with this may be cited such decisions as that of the Supreme Court of Montana in the case of Kelly vs. the Fourth of July Mining Co., previously noted herein, which equally with the war tax will tend to discourage the tendency to capitalize in excess of the true value of the property owned, and, in that way, good may result.

It has been the custom in capitalizing a new mining company to put a fictitious value on the property; a company owning property worth \$50,000, would be capitalized for \$500,000, with no intent to deceive, or work fraud, but merely because of custom, the market price being without reference to par value, which now becomes of such present importance. The Montana decision was to the effect that the owners of stock in an over-capitalized company were liable for the difference between the real value of the property and the total capitalization.

ABOUT nine miles steel pipe, from 15" to 26" diameter, are being made at Adelaide, West Australia, after a new design, rivetless, longitudinal joint. Each section is 26 feet long, with but four pieces, two locking bars and two plates. Each plate is cut with square ends, after passing through a tram of leveling rollers, after which a planer with four cutters on a sliding table cuts the two longitudinal edges parallel, and sixteen rollers—eight on each side—carried by the bending rolls, upset the edges in a dove-tail of uniform width and depth. Thence the plate goes through a hydraulic press which upturns the edges, after which it passes through rolls which bend it into a half-circle, two of which are placed in grooves in locking bars and temporarily clamped together. The pipe is next subjected to hydraulic pressure of fifty tons per inch on an expanding mandrel, the grooves closed and the usual asphalt coating applied. The pipe is jointed in the trenches with steel rings and lead, and is said to satisfactorily stand ordinary tests.

SECRETARY OF THE NAVY LONG has refused the recommendation of Chief Engineer Melville to fit up on this coast an engineer repair shop on a steamship similar to the Vulcan. He says that by the time the vessel was ready the war would be over. Possibly: yet economy and the surrounding circumstances justify Chief Melville's suggestion. Probably the Navy Secretary's chief reason was a desire to note the result of this new naval experiment in Atlantic waters. At an expense of about \$300,000 the steamer Chatham has been transformed at Boston,

Mass., into "a floating machine shop," and renamed Vulcan, as a tender to the fighting vessels, though not wholly defenceless, she carrying two rapid-fire 6-inch guns. In the bow is a stock room; aft are blacksmith shop, foundry and machine shop, respectively. The foundry is not a very elaborate one, but castings can be made on the boat. Of the crew of 200 a large percentage are skilled engineers and machinists. It is possible that later on a similar vessel will be put in operation here in front of the front door of the United States.

Liquid Air.

If one-half of what C. E. Tripler of New York declares as true is so, there is a new form of energy in the mining and industrial world more potent than steam, electricity or compressed air. Recently was published herein an account of Prof. T's exhibition of his process for producing liquid air. He now claims in published articles, with some semblance of fact, that liquid air is cheaply made and easily handled, and capable of being economically utilized in a variety of ways. He cites the fact that heat is an equivalent of force and that hitherto we have been able to utilize only the heat which rises considerably above the ordinary temperature of things. "The heat of coal, for instance, becomes effective in the steam engine only when the boiling point of water is reached; all that lies between this and the absolute zero—supposed to be about 460 degrees below zero, Fahrenheit—is wholly wasted. Thus, 90 per cent of the potential energy of the coal consumed, representing 672 degrees of temperature, is thrown away." But liquid air that boils and develops enormous pressure at a temperature 312 degrees below zero, enables us to utilize some of the waste. Confined in a properly constructed boiler, it acts precisely like steam, though with even greater energy, the difference being that no fire is needed to boil it. Its condition at 32 degrees Fahrenheit is like water at, say, 1500 degrees. One would not need fire to boil water if the whole earth were red-hot, as it is relatively to liquid air. It is entirely possible, in Mr. T's opinion, for a warship, furnished with his apparatus and equipped with suitable engines, to be driven indefinitely at the highest rate of speed which her construction enables her to endure, propelled by the heat of the waters that buoy her up exerted upon liquid air, making it as needed from the wind blowing over the decks by the use of apparatus which has waved satisfactorily in his laboratory experiments. This liquid air which boils and evaporates at 312 degrees below zero, Fahrenheit—524 degrees below the temperature of boiling water at sea level—represents in each cubic foot 800 cubic feet of ordinary atmospheric air, and, it is claimed, as it returns to its gaseous state, affords in such expansion energy capable of being economically directed in many of the arts of peace and war. A substance that would at once perform the function of blasting powder in a mine and at the same time purify the air and hoist the rock to the surface would be of manifest value to the miner, though many of Mr. T's conclusions seem chimerical.

THE amount of space given in the last six years in these columns to the cyanide process exemplifies the importance that mode of treatment is considered to be to the mining world. The fact that though an extra large number of copies of each issue is printed, when those "cyanide articles" appear, those particular issues are soon out of print, further evinces good grounds for such belief. In connection with this matter it may be said that in response to suggestions questioning the correctness of the item in last week's issue, that the De Lamar, Nevada, mill used 900 pounds of cyanide per day, the fact is as stated. The reason for such abnormal use is understood to be that, while ordinarily from one-quarter to one-half a pound per ton of ore treated is found sufficient, in the case cited the peculiar nature of the ore makes necessary the use of three pounds per ton. On the Rand, S. A., when cyanide was first used it was not uncommon to use three or four pounds per ton treated; the average consumption there now is .7 lb. per ton: the average extraction 76%. Regarding this matter of cyanide, it is noticed that considerable is being still said about the "secrecy" of the method

of cyaniding now in use at the new Golden Gate mill, Mercur, Utah. This paper believes that there is no great "secret" about it. Instead of using the ordinary leaching vat with zinc shavings accompanying, at the Golden Gate they precipitate the gold by the use of zinc dust.

Concentrates.

VIRGINIA, NEV., miners are going to Butte, Montana.

In the new camp of Republic, Wash., 350 men are employed in mining.

YAVAPAI COUNTY, ARIZ., has 259 stamps in operation in the various mines.

EIGHT mines at Mercur, Utah, have a monthly payroll aggregating \$50,000.

The Yellow Dog mine, near Yuma, Ariz., contemplates building a 20-stamp mill.

WITHIN a radius of fifty miles of Baker City, Oregon, 2000 men are working the mines.

The British American Corporation holds 290,000 of the 500,000 shares of the Le Roi, B. C., mine.

The Kemmerer, Wyoming, townsite has been sold to the Oregon Short Line Ry. for \$250,000.

It begins to look now as though the Klondike would yield almost as much gold in '98 as California.

In the Sterling mine, near Jacksonville, Or., a nugget was recently found that weighed sixteen ounces.

A cut from 25 to 20 cents per hour in wages has occasioned a strike at the Hall mines smelter, Nelson, B. C.

The Riata branch of the Mexican International railway is expected to be completed to Monterey Sept. 1st.

A PIPE 4 inches in diameter will, theoretically, carry four times as much water as one 2 inches in diameter.

"SLIMES" may be defined as that portion of crushed ore which, consisting of clay and sand, is not leachable.

The Arizona Copper Co. will add to its present reduction works two 150-ton concentrators and a new furnace.

The first steam quartz mill was built by Wm. Irvine, one and one-half miles north of El Dorado, Cal., in 1852.

In the forty mines at Rosland 1000 men are employed, the payroll aggregating \$100,000 a month, or \$1,200,000 a year.

The mines of Grand Encampment, Wyo., will furnish the reduction works 2250 tons of gold and copper ore per month.

A RELIABLE estimate places the number of British investors in B. C. mines at 15,000 and their investments at \$50,000,000.

ONE of the next necessary efforts in changed federal mine legislation is reduction of expense in patenting a mining claim.

DURING the past year zinc ore has increased 25% in price, with the result of a "boom" in the zinc districts of Missouri.

SPOKANE, Wash., mining brokers have formed a protective association to secure local enforcement of the war revenue law.

The Railway Age says that \$60,000,000 will be spent this year in railway construction, of which \$48,000,000 will go to labor.

The superintendent of the Government assay office at Boise City, Idaho, says the State produced 125,000,000 pounds of lead during '97.

THE May aggregate of gold yield in New South Wales was 20,925 ounces. For the first five months of '98 the total was 116,347 ounces.

At the drilling contest in Victor, Colo., July 4, Lyons & McCullough drilled 36 9-16 inches in Gunnison granite and took first prize of \$200.

The net proceeds of the Silver Bow county, Montana, mines for the fiscal year ending June 30th, '98, according to the assessor, were \$7,688,570.

THE Mining and Industrial Reporter and the Mining Industry and Review of Denver, Colo., have consolidated and will prove that in union is strength.

THE Willows, Cal., Promoter says that along the foothills to the west wells are going dry, springs ceasing to flow, and that a water famine has set in.

WHEN the war broke out sulphur bounded from \$18 to \$45 per ton. Better understanding of cosmopolitan conditions has since dropped the price to \$21.

AMONG the 118 passengers arriving on the steamer Elder at Seattle from the Copper River country nearly all told a tale of disappointment and discouragement.

In the case of Peardon et al. vs. The Alexander M. Co. at Smartsville, Cal., Judge Ellison held that the liens of workmen take precedence of other claims.

In the North Star mine at Robinson, Utah, J. C. Fulmer noticing that one of the holes had missed fire pulled out the fuse, an explosion occurred and killed him.

THE "Zymean process," so far as known, is a laboratory one and is believed to be empirical. It is not considered worthy of serious attention by practical metallurgists.

THE waste ore from mines in Mohave county, Ariz., is to be treated by a pyritic smelter and concentrator to be erected somewhere on the line of the Santa Fe Pacific.

THE mines and smelter at Alabama City, N. M., have closed down. The men wanted higher wages and were refused. There are seventeen lead mines in that locality.

EXPERTS say artificial stone cannot be successfully made with silicate of soda. Silicate is sometimes used for drying the surface, but does not ordinarily enter into its construction.

WASHINGTON STATE, always emulous of Oregon's fame, now lays claim to the discovery of gold in Ellensburg duck gizzards. The lost Blue Bucket mine is also reported discovered again.

FROM all parts of California come reports of temporary cessation of active work because of the prevalent drouth. With the close of the war and the fall rains will come renewed activity.

NORTHERN CALIFORNIA placer miners are taking advantage of the unprecedented low water, and wing-damming and river-bed mining will be unusually active till the winter rains set in.

NEAR Boise, Idaho, three dredging companies calculate to handle 3500 cubic yards of gravel daily, each. They will operate on such a large scale that they expect 5-cent gravel to be worked at a profit.

"VARISCITE" is a green gem stone of cabinet value and

very scarce. The chief market for variscite is found in China and Japan. So far as known it is indigenous to Camp Floyd mining district, Utah.

THE Stockton, Cal., Mail says that the Stockton and Tuolumne railroad will soon change hands. A controlling interest is to be sold to a Chicago company which will push the line to Summerville and across the Sierras.

THE bill exempting locators of mines who volunteer in the army and navy from proving up so long as they are in the service, and allowing their rights to stand, became a law by the approval of the President July 12.

GOLD dredging near Bannack, Montana, continues. A Philadelphia company that recently bought the Cope placers there is building a larger boat than the A. F. Graeter, and talks of building four more for next season.

ALASKAN reports point to the possibility of the Manook Creek district developing an ancient river channel, supposedly as full of gold as the ancient river channels in the California Sierras. The latter are still partially undeveloped.

THE new revenue law will stop the custom of incorporating mining companies with a capitalization of \$1,000,000, as the stamp tax of 5 cents on every \$100 face value of original certificate would alone require \$500 in internal revenue stamps.

"A FOOT POUND" is 1 pound lifted 1 foot in 1 minute. A "horse-power" is 33,000 times that. The last has long been objectionable as a unit of measurement, but so far nothing has been agreed upon to take the place of that obsolescent term.

THE Merrifield mine, Nevada Co., Cal., has paid over \$1,000,000 in dividends. Edward Merrifield, its discoverer and former owner, died in San Francisco about three years ago while working for Wells, Fargo & Co. as way-bill clerk for \$60 per month.

AT Cripple Creek, Colo., a new system of placer mining is in operation. There is a deposit of black sand on the bedrock which carries iron besides gold. The whole product is treated as a concentrate and shipped to the smelter. Twelve tons returned \$140 in gold per ton.

NEW diamond discoveries are reported at Hopetoun, eighty miles southwest of Kimberley, South Africa. Nearly 10,000 people have gathered from all parts of the country awaiting the authorization of the Cape Government, which will be followed by a rush for claims.

IN a quarry near Holly, Cal., by the unexpected explosion of a stick of giant powder carelessly left in a rock partly drilled and abandoned without a fuse attached to give warning, J. Craig lost his sight. I. Knox will not survive and C. Howe is in a doubtful condition with concussion of the spine.

EMPLOYEES of the Widman G. M. Co. at Sutter Creek, Cal., have organized a mutual accident aid society. The monthly assessments are \$1; permanently disabled members get \$250; if temporarily disabled, \$1 per day, physician and nurse's fee. In case of accidental death his dependents receive \$250.

IT is calculated that each 1850-lb. stamp dropping 100 times per minute will require 2 1/2 H. P.; each 900-lb. stamp, at the same drop rate, 2 H. P., and each 750-lb. stamp 1 1/2 H. P. Boiler feed for each H. P. per hour will average five gallons water; each stamp per hour will require from 60 to 75 gallons; each concentrator per hour 250 gallons.

IN a 5-stamp mill 1, 5, 2, 4, 3 is considered good arrangement in drop, making uniform the splash of the water and pulp in the mortar. Thus, No. 1 dropping sends the water through the battery lengthwise, which No. 5 in falling catches and throws back, the same with No. 2, sending it back to No. 4 in its descent, No. 3 equalizing the swash.

JUDGE MORROW of the U. S. C. C. has overruled the demurrer to the complaint in the case of Skinner vs. Garnett M. Co., which had been removed from Sierra county, Cal. This suit was brought under the so-called pay day acts, for wages due a number of workmen employed upon the Garnett mine, near Hepsidam, Cal., and involves the constitutionality of these acts.

IN answer to an inquiry from Saguache county, Colo.: "Is an open cut or tunnel 10 feet long and with a 10-foot face a legal assessment?" the Denver Post maintains that it is not a legal assessment unless it shows a lead in the face or breast of the open cut or tunnel. No assessment is legal that does not disclose a vein. The assessment is only legal when the crevice or vein is shown at 10 feet from the surface.

IN the case of the Selby Smelting & Lead Co. of San Francisco the U. S. Attorney-General has decided that drawback of the duties paid on imported lead, retained in a bonded establishment and subsequently withdrawn on payment of duties for domestic consumption, as provided by the Act of July 24, '97, should be allowed upon the exportation of the articles manufactured wholly from such lead under Section 30 of the same Act.

C. KELLEY of Helena, Montana, in '94 sued the Fourth of July Mining Co. for \$50,000 damages and got judgment for \$15,000. The company was insolvent. Another action was brought to hold the stockholders liable. The Montana Supreme Court now decides that the stockholders are so liable and must pay. The decision will deter the acceptance of stock in mining companies by men who know that such acceptance is merely meant for privilege to use their names.

NOTICEABLE are the movements of gold and silver for the year ending June 30, '98. While exports of gold coin and bullion aggregated only \$15,324,929, the imports amounted to \$115,173,988—an increase of \$33,762,455 as compared with '97, showing an excess over the exports amounting to almost \$100,000,000. The silver movement for the year was, in the main, an export one. Exports were \$54,942,572; imports, \$10,890,261; exports showing an excess over imports amounting to over \$44,000,000.

"MOUNTAINS OF GOLD" and "rich mining strikes," as reported in the daily newspapers, are as unreliable as some war news or the "\$50,000,000 coming from the Klondike." As a cold matter of fact, any one having the money to pay for it can have any alleged fact in connection with "business" placed in certain daily papers under telegraphic headings marked "By Telegraph," and apparently so sent from the place designated in the "dispatch." The most prominent advertising agency in the country widely proclaims its ability to furnish such service and secure the insertion in some dailies of such bogus news.

THE following is considered a practical recipe for a welding compound: Ten parts of borax and one of sal-ammoniac; grind them together roughly, and then fuse them in a metal pot over a clear fire, taking care to continue the heat until all

the acum has disappeared from the surface. When the liquid appears clear, it is ready to be poured out to cool and concrete, afterwards to be ground to a fine powder. A small quantity of this composition will be sufficient, sprinkled on the parts to be welded while in the fire. The steel is to be raised to a heat which may be expressed by bright yellow. It is then dipped into the welding powder and again placed in the fire until it attains the same degree of heat as before. It is then ready to be placed under the hammer.

LAST year the Alaska-Mexican Co. raised 158,005 tons ore. The mill crushed this, average duty of stamps per day of twenty-four hours being 3 7/8 tons, at a cost of 32 1/2 cents per ton; 2863 tons concentrates were saved; these were treated by the chlorination process at the Alaska-Treadwell works at a charge of \$10 per short ton; the chlorination saved 93.7% of the gold contained. Of the \$335,629 gold yielded, \$236,332 was free gold from the mill; the remainder from the sulphurets. The chlorinated concentrates averaged \$31.18 per ton. The average yield of the 158,005 tons crushed was \$1.43 free gold and 70 cents sulphurets, an average of \$2 1/2 per ton. The expenses for the year were \$248,528, the profit was \$87,101. The daily average number of employees was 143. In addition to board and lodging miners were paid \$2.50 per day, laborers \$2, drillmen \$2.50, engineers and mechanics \$2.50 to \$4.

AT Lake Charles, La., the process of extracting the sulphur is as follows: A 10-inch pipe is first driven through the surface to the sulphur bed, 526 feet below the earth's surface. A 6-inch pipe is then placed inside of this 10-inch pipe. Water is forced from the boilers into a reservoir and maintained at the temperature of 335° Fahr., and allowed to flow by its own gravity down this 10-inch pipe into the sulphur bed. This water liquefies all sulphur with which it comes in contact. The sulphur, being of a greater specific gravity than water, sinks below it. It is then pumped to the surface by a pump which is run down inside a 3-inch pipe inside of the 6-inch pipe. This pump has a capacity of five tons an hour or 120 tons per day. When the sulphur is pumped up it is thrown into vats 10 feet wide, 20 feet long and 12 inches deep, where it solidifies in a few hours, and is broken by pickaxes into blocks ready for shipment. This sulphur comes to the surface at a fraction above 99 per cent pure, and is in a purer condition than it would be if taken from the ground in its virgin state, as any heavier substance would sink below and a lighter surface would float on the water, so that it may be said to be refined by this process of liquefying and pumping. Nearly 120 tons per day are thus produced.

HERR A. VON DESSAUER writes to the Chemical and Metallurgical Society of South Africa: "Experiments which I carried on for two years in the 120-stamp mill of the Twelve Apostles Gold Mining Company, Transylvania, and other mines, provided that the amalgamation with warm or cold water was equally good; the battery water in summer varied from 80° to 90°; in midwinter it had been from 34° to 36°. The theoretical and actual extraction in both seasons showed hardly any difference; but amalgam obtained from warm water had 25 to 35 per cent of gold, whereas it yielded in winter time only 7 to 10 or 12 per cent gold. The most dangerous seasons for amalgamation were spring and autumn, as the temperature of the mill water varied enormously in consequence of night frosts. Amalgam that had settled hard on the plates out of cold water during the night time, got soft in the day time, and was washed down the plates into the mercury traps and even beyond those. It seems that the percentage of gold in hard amalgam is in direct proportion to the temperature of the pulp. The quantity of mercury needed in winter was therefore three or four times as large as in summer for a given quantity of gold. The loss of mercury from plates was larger when warm water was used, but it is considerably larger in the rotating amalgamation pans when cold water was used."

AN article in last week's issue gave all the procurable authorities on the size of mesh of battery screens, regarding which there is no recognized standard. In connection therewith it is further in order to note that wire screens take their numbers from the meshes to the linear inch; perforated and slotted screens are numbered from the needle used in punching them. In gold milling the most commonly used sizes are No. 6 to No. 9 for perforated and slotted screens and No. 30 to No. 40 of the wire screens. The slots are from 1/4 to 1/2 inch long, in alternating or even rows, sometimes burred on the inner side. The following table gives the comparative different varieties and numbers:

| No. of Needle. | Corresponding Mesh. | Width of Slot (Inches). | Weight per Sq. Ft. (Lbs.). |
|----------------|---------------------|-------------------------|----------------------------|
| 5 | 20 | .029 | 1.15 |
| 6 | 25 | .027 | 1.08 |
| 7 | 30 | .024 | .987 |
| 8 | 35 | .022 | .918 |
| 9 | 40 | .020 | .837 |
| 10 | 50 | .018 | .735 |
| 11 | 55 | .016 | .666 |
| 12 | 60 | .015 | .600 |

The size needed in individual cases is a matter of opinion on the part of the millman, ore carrying fine gold requiring finer crushing, ores with considerable percentage of sulphides needing extremely coarse crushing.

REGARDING the two Supreme Court opinions published in the issues of July 2d and July 9th, it may be further said concerning the answer "Yes" to the following question: "If the apex of a vein crosses one end line and one side line of a claim as located thereupon, can the locator of a vein follow its dip beyond the vertical lines of his location?" that if a vein enters a side line and goes out of an end line of a claim, the extralateral right to follow the vein on the dip is confined to the side line; it cannot be followed on its dip beyond the end line, and only so much of the vein can be followed on the dip as there is of apex within the limits of the location. It is exactly as though the end line which is not crossed by the vein was brought right up to the point where the vein crosses the side line, and between those two end lines as contracted, the miner may follow the vein on its dip beyond his side line. Other recent decisions may not be without interest: If a vein enters a side line and departs out of the same side line the miner has no extralateral right whatever, but is confined solely to his intralateral right of mining within his lines entirely. If a miner locates along the course of his ledge 1500 feet, he can have only one dip right; he may discover a ledge that runs across his location, but he cannot follow it on its dip beyond his end lines. But if he mistakes the course of his vein in making his location, his end lines will become his side lines, and then he will have the right to follow the ledge on its dip beyond his new side lines, which were originally his end lines.

The Development of the Cyanide Process.

Following is a paper read by Wm. Orr before the International Mining Congress at Salt Lake City, Utah, July 8th, '98, and specially reported for the MINING AND SCIENTIFIC PRESS:

Five years ago the total cyanide mills in America would not exceed five or six in number and to-day, I am conservative in stating, there are over fifty plants in the United States employing the MacArthur-Forrest cyanide process. Take the State of Utah for example. In 1893 there was only one cyanide mill in operation, namely, the famous old Mercur mill, with the history of which almost everyone is familiar, and to-day there are in operation, or in course of erection, no fewer than fifteen cyanide plants within the boundaries of the State. In Camp Floyd, commonly called Mercur district, alone, there are ten cyanide plants, and as this district is dependent entirely on the cyanide process for its ore reduction, I will give you a brief sketch of the methods which have been employed and the difficulties which I (as the representative of the MacArthur-Forrest Co.) have encountered in the reduction of the ores of this district by means of cyanide. The ore is principally an altered or silicious limestone, which can be easily pulverized; in fact this feature of the ore was the cause of the first difficulty encountered by the pioneer operators. Fine crushing was entirely out of the question for this ore as the fines thereby produced retarded or entirely stopped the circulation of the cyanide solution. Here the extremely porous character of the ore came to the assistance of the millman, enabling him to leach the ore in a coarse condition (from a $\frac{1}{4}$ -inch to $\frac{3}{4}$ -inch mesh) when he would otherwise have been driven to employ agitation and decantation as his method of extraction instead of the simple and economical method of percolation. Beginning by crushing the ore to 10 mesh, which was found impracticable, the mesh has gradually been raised until $\frac{3}{4}$ -inch mesh has been reached in some cases. From $\frac{1}{4}$ -inch to $\frac{1}{2}$ -inch mesh, however, has been found to yield the best results.

It is impossible to fix a definite mesh for all the mines in the district, as they vary considerably in character, some—such as the Geyser-Marion and Brickyard, being much more silicious in character than the Mercur, Sacramento or Sunshine. Four or five years ago it was considered necessary to leach the ore at least four days, but this was eventually found unnecessary and the time has been reduced to from forty-eight hours to seventy-two hours, and may in some cases reach eighty-four hours with talcy ores. It is a remarkable fact that the gold in the ore in this district can be entirely brought into solution in fifteen minutes under favorable conditions, such as by agitation at 10 mesh, so that on a commercial scale the time taken in obtaining a satisfactory extraction is chiefly required in actually washing out or displacing the first solution, which, from experiments I have made, I conclude, must have dissolved the greater part of the gold. The strength of cyanide solution employed has also been greatly reduced and now the strength generally used varies from $\frac{1}{10}$ to $\frac{2}{10}$ of 1 per cent, and I have even seen a solution containing $\frac{1}{10}$ of 1 per cent produce an excellent extraction, but the precipitation with this solution was imperfect until the solution was restrengthened. The result of this change in the strength of the cyanide solution now employed from that used five years ago, namely, $\frac{1}{2}$ of 1 per cent to 1 per cent is a great reduction in the loss of cyanide and therefore in cost. A great saving in the loss of cyanide in some cases has also been effected by the addition of lime, thereby neutralizing the acid salts deleterious to the cyanide and which occur principally in the surface ores; in fact on one occasion I experienced the total loss of the cyanide in solution and on investigation found it was due to the presence of some surface ore from a new ore chute, the ore from which contained a large amount of acid salts. On testing this ore I found the loss of cyanide, without the addition of lime, was nine pounds per ton; with lime added three-quarters of a pound per ton. Without careful attention an occurrence of this kind will result in a heavy loss of gold in the tailings if the trouble is not speedily located and overcome. The acidity in the Mercur oxidized ore is principally due to acid iron, aluminum and magnesium salts which can be neutralized to a large extent by the addition of lime. This lime is added as the ore is charged into the tank, the quantity used being from one to two pounds lime per ton of ore. The lime is generally prepared by the method known as dry-slaking; that is, taking the quicklime and adding only sufficient water to reduce the lime to a fine, dry powder. Thus prepared it is easily powdered and is presented in a very efficient form. The exact amount of lime necessary requires careful calculation, as either an insufficient supply, or an excess, will give disappointing results.

The consumption of zinc, like that of cyanide, has likewise been greatly reduced within the last five years, and now only from one-quarter to three-

eighths of a pound is consumed per ton of ore treated. Judicious handling of the lime has an important bearing on the consumption of the zinc.

The surface or oxidized ores of the Mercur district, however, present few difficulties, but occasionally a pocket of unoxidized ore will find its way into the tanks and therewith make its presence felt in a most objectionable way. This unoxidized ore contains the following minerals which affect the solution, namely, native sulphur, the arsenic sulphides (regular and orpiment), ferrous arsenide compounds, and occasionally a certain kind of shale. No chemist could suggest a more deleterious mixture for effectually checking the solution of the gold. The alkaline cyanide solution acting on the sulphur and sulphides produces a soluble alkaline sulphide, in presence of which no gold can be dissolved. The cause of this is easily explained. Gold to be dissolved by a cyanide solution requires the presence of oxygen in that solution. By the introduction of even a very small quantity of such a strong reducing agent as an alkaline sulphide the oxygen is removed and the solution of the gold rendered impossible. Therefore, before the cyanide solution thus found by the pressure of an alkaline sulphide can be rendered effective this sulphide must be removed either by oxidation to sulphate or precipitation as an insoluble sulphide. The ferrous compounds in the base ores are also extremely injurious, but act in a different way from the sulphides, namely, by conversion of the cyanide into ferrous cyanide, which, for all practical purposes, is a non-solvent for gold. Another occasional constituent, the shale, acts in a similar manner to the sulphide, namely, as a reducing medium, thereby rendering the solution ineffective. This shale has also the property of precipitating gold already in solution through virtue of the carbon it contains. I have taken a solution assaying \$11.60 per ton and after circulating it through some of this pulverized base ore for twenty-six hours found it then assayed only \$9.20. It will thus be seen that the base ore of the Mercur district is a hard combination for the cyanide process. I have found the entire stock of solution in several of the mills being run to waste, because, according to the millman, "it had become fouled by arsenic." I have shown by the above that this is partly an erroneous idea, as the arsenic, while present, is not the real cause of the trouble. The sulphur, in combination with the arsenic, the ferrous iron, and the carbon in the shale are the causes. I have treated an ore containing over 3 $\frac{1}{2}$ per cent of arsenic with satisfactory results, but the arsenic in this case was carried in the minerals scorodite and haidingerite—oxidized varieties of arsenic minerals. In fact arsenic is present at all times in the cyanide solution in the Mercur district and is precipitated to a certain extent on the zinc with the gold.

The sulphide in solution accounts for the fact that the solution, after having been used on the base ore, is inefficient when turned on to a thoroughly oxidized ore, even although it may have had more cyanide added and the solution again brought up to the working strength. Careful attention at the mine, however, can almost entirely eliminate this danger from the base when working the oxidized ores, as this base ore occurs principally in bunches along the hanging wall, where it can be left hanging or sorted out. When the workings get deeper and the base ore becomes general, roasting will become absolutely necessary, and this is the metallurgical problem which will require to be decided in the near future, and is being investigated at the Golden Gate mill at the present time. A superabundance of talc in the oxidized ore sometimes causes trouble in leaching, but this is only a mechanical difficulty and can be obviated in most cases in the district by judicious mixing of the different characters of the ores at the mine before going to the mill to be crushed.

On some of the ore of the West Dip of the Mercur district, however, roasting of the oxidized ore will be absolutely necessary before it can be successfully treated, owing to the large percentage of talcy and clayey matter which it contains, as in the case of the La Cigale ore. This talcy and clayey ore, which is composed of hydrated silicate of magnesium, hydrated silicate of aluminum, etc., on being roasted, becomes dehydrated and in this condition leaches beautifully. The secret in treating very slimy ores successfully is to heat that ore to a sufficient temperature to expel the water of hydration (combined water of the silicates and oxides) when an easy leaching process will be produced.

The extractions obtained in the Camp Floyd or Mercur district by the MacArthur-Forrest cyanide process are very good, considering the character and grade of ore. Metallurgists will agree with me when I say that an extraction of 75 to 80 per cent on \$4 ore and 80 to 86 per cent on \$6 ore is good work, and that is what is being done on ore in the Camp Floyd district at the present time. I now come to a very important point, and one which will probably be of interest to all, namely, the cost of mining and milling by cyanide in the Mercur district. Mining in the Mercur district is being done at a cost of from \$1 to \$1.50 per ton and the milling from 75 cents to \$1 per ton, and several of the companies in Mercur are mining and milling by cyanide for less than \$2 per ton. This low figure for cost has enabled some of the com-

panies to work \$3 ore at a profit, and is ample testimony to the value of the cyanide process.

In concluding, then, my remarks on the Mercur district, I will point out the daily capacity of the cyanide mills in operation at the present time, to which I will add the capacity of those in course of erection, and which will be ready for crushing within the next two months, to illustrate the great development which has taken place within the last five years.

At the beginning of 1893 the capacity of the cyanide mills in the district was fifty tons per day; at the present time it is 1500 tons per day.

But the use of cyanide has developed equally rapidly in other States besides Utah. In the Cripple Creek camp of Colorado about 12,000 tons per month of ore varying in character and value are successfully treated in custom cyanide mills. When the process was first introduced into Cripple Creek four years ago the camp was in its infancy, and the ore treated was almost entirely of an oxidized character which readily yielded its value to cyanide, but, as the camp developed, the character of the ore changed, becoming base, the values being carried in the "live" tellurium minerals and iron pyrites. This necessitated a change in the method of treatment, which was effected by first roasting the ore before leaching, thus overcoming the difficulty and enabling the process to become available for both the oxidized and base ores of the district.

Another result of cyanide research has been to prove the thorough efficiency of the process when applied, not only to ores of low grade, but to gold-bearing rock carrying values as high as four or five ounces.

In Arizona, where the cyanide process was operated in the early stages of its introduction into this country, quite a number of large ores and tailing plants are being successfully operated. In connection with the copper characteristics of the Arizona ores, it was formerly generally accepted that the presence of a small quantity of copper entirely prevented treatment by cyanide, but a modification of the process has been devised which meets this difficulty to a very large extent. In one of the Arizona tailing plants the cost of profitable treatment has been brought as low as 65 cents per ton on tailings which five years ago were considered untreatable. Considerable interest has recently been manifested by the mining operators of Montana regarding the use of cyanide, and at the present moment four new mills are either starting up operations or are in course of erection. Time will not permit me to detail the cyanide successes of California, Black Hills, Idaho, Oregon, Nevada, etc., but the extension of the use of cyanide, based largely on the results of careful experiments conducted on ores from all parts of the United States, leads to the conclusion that in many cases where the first appearance of an ore does not look favorable for treatment by cyanide, a judicious modification of the process, under expert guidance, will achieve satisfactory results. One of the greatest drawbacks, however, to an extension of the use of cyanide is the result which occasionally follows the starting up of cyanide operations without experienced supervision. Mr. Montgomery, from Colorado, complained the other day, and justly so, of the principle prompting Eastern capitalists to send out their friends, who are absolutely inexperienced, to take charge of mines. Many of these Eastern representatives, who might be diffident about taking charge of a mine, have no hesitancy whatever in accepting the responsibilities attaching to the running of a mill, particularly a cyanide mill, as this process, to the uninitiated, seems to present few difficulties. With the facilities which every mine owner can now have for having his ore thoroughly tested and reported upon before incurring a nickel of expense in the erection of a cyanide plant, it is absolutely unnecessary to incur the expense of plant erection until the prospective operator knows exactly the most economical modification of the process to follow, the actual extraction to be obtained, and the cost per ton to be incurred in the obtaining of that extraction. In other words, provided the mine continues to carry the values, nothing need be left to chance in the treatment of the ore by means of cyanide or potassium.

United States Copper Production.

The following table gives figures for 1896 and 1897 for the States in the Union producing copper:

| States. | 1896. Pounds. | 1897. Pounds. |
|---------------------------------|------------------|------------------|
| Arizona | 73,745,321 | 81,019,932 |
| California | 1,971,545 | 14,129,020 |
| Colorado | 9,539,245 | 9,437,683 |
| Michigan | 144,058,524 | 145,839,749 |
| Montana | 228,958,164 | 237,158,540 |
| Utah | 3,550,050 | 3,854,821 |
| Eastern and Southern States.. | 3,750,124 | 3,727,939 |
| All others | 2,050,000 | 2,018,929 |
| Copper in sulphate | 12,183,210 | 13,003,236 |
| Total domestic production | 479,806,183 | 510,180,719 |

Prices for the year 1897 were higher than in 1896, the average in New York being 11.29 cents in 1897, against 10.88 in 1896. In the world's production of copper for the past year the United States leads the list.

Some Business Aspects of a Mine.

The Helena, Montana, *Independent* of the 9th inst. publishes parts of a special report just made by the directors of the Hecla Consolidated Mining Co., containing data about the property additional to that contained in the last annual report, and giving the result of a special examination recently made of the company's property by a stockholder of long standing, and of interest to mine managers and stockholders in general.

In his annual report, as far back as '81, General Manager Knippenberg had said: Nothing in mining should be considered as available to stockholders except cash. For twelve years I have insisted that the cost of all permanent improvements, buildings, tramways, machinery, supplies, etc., amounting in this time to more than \$300,000, should at once be charged to expenses, and that the stockholders should be shown, as profits each year, only the cash remaining after all expenses have been paid. You may call this a cold-blooded proposition, but it is a safe one, and never deceives. Suppose that to-day I should show you a surplus of \$500,000, consisting of smelter, concentrator, machinery, tramways and all other tools and machinery (and these originally cost the amount claimed), but should show your mines entirely exhausted, how would you divide these assets? Sell them you could not. Cash is all you can divide between the stockholders. The curse of the mining industry is the fictitious value placed upon unknown quantities of ore of uncertain quality, and finely engraved stock certificates, entrapping the unwary and innocent, only to let them find out how quickly the supposed millions can vanish. Such schemes are based upon wind, and are conceived in diseased and disordered minds. Every dollar invested in a mine must come back, if at all, in the shape of dividends. Stop paying dividends, honestly and forever, and your capital stock is worthless—an empty hole in the ground is your entire assets.

The board of directors appointed D. N. Ramsdell a commissioner to examine the property in March, '98, and directed him to incorporate in his report seven questions. The first was:

Why has there been no reduction in wages when silver and lead have declined?

Mr. Ramsdell replies to that: The miner receives \$3.50 a day for ten hours' work; the helper receives \$3 a day; engineers receive \$4 a day of ten hours; firemen, \$3.50; the foreman receives \$6 a day. These are the same wages that have been paid for twenty years. It looks unreasonable that with the decline in silver wages should remain the same. No man can understand this, except he be on the ground, and see the situation and thus learn why. Every attempt that has been made in Montana or Idaho to reduce these wages has failed, and resulted often in the destruction of property and loss of life. The mine owner has but one right: he may close down his property and let it go to destruction. The Miners' Union—headquarters at Butte—fixes the wage rate, and in a large measure the management. My visit to Butte City and further investigation have satisfied me that to reduce the wages of our miners is impossible.

Of the iron mines located at Soap gulch, fifteen miles from Glendale, Mr. Ramsdell says: They have been practically abandoned. The iron ore has become so poor that it cannot be used as flux, and the general manager now buys iron ore at Salt Lake City. The value of these mines is nothing.

Thirty questions, asked by stockholders not directors, are referred to. Four referred to the labor question. These questions and the commissioner's answers are:

Q. Whether it is possible to reduce the wages and other expenses? A. It is possible to reduce wages, even to a point below a living wage; but in doing so you would lose your expert men, and would be obliged to work inexperienced men, whose blunders would cause more loss than their wages would amount to. In the one item of the careless handling of dynamite you would be in constant danger of damage to property and the killing and injury of innocent persons; and should you employ a man as a miner who has no knowledge of explosives, you would be responsible for any damage resulting from his inexperience and ignorance.

Q. Whether it is possible to work the mines on the co-operative plan, by reducing the wages of miners and employees, and, as an inducement, giving them a per cent of the net profits? A. The "ups and downs" in all mining ventures are against such a plan. Miners will lease mines and pay a royalty on ores produced. This is as near a co-operative plan as seems feasible, to my mind, in our situation.

Q. Are the wages paid by the Hecla Co. lower, higher, or the same as paid by other lead and silver mines in Montana? A. Taking favorable contracts for labor into account, I would say that they are as low or lower than other mining companies.

Q. What is the prospect of reducing the wages paid miners, and can it be done, and if so, how? A. Expert miners' wages cannot be reduced. "Scab"

miners are not reliable and should not be employed. One good miner is worth half a dozen poor ones.

Another stockholder wanted to know what the mine would be worth closed down. Mr. Ramsdell replied: The value of the Hecla property lies in its mines. The concentrator and smelter are creatures of the mines, and depend entirely upon the mines for their operation. When the mines stop they stop. The machinery and buildings at Glendale and Greenwood (concentrators) are old and worn, and virtually worthless for any use other than that for which they were intended. If some of the machinery were in Butte it might have a value; but to sell it where it is I would deem impossible. As to the mines, I would think that if the Hecla Co. should abandon them their value would be nil in the opinion of others looking for an investment. I would not say our property has no salable value, yet I cannot say it is salable should we abandon it.

In answer to the questions put by an outside stockholder: Would the mine be operated just as well without Mr. Knippenberg as with him? In other words, can his position be dispensed with? Or, in event it cannot be, would a less expensive man do as well? Could Mr. Barbour do the work without Mr. Knippenberg's supervision? The answer was: The mine is the foundation upon which the Hecla Co. has been built; but the foundation is not all of the structure. That Mr. Barbour can superintend the mining of ore without Mr. Knippenberg's assistance or supervision cannot be denied; but the superintendent of mines is but one link in the chain, but one department of your mining work in Montana. Your ore must be reduced, and that requires your smelting department. Your books must be kept, and your miners and laborers and contractors paid, and that requires your cashier's department. These departments must have a head to which they may turn for counsel and instruction. If it were not so, there would be no harmony in action. Some one must be over all of your departments, and be responsible to you for the conduct of each of them. The gentleman who has served you in the capacity of general manager for so many years is the right man in the right place. Keep him, then, if he will serve you, is my advice.

The stockholders adopted the report unanimously at a subsequent special meeting.

Recent Additions to Museum of the California State Mining Bureau.

Mercuric oxide: Formed in the bricks of old, worn-out furnace recently torn down at the New Almaden quicksilver mine, San Clara Co., Cal.; C. C. Derby.

Specimens of conglomerate from supposed ancient river channel in Trinity Co., Cal.; Geo. Madeira.

Several specimens of rich telluride gold ores, ranging from four to ten ounces of gold per ton, in a schistose dioritic gangue, from mines at Kalgoorlie, West Australia; James Parkinson, M. E.

Auriferous black sand (concentrate from sluices), assaying \$393 gold per ton: East Fork of Trinity river, Trinity Co., Cal.; W. H. Foster.

Rich silver ore, assaying 1000 ounces of silver and \$4 to \$6 per ton gold: Whitewater mine, West Kootenay, B. C.; J. W. Powell.

Wire gold, resembling a braided cord, in quartz, from the Golden Rule mine, Stent, Tuolumne Co., Cal.; B. M. Newcomb.

Crude sulphur, alum, etc., from properties of the California Asphaltum Company, Ventura, Cal.; J. A. Dubbs, Mgr.

Native copper: Red Cap mine, Red Cap creek, Humboldt Co., Cal.; E. V. Burke.

Rhodonite, silicate of manganese: Sawyer's Bar, Siskiyou Co., Cal.; E. V. Burke.

Iridosmine: Demidoff estate, Ural mountains, Russia; Dr. David T. Day.

Molybdenite, fine specimen from a mine near Grizzly Flat, El Dorado Co., Cal.; Alexander Oliver.

Crude sulphur: Lassen Butte, Shasta Co., Cal.; J. A. Heslewood.

Muscovite mica: Oro Fino, Siskiyou Co., Cal.; John M. Conner.

And others of less importance.

H. S. DURDEN, Curator.

The lightest metal tubing is now made from an alloy of nickel and aluminum. A quantity recently made for electrical instruments was only 0.036 inch in outside diameter, with walls 0.0015 inch thick, and 3,000 feet weighed but a pound. A still more remarkable specimen was only 0.01 inch in diameter, with a hole that could be seen only with a magnifying glass. These tubes mark great progress in aluminum working, as a few years ago such alloys could not be drawn.

KRYPTON, the newly-discovered fifth element in the air, is supposed to be somewhat greater in density than oxygen, and to constitute about 20/100 of the atmosphere. The sixth constituent now suspected to exist, is believed to be, like helium, lighter than nitrogen.

The Minerals Which Accompany Gold and Their Bearings upon the Richness of Ore Deposits.*

By T. A. RICKARD, State Geologist Colorado.

In examining a lode only incompletely developed and in a new country, what is the evidence on which a correct estimate of the prospective value of the mine may best be based? The two most common answers would be a plain denial of any man's ability to see further into the ground than the point of his pick, and against this miserable *non possumus* would come the reply that the best indication would be found in the presence of particular minerals in association with the gold.

It is this question of indicative minerals which I propose discussing. The experience of certain mining districts has gone to prove that gold is notably accompanied by particular minerals, and this to such an extent that they are considered to assure the richness of an ore in which the gold itself cannot be visibly discerned. These "indicative minerals," as they may be termed, are not the same in every locality. A few samples, such as have come within my own experience, may be quoted. Every mining engineer can add to the list.

In Boulder county, Colorado, roscoelite (a vanadium mica) is closely associated with the tellurides of gold (calaverite and sylvanite). I recognized the same rare mineral in the telluride ores of Kalgoorlie, in West Australia. At San Andreas, in California, uranium ochre (the yellow oxide of uranium) is found to distinguish the pockets of specimen gold ore to such an extent as to serve for a guide in prospecting. In several parts of Arizona, in Yuma, Yavapai and Pinal counties, especially the last, vanadinite and descloizite (both vanadates of lead) characterize ores rich in gold and silver. Wulfenite (the molybdate of lead) often accompanies the vanadium minerals, and has been noticed in the ores of the Comstock in Nevada and the Vulture, Maricopa, Ariz. The association of gold with these lead ores is notable, because the particular minerals mentioned are all of great beauty and delicacy. The same may be said of crocoite (the chromate of lead), which characterizes several gold veins in the North Coolgardie gold field, especially at Menzies. The more common sulphide, galena, is also an accessory mineral in the richest mines at Menzies, and accompanies coarse native gold. At Niagara, Pinyalling and Wagie-moola—three widely separated localities in West Australia—I found gold closely associated with tourmaline in the form of acicular crystals in contact with coarse gold and also in a condition of minute diffusion forming dark blotches in the white quartz. The gold ores of the Mysore in India carry tourmaline.

Occurrences such as have been enumerated would seem at first sight to afford a much-needed aid to the explorer. It is unfortunately easy to prove that as evidence they and any number more of them are of very uncertain value in a new mining territory, because they are contradicted by similar testimony of a negative kind must be regarded rather as chance coincidences. Take the case of zincblende. One locality was quoted where this mineral is a sure sign of a generous amount of gold and silver in the ore. The Morgan mine, in Wales, affords, I understand, corroborative testimony. At the East Murchison mine, in West Australia, this mineral has been found to be an almost unerring guide in separating rich from poor ore. But in Arizona it is a common experience that the impoverishment of lodes in depth, when it does occur, is concomitant with an increasing percentage of zinc. Other regions echo this unpleasant fact. Broken Hill knows it. Again, take the beautiful mineral fluorite or fluorspar. The association of fluorite with the tellurides of gold was early recognized in both the Boulder and Cripple Creek districts of Colorado, and the purple tint imparted by this mineral was speedily hailed as a distinction peculiar to rich veins. Later experience, notably in Park county, has proved that poor ores are favored with fluorite no less than the bonanzas. I have mentioned a locality where rhodochrosite is esteemed a favorable mineral. But while it is thus characteristic of rich ore at Rico, in Colorado, it is a negligible factor in certain lodes at Butte City, Montana. Again, consider calcite. When it is seen amid the gold-bearing quartz of California, it is recognized with regret, because it so often means a falling off in values, while at Kalgoorlie the same mineral characterizes ores rich in calaverite (the telluride of gold), and at Rhoda, in Transylvania, a very valuable gold vein has been worked whose matrix was essentially calcite.

We are all familiar with mines in which iron pyrites is so intimately associated with the gold that a lessening of the one means a diminution in the other. There are also cases where an excessive percentage of pyrites coincides with impoverishment. Moreover, there are lodes in which the coarse cubes of pyrites are less favorable to the presence of gold than the finely crystalline variety, but there are also those in which the reverse is true. There used to be

*Condensed from a paper read before the Institution of Mining and Metallurgy.

an idea that coarse cubical galena was less silver-bearing than the fine-grained kind, but this as a generalization has long since been exploded. Thus, therefore, it requires but little sifting of this sort of evidence to emphasize its contradictory character.

The rich lodes of the same district frequently differ widely in their mineralization. Poor veins often carry the ores considered characteristic of the rich ones. The neglect of the former causes this fact to be overlooked. When the field of comparison is enlarged from mines to whole districts the divergence of evidence becomes tenfold emphasized.

In matters like these the experience of each mining engineer is a personal equation by which every theory must be eventually tested. Out of the whole of the sad wreck of glittering generalizations on this particular subject, only one or two have survived my own particular trial of them, and even they, I fear, await the destructive testimony which may at any moment be found in the development of new mining regions. When gold occurs in pyrrhotite ores it has been as yet invariably proved to be in immediate association with a small, often overlooked, percentage of copper pyrites. The testimony of Montana, Colorado and British Columbia is as in this deduction. Again, while many veins carrying coarse gold encased in white quartz persist to great depths, and in this respect Bendigo does especially set at naught the dictum of American experience, nevertheless I have not known gold quartz to be persistent wholly barren of the sulphides of the baser metals, while, on the other hand, I do remember innumerable examples of ore quite destitute of pyrites, galena and blende which proved particularly short lived. I might venture one other. I know of no better indirect evidence of the size of a body of gold ore than uniformity in the distribution of the gold. A patchy occurrence is less likely to indicate continuity or size than homogeneity; samples which vary between narrow limits are more encouraging than those which swing between wide extremes of richness and poverty. It is with a desire to avoid a merely destructive attitude that I have dared to offer these three observations.

While, therefore, the evidence in support of the value of the supposed indicative minerals is, as we have seen, of a very contradictory nature, it has also another feature which must not be overlooked. At its best the aid of these minerals would be delusive, because, even if it proved the invariable association of gold with particular minerals, it could not predicate the actual amount of that gold. That a lode should carry gold is quite insufficient to the mining engineer, whose operations for its successful extraction require that it should be there in paying quantity. This is the difference between science and business. The union of the two creates an industry. One might discuss in a learned and entertaining manner (as Stelzner has done) the suggestiveness of the association of gold with such a compound as the silicate of boron and aluminum (tourmaline), because it indicates a deep-seated origin. The presence in notable quantity of the fluoride of calcium (fluorspar) might prompt speculations of a vaporous and corroding kind. But the proof of gold having either a profound or gaseous origin, were it attained by the geologist or chemist, would not permit the mining engineer to infer that the gold persists in paying quantity to any particular depth. An ore which carries two penny-weights per ton in a region where the conditions are such as to require the equivalent of fifteen penny-weights to be expended in the extraction and reduction of a ton of it is to all practical intent as valueless as one which is wholly barren.

The question of indicative minerals bears many points of resemblance to that of the plants which have been observed to distinguish the soil enriched by particular ores. The *Viola lutea* was supposed to be peculiar to the soil covering the zinc deposits of Westphalia, and was subsequently recognized growing on the outcrop of the zinc ores of the Horn silver mine in Utah. It became known as the "zinc plant." Similarly there is a so-called "lead plant," the *Amorpha canescens*, which characterizes the deposits of Michigan, Wisconsin and Illinois. These plants are varieties of widely distributed specimens rather than a distinct species, their color being affected by their absorption of the particular metallic ingredient in the soil. Their occurrence has long ceased to have anything more than academic interest.

If, then, we cannot accept the belief that certain minerals are indicative of the plentiful occurrence of gold, what shall be said for the idea that they give an assurance of persistence in depth? Every one has read serious statements to the effect that this or that mine was of undoubted value, because its ores contained particular minerals, the presence of which promised that the vein would increase in richness in depth. In young mining regions such ideas find a fertile soil. In West Australia the finding of tellurides in an ore is now generally considered to permit of the inference that the lode will go down to a great depth. The early discoveries of extraordinary pockets of native gold in veins of white quartz, such as the famous Londonderry, having proved sporadic and bunched to a distressing degree, therefore, when the telluride ores of Kalgoorlie became recognized, and were found to occur in bodies of magnificent size and very satisfactory

persistence, then the conclusion was jumped at that if tellurides were only present in an ore continuity in depth became thereby guaranteed.

In these matters a very small portion of ascertained truth is swamped amid a mass of supposition quite unworthy of the name of theory. A theory embodies an underlying principle of universal application. The idea which to-day dominates the mining of West Australia is a vain imagining, delusive as a promoter's dream.

Those who are acquainted with the history of the mining of tellurides need not be told how ill founded is the statement that these particular minerals characterize lodes of peculiar permanence. The combinations of tellurium with gold and silver have proved of notable commercial importance in three mining regions—namely, Transylvania, Colorado and West Australia. There are other districts where the mining of them is an incident in the working of ordinary gold ores. Such is the case in certain localities in California, South Dakota, and the North Island of New Zealand. In none of these, however, have they been indicative of any special persistence in the richness of the veins, and their occurrence has been merely an added obstacle to the successful extraction of gold.

It was in 1802 that Klaproth discovered the presence of a new element, tellurium, in the ores of Zalathna, and so led to the recognition of a large number of the compounds of that metal with gold and silver. Zalathna, Nagyag and Verospatak were gold mining centers when Transylvania was the Roman province of Dacia and ruled by Trajan. Their very complex ores have been a puzzle to the metallurgists of many generations. The veins penetrate young volcanic rocks (such as porphyry) and tertiary limestones, sandstones and conglomerates. This very ancient mining country exhibits to-day a very forceful example of impoverishment in depth, while the refractory character of the ores has tried the resources of the smelting establishments of Schemnitz, Zalathna and Freiberg.

In Colorado the tellurides were recognized as early as 1874 in Boulder county, more especially at the mines of Magnolia, Salina and Sunshine. An experience of nearly twenty-five years has proved to the miners of that district that these ores occur there in comparatively small bodies of remarkable richness, but of very irregular and uncertain behavior. In two other districts of the same State, viz., in Hinsdale county and amid the La Plata mountains, valuable mines, carrying rich ores in the tellurides of gold and silver, have been worked during the past ten years, but their record corroborates that of Boulder. There remains the more important gold field of Cripple Creek, where veins penetrating a remarkable complex of volcanic rocks have proved so persistently rich to a depth now approaching 1000 feet that they have obliterated the reputation which this class of ore won in the three older parts of the same State.

In West Australia tellurides are being mined in three localities—Redhill, Bardoc, Kalgoorlie—and the wonderful development of the last has given a new impulse to the whole industry of the colony.

Thus, one hears much of Cripple Creek and lately of Kalgoorlie. In both districts very rich lodes, characterized by telluride ores, have been opened up, with results so eloquent as to silence the story of the more numerous localities where these particular minerals have been only a metallurgical obstacle associated with ore bodies of no satisfactory continuity. As a consequence, investors are prepared to swallow the rhetorical confectionery of an irresponsible press, and to believe that a new era has dawned for any neglected region in which these tellurides have not been heretofore recognized. Believe me, the compounds of tellurium are far more widely dispersed in gold ores than is generally supposed. I have detected them in several mines when a low extraction in the stamp mill suggested an unusual difficulty in the ore, and it is certain that during the next few years the search for these minerals will lead to their recognition in so many unsuspected localities that they will cease to be a mineralogical curiosity.*

The idea, now very prevalent, that at Kalgoorlie especially the presence of tellurides guarantees persistent richness is contradicted by several facts, the most notorious of which should be that the very mine in which they should be first recognized (by Mr. J. C. Moulden, in May, 1896), and subsequently acclaimed by the local press as heralding sure prosperity, has proved unprofitable; indeed, the particular ore body in which the first telluride was seen has been demonstrated by later development to be an isolated patch leading to nothing of any moment. Moreover, the lodes at Kalgoorlie vary in the amount of tellurides, which they carry without a necessary coincident difference in their richness. The gold occurs not only in chemical combination with tellurium, but also in its ordinary native condition. Further, tellurides occur other than those which contain gold. The so-called "black tellurium" of certain mines is

*The sulphide ore of Mount Morgan, Queensland, carries tellurides. The fact was recently determined by Mr. E. S. Simpson, Government Assayer for West Australia. How much of the early troubles in the treatment of the oxidized ores is explained by this discovery? It also recalls to me the resemblance between the dull brown gold of some of the Mount Morgan ore and that of the first discoveries of Cripple Creek in 1892.

the rare telluride of mercury, called "coloradoite," from the locality of its first discovery. Native tellurium also exists. Again, some of the veins, even below the zone of oxidation, are so free from tellurium as not to differ from ordinary gold-bearing reefs. Yet there is no reason to suppose that these are less rich or persistent than those which are characterized by a notable percentage of tellurides.

It is not too much to say, therefore, that the observations gathered from the working of these ores in various parts of the world refute the idea that their occurrence has any particular bearing on the question of persistence in depth: while, on the other hand, experience has frequently demonstrated that their presence is an important factor from a metallurgical standpoint, because it increases the cost of gold extraction, the treatment of such complex ores being more expensive than that of those in which the gold exists in a free state.

(To be Continued.)

Steel Moulded Like Dough.

There are several firms in the United States now busy making steel projectiles for Uncle Sam's big rifles, but it is said that only in the Brooklyn Navy Yard is it possible to see steel—not what is technically known as soft steel, either—moulded like so much dough. Usually such projectiles are formed by cutting, and are then bored out to make a chamber for the explosive.

Both armor piercing and semi-armor piercing shells are made in sizes ranging from 6-pounders to 8-inch. The raw material is steel, partially hardened, in round bars from 2 to 8 inches in diameter. These bars are sawed into lengths varying for the different sizes of shells from about 4 inches to about 13 or 20 inches. The work of cutting up the steel bars is such as may be seen in any machine shop. But the next step is a surprise. Entering a great room which has a dirt floor, one sees about him fiercely hot furnaces and huge hydraulic presses. A solid cylinder of glowing white metal is carefully adjusted in the die of the hydraulic press that performs the first operation. The press operator pulls down a lever with an easy movement of one hand, and down comes the mighty mandrel, exerting a pressure of hundreds of tons upon the chunk of hot steel. When the mandrel is withdrawn the piece is automatically ejected from the die. It is now slightly conical in form, having been squeezed into this shape by the great pressure as easily as if it had been putty or dough. Immediately it goes to another of the great presses, where it is held in a die with the thicker end up. Here, when the mandrel has silently applied its force and been withdrawn, the piece shows a deep hole punched in the center and has taken a form roughly resembling the finished projectile. Without reheating, so rapid is the process, the shell now goes into a third press, from which it comes still more nearly shaped to the proper pattern, and a fourth forming operation makes it ready for the finishing room.

The shells are finished and trued in lathes. A rifling band of copper is welded on near the base. Around the nose of the full armor-piercing projectiles, a short distance from the point, a groove is cut. This is for a soft steel cap, which is put on by the Government when the shells are loaded. The cap serves to prevent the shell from glancing when it strikes obliquely, and also acts as a lubricant, enhancing its penetrating power.

HAVING analyzed the powder found in the pits, M. Olroy, a French engineer, gives in an article the results of his investigations in the pitting of boilers. He found that the powder contained 86.26 per cent of peroxide of iron, 6.29 per cent of grease and other organic matter, and 4.25 per cent of lime salts. He discusses the pitting of feed heaters, boilers, etc., mentioning the conditions under which pitting most frequently occurs. He also cites certain experiments in which a polished iron bar was first immersed in a natural water containing much oxygen, and no lime salts. The bar gradually rusted, but the corrosion ceased when the oxygen was used up. The bar was then removed, repolished, and put back, after which it remained perfectly bright. Repeating the experiment with water containing lime, the rusting was much less complete, the lime salts forming a protective layer on the iron, but on polishing this off corrosion recommenced. In distilled water the bar remained quite bright. The corrosion is much more rapid if the water contains carbonic acid gas as well as oxygen. In this case a voltaic action takes place. The rust first formed is electro-positive to the iron, which then dissolves away, decomposing the water. It is for this reason that in cases of pitting it is essential that all traces of the iron peroxide should be cleaned from the metal, or the rusting will continue.—Scientific Machinist.

TRAUTWINE states the melting point of steel as being 2370 to 2500° Fahr., and iron as being 3000 to 3550° Fahr., but Greenwood gives the following temperatures, Fahr., approximately, for both iron and steel: Incipient redness, 977; dull red, 1292; cherry red, 1652; deep orange, 2012; white heat, 2372; dazzling white, 2732 to 2912.

Coast Industrial Notes.

—Flagstaff, Arizona, has contracted for water works to cost \$5,000.

—Eastern fruit shipments from Sacramento, Cal., the past eight days exceed 170 carloads.

—For the fiscal year ending June 30th 2274 immigrants landed in San Francisco, bringing with them \$214,520.

—I. D. Applegate, in Klamath county, Oregon, sheared 21,000 pounds of wool from 2700 head of sheep.

—Tails of Kero Co., Cal., ground squirrels are worth two cents each delivered to the county supervisors.

—The bark Palmyra is at Unga, Alaska, with the first cargo of coal ever taken from Australia to Alaska.

—Mr. Dole of Honolulu, U. S. A., has signed a contract with the Scrymser Co. for a cable thence to San Diego, Cal.

—Now that Hawaii is annexed, no vessel flying a foreign flag can do business between this coast and the islands.

—Oregon lumber is leaving for the East at the rate of 150 M. feet per day from the various lumber mills of Portland.

—The Postal Telegraph Co. has bought the Rocky Mountain & Postal Telegraph Co. and will operate it as a part of its system.

—The drouth has sent southern California cattlemen into the Yosemite park, from which they are being ejected by U. S. officials.

—Surveyor-General Blair reports a notable shrinkage in the applications for U. S. mineral surveys since the new rule governing patents went into effect.

—The Crow's Nest Pass Railway, B. C., is completed to Elk river, and it is expected that by the middle of October traffic will be possible from McLeod to Rossland.

—Heldmair & New, Chicago contractors, have the contract for the construction of the breakwater at San Pedro, Cal., harbor. It is thought now that active work will soon begin.

—At Grays harbor, Wash., there is a scarcity of labor. Sawmills are paying \$1.50 per day for men. There is room for 100 laborers in the mills at the harbor at steady employment.

—The Wellborn-Seaver E. Co. will build a plant for the manufacture of steel at Chihuahua, Mexico. The iron ore from the Cerro de Mercado mine at Durango will furnish the raw material.

—Chas. Fair claims to have successfully experimented with a plan to manufacture illuminating gas, for use in San Francisco, of 35-candle power, at a cost of 30 cents per M cubic feet, from garbage.

—From the Columbia river, during the year ending June 30, '98, \$890,589 cents of wheat valued at \$12,197,762 were exported. Exports of flour for the same period were 907,891 barrels, valued at \$3,610,707.

—June shipments of redwood lumber from coast ports were 14,000 M. feet, a falling off of 3000 M. feet for the same month last year, and for the half year ending June 30th a decrease of over 11,000 M. feet.

—At Fresno, Cal., the drouth affects the San Joaquin Electric Co.'s long distance transmission plant, which is barely able at present to furnish power or light on account of scarcity of water in the San Joaquin river.

—The Lingham T. & Co., of Johannesburg, South Africa, has ordered 2000 M. fir lumber for Delagoa Bay from Pacific coast mills. This company has shipped 30,000 M. lumber from Puget sound and B. C. to South Africa in the past nine months.

—The fourth ocean log raft built by H. E. Robertson at Stella, on the Columbia river, Wash., has started for San Francisco. It scales between 6,000,000 and 8,000,000 feet, is 600 feet long, 63 feet beam, draws 20 feet of water and is cigar-shaped. The raft is insured.

—The Melrose, Cal., works of the Western Fuse & Explosive Co. were on the 19th blown up by a Chinese murderer who had secreted himself in the magazine which he exploded on the approach of the county peace officers, killing himself and six others. The loss aggregates \$50,000.

—The annual report of the surveyor of the port of San Francisco shows that in the year ending June 30th, '97, there were 813,602 tons of dutiable goods imported; in the same time in '98 there were 977,868 tons. The increase in exports is larger. In '97 there were 11,824 tons of dutiable goods, and 54,964 in '98.

—The projected contract between the Spreckels sugar refineries and Los Angeles oil producers for the daily delivery of 500 barrels of oil for a year has fallen through. The price named was 8 1/2¢ a barrel f. o. b. Los Angeles. Oil is now \$1 per barrel, spot delivery. Southern California's present San Francisco shipments average 15,000 barrels monthly.

—Illustrating how war augments expenses, an officer of the Atchison, Topeka & Santa Fe says that it will cost the company \$25,000 a year for revenue stamps on checks in paying employees. The company contemplated running a pay car and paying in cash, which was the custom throughout its lines until a year ago, but it has been decided to continue paying by check.

—The Oregon Short Line has made a contract for 15,000 tons of 70-pound steel rails to be delivered in October to be laid on the west end of the main line, which will practically complete the laying of heavy rails on the entire line from Granger, Wyo., to Huntington, Or. The company has on hand 550 miles of 52-pound rails piled along the road, which was replaced by the new steel. This is enough to lay track from Milford, Utah, to Manvel, Cal., including all switches, spurs and side-tracks, and a branch to Pioche, Nev., and one

to St. George, Utah, should such a road be built. Manvel is the northern terminus of the California Eastern, which connects at Blake, Cal., with the Santa Fe.

—At the Great Northern tunnel at Wellington, Wash., the tunnel is in about 600 feet at both ends. Three shifts employ 150 men. Wages range from \$1.50 to \$2.75 a day, board \$4 a week. Trouble is experienced in getting men because of the wages. Men who get \$1.50 a day have very little after they have paid board and for necessities of life.

—At the Union Iron Works, Potrero, San Francisco, the Farragut was launched last Saturday. She is the first torpedo boat destroyer built on this coast, 273 tons, contract price \$227,500, speed thirty knots, vertical triple expansion engines driving twin screws, length on the water line 210 feet, beam 20 feet, draught 6 feet. The boat is unarmed. She will carry two torpedo tubes and a battery of six pounders.

—The California cereal year ended the 30th ult. During the year there were exported from the State 9,922,021 cents of wheat, valued at \$15,005,713, and 832,030 barrels of flour, valued at \$3,600,686. The exports of barley were 2,932,792 cents, value, \$3,474,274. The total California crop of wheat is estimated to have been 1,865,642,000 cents. The wheat and barley crops of this year will be less than half the above.

—W. A. Bissell, assistant freight traffic manager Atchison, Topeka & Santa Fe, says: "The Santa Fe expects to enter the field of Asiatic commerce in competition with other lines. We are to have a line of steamers to the Orient running out of San Diego by Oct. 1st. We want some of the business that has been so profitable to the northern lines. We believe that there is room for another line between the Pacific coast and the Orient."

—The Pacific Coast Metal and Hardware Association held its fourth annual convention in San Francisco last week. Brace Hayden, president; W. Honeyman, first vice-president; C. C. Reynolds, second vice-president; Wm. Schaw, third vice-president; J. F. Merrill, treasurer; F. L. Brown, Secretary; W. C. McCloskey, assistant secretary; Executive Committee—W. R. Wheeler, A. A. Watkins, Wakefield Baker, E. F. Selfridge, A. L. Scott, C. F. Fay, A. A. Wigmore.

—From custom-house returns of a table showing the business of the Puget Sound collection district for the fiscal year ending June 30, 1898, exports and imports for the year aggregate \$23,008,991, the principal articles of export being 8,023,912 bushels of wheat, 615,155 barrels of flour, 130,168 M. feet of lumber and miscellaneous merchandise, shipped principally to China and Japan, valued at \$7,952,046. There were 1624 entrances and 1868 clearances in the district, with a total tonnage of 2,233,532.

—Vessels of the revenue fleet are to be equipped for patrol duty along this coast. Lieutenant Commander Mozier of the Albatross will be at the head of the fleet. The vessels under his command will include the Grant, the Corwin, the Rush and the Perry. The Corwin is now at San Diego and the Perry is on the Columbia river. These vessels will be supplied with new rapid fire guns and some of them may ultimately be sent to the Philippines for revenue work or scouting duty.

—As noted in last week's issue, a Pittsburgh, Pa., firm got the contract for the structural steel work of the new postoffice building at San Francisco. The bids were as follows: Stewart Iron Works, Cincinnati, \$179,990; Ed T. Jones, San Francisco, \$176,115.87; Risdon Iron & Locomotive Works, San Francisco, \$174,875; San Francisco Building Co., San Francisco, \$174,875; City Street Improvement Co., San Francisco, \$166,000; I. G. Wagner, Milwaukee, Wis., \$164,400; McGuire & Hall, New York, \$166,498; Thomas Marshall, Pittsburgh, Pa., \$154,615. Marshall promises to have the work completed by March 1, 1899.

—On Sept. 6th, '98, there will be nearly 1,000,000 acres of land in southern California thrown open, subject to entry in the United States Land Office at No. 317 New High street, Los Angeles. This land has been held by the railroad company and its assigns, but now reverts to the United States government. This section takes in a majority of the odd-numbered sections of land, reaching from a line extending east and west north of Pasadena and extending north to the Tehachapi mountains, except the Government timber reservations and the Mexican grant lands. Those sold to bona fide purchasers will be acquired by said purchasers as soon as they have filed proofs after Sept. 6th and paid \$1.20 per acre. There is an uncertainty about getting back the money paid to the railroad. Homesteaders are limited to 320 acres of Government land. Purchasers of railroad land are not limited except to the amount previously contracted for. Alien holders of railroad lands cannot acquire title. The holdings of such aliens will be open to entry by citizens as homesteads or desert claims.

—R. G. Allen, vice-president and Western manager National Association of Manufacturers, who has been traveling through Mexico, writes *Iron and Steel* that Americans sell the greater part of the modern mining machinery used in Mexico. The machinery for all the new smelting plants, which have a capacity of about 4000 tons per day, was sold by Americans. Stamp mill machinery is nearly exclusively American made, and it is only in Chilean mills and similar classes of triturating machinery that American houses have found serious competition. England and Germany furnish a large part of the machinery of this class and a great many stationary steam plants. Steel for stamp mill shoes and dies, for Chilean mill tracks and tiers and for mining purposes, is imported largely from England. Explosives are exclusively American. There is but little illuminating material imported for mining purposes,

the cheapness of tallow and the oils extracted from the many oil beans indigenous to the country supplying this want. A few American candles, however, have been imported recently, and there is a good prospect for increasing this trade. Sulphate of copper until a few years ago came almost exclusively from England. For the past five years New York has furnished the greater part of this material, and within the last few months the Kansas City Smelting and Refining Company has been making heavy shipments to Pachuca and other mining centers.

—City of Mexico advices are that the Grande Mexicano del Sur is an assured fact. The entire route has been surveyed from the Tehuantepec to the Suchlate, on the Guatemalan border, and work will soon begin. The concession for the canal was granted last December to Bolanos & Leroy, and carries with it a subvention of \$5000 per kilometer, which is to be taken out in public lands at the rate of about \$1 per acre. The course of the canal is generally parallel with the Pacific coast at a distance of from one to twenty kilometers and from twenty to thirty kilometers from the coast range of the Sierra Madre. The ports along the route are really unfit to admit but the most shallow draught boats. The first port entitled to the name southeast of Acapulco is Puerto de Ocos, in Guatemala. The general height of the mountain range opposite the course of the canal is from 1000 to 2500 meters, although there are a few peaks which run considerably over this. By the terms of the concession the concessionaries are granted seventy-five meters on each side of the canal, and they have the right, with the customary legal formalities, to condemn, appraise and appropriate to their uses the right of way through all lands that the canal may pass. They also have ten years' time in which to build the canal and ninety years' privilege to free use of all game, fish, salt, etc., on all the islands and public lands on the route of their canal. The canal will be two meters deep, twelve meters wide at the bottom and fifteen meters on the surface of the water. It will be 440 kilometers long in that section which passes through Mexican territory, of which about one-fourth will be in the State of Oaxaca and three-fourths through the State of Chiapas. It starts at the station on the Ferrocarril Nacional de Tehuantepec at the City of Tehuantepec. There will be flat-bottomed boats for passenger traffic, propelled by electric motors. These boats will tow the freight barges, of which there will be about 100, of from 50 to 100 tons capacity each.

—The currency of that part of our national domain lying within the limits of the Hawaiian islands is of the same unit of value as that of the rest of the United States. The gold is all of American mintage, and United States silver and paper money is in circulation and passes at par. The Hawaiian money is paper, the paper being secured by silver held in reserve. Banks keep two accounts with their depositors, silver and gold, and checks are so worded that the depositor may specify the account from which the check is to be paid, though in case the check does not state in what currency it is to be paid the law provides that the holder may demand gold if the amount is over \$10. The Hawaiian silver money amounts to \$1,000,000, of which \$300,000 is held by the Government to secure a like amount of paper. The total amount of money in circulation is estimated at \$3,500,000. The rate of exchange is 1 1/2 per cent on Eastern cities of the United States and 1 per cent on this coast. Gold is at a premium of 1 per cent. The annual internal taxes average \$6.48 per capita; the total revenue from all sources, \$2,283,070 (in 1896); expenditures, \$2,137,103, and the public debt, \$4,101,174, bearing interest at 5 and 6 per cent. Commercial travelers are, under the law now in force, required to take out a license, costing at Honolulu for the island upon which it is located \$570 and on each of the other islands \$255. The market for all kinds of labor is overstocked. Wages on the plantations, including house and firewood, or room and board, range from \$125 to \$175 per month for engineers and sugar boilers, \$50 to \$75 per month for blacksmiths and carpenters, \$40 to \$75 per month for locomotive drivers, \$100 to \$175 per month for bookkeepers, and \$30 to \$40 per month for teamsters. In Honolulu the rates are \$5 to \$6 per day for bricklayers and masons, \$2.50 to \$5 per day for carpenters and painters and \$3 to \$5 per day for machinists. Retail prices of provisions are: Hams, 16 to 30 cents per pound; bacon, 16 to 20 cents; flour, \$2.50 to \$5 per 100 pounds; rice, \$3.25 to \$5 per 100 pounds; butter, 25 to 50 cents per pound; eggs, 25 to 50 cents per dozen; ice, 1 1/2 cents per pound. The productions of the islands are almost entirely a class of articles for which the people of the United States have in the past been compelled to send money outside of their own borders. Sugar, coffee, tropical fruits and rice, for which we send abroad more than \$200,000,000 annually, are the chief productions of the islands, and while the quantity so produced amounts to less than one-tenth of this sum, it is believed that it may be materially increased and to this extent our expenditures for this class of article be, in the future, kept within our own borders and among our own people. Of sugar, of which it is said the Hawaiian islands are much more productive in a given area than those of the West Indies, the exportation increased from 294,784,819 pounds in 1895 to 520,158,232 pounds in 1897, and for 1898, will, it is expected, be considerably in excess of last year. Of coffee the exportation increased from 3051 pounds in 1891 to 337,158 pounds in 1897; of rice the exportation increased from 3,768,762 pounds in 1895 to 5,499,499 in 1897 in pineapples the increase was equally striking. In the matter of imports, as above indicated, nearly all of the necessities of life, aside from sugar, fruit and vegetables, are imported, the products of the United States being given the preference in nearly all cases.

Personal.

T. J. HOUGHTON is Supt. Lightner mine, Angels, Cal.

W. D. PINKSTON is Supt. Three Stars mine, Auburn, Cal.

J. MIRON is appointed Supt. Manora M. Co., Silver City, Utah.

O. S. BUCKBEE is Supt. Sheep Trail mine, Fort Mojave, Ariz.

J. QUINN, a mine owner from Bisbee, Ariz., is in San Francisco.

A. N. BUTTS, owner Bovee mine, Angels, Cal., is in San Francisco.

CAPT. J. R. DELAMAR sailed from New York this week for France.

J. DAGGET of San Francisco is at his Black Bear mine in Siskiyou Co., Cal.

RALPH NICHOLS left Silver City, Idaho, for Kalkorlie, Australia, last week.

A. C. CURTIS of the Mercur mine, Mercur, Utah, has returned from Wisconsin.

A. D. FOOTE, Supt. North Star mines, Grass Valley, Cal., is in San Francisco.

L. L. MYERS, Supt. Malakoff mine, North Bloomfield, Cal., is in San Francisco.

W. H. SUTHERLAND of London, England, is visiting his mines at Grizzly Flats, Cal.

C. A. BATTERMAN Supt. Anaconda mines, Anaconda, Mont., is at Placerville, Cal.

E. H. WEBSTER becomes Supt. Grand Central mine, La Colorado, Sonora, Mexico.

JAS. W. ABBOTT has returned to Grants Pass, Or., from the Mt. Ruben district.

PROF. ARTHUR LAKES of Denver, Colo., is in California studying the mining situation.

W. T. ROBINSON, Supt. Spanish Bar mine, Mokelumne Hill, Cal., is in San Francisco.

J. D. KIEFFER of the Herschel mine, Mercur, Utah, has returned from his Eastern trip.

M. SPROAT has been appointed gold commissioner for the Slocan, at New Denver, B. C.

J. M. PHILIPS, Supt. Amador Queen No. 2, Jackson, Cal., has returned from Toledo, Ohio.

J. A. FERGUSON, Supt. Red Point mine, Damascus, Cal., has returned from San Francisco.

H. K. SHOCKLEY, Supt. Phoenix mine, Nevada City, Cal., has returned from Cincinnati, Ohio.

P. L. SCHUMAN, Supt. North Star Con. M. Co., Mokelumne Hill, has returned from San Francisco.

S. C. WILMANS, Supt. Boulder mine, Shingle Springs, Cal., has returned from San Francisco.

D. D. FINDLEY has been appointed Gen. Mgr. Gold Sovereign properties at Cripple Creek, Colo.

LETON BALLIETT, Mgr. Van Avery mine, has returned to Blue Canyon, Cal., from Des Moines, Iowa.

F. W. PAGE of San Francisco is visiting the South Fork mines, of which he is Gen. Mgr., at Forest, Cal.

E. A. STENT, managing owner Griffith Con. mine, Diamond Springs, Cal., has returned to San Francisco.

F. SEARLES, a mine owner and mining attorney of Nevada City, Cal., has returned from San Francisco.

J. GUKER, owner of the Great Northern mine, Baker City, Or., has returned home from Salt Lake City.

LOUIS RUEL and LOUIS FADE of the Roessler & Hasselacher Chemical Co. of New York are visiting San Francisco.

T. J. PARSONS of San Francisco, Vice-Pres. Cal. State Miners' Association, is visiting his mine at Alleghany, Cal.

F. W. BRADLEY of San Francisco, Mgr. Bunker Hill & Sullivan M. Co., is in London, England. He will return in four weeks.

C. B. WINGATE of San Francisco has returned from the Chloride and Bailey mines, in which he is interested, at Dedrick, Cal.

H. L. BENNER has resigned as Supt. of the Geyser-Marion mine, Mercur, Utah, to develop properties in which he is interested.

W. J. ADAMS, E. M., of San Francisco is at Ackerman, Placer Co., Cal., examining a quartz property for Messrs. Brandenstein & Jacoby.

W. R. CHADBOURNE, Gen. Mgr. Mikado mine, Leadville, Colo., is at the Lindsay mine, Maybert, Cal., which his company is exploiting.

C. H. THOMPSON, interested in the recent purchase of the Virtue mine, Baker City, Oregon, becomes Gen. Mgr. of the Virtue and Collateral mines.

H. KERNER of St. Louis, Mo., Pres. Lucky Marion G. M. Co. of Greenwood, Cal., is visiting the mine and says work will soon be resumed on the property.

W. H. ANDREWS, managing director Young America M. Co., Tuscarora, Nev., is en route to San Francisco from Salt Lake City. He comes to procure plans and prices on a mill for his properties.

D. H. JACKSON of Placerville, Cal., has been offered his wholm position as Supt. Holmes mines, at Candelaria, Nevada, properties that were extensively operated before the decline in silver.

WM. SCHAW, senior member of the firm of Schaw, Ingram, Batchelor & Co. of Sacramento, Cal., has gone to London to bid on the contract for making and laying the 323 miles of 30-inch riveted iron pipe for the Coolgardie, Western Australia, water system.

Aug. J. BOWIE of San Francisco returns on the Roanoke from Dawson City, whither he went last July, representing Jas. R. Keene of New York, at an annual salary of \$25,000. Mr. Bowie, who is leading authority on hydraulic mining, confirms the estimate of the country given in his first correspondence while there.

Mine Legislation and Inspection in the Anthracite Coal Region of Pennsylvania.

An address delivered before the International Mining Congress at Salt Lake City, Utah, July 9th, 1898, by G. M. WILLIAMS of Scranton, Penn., and specially reported for the MINING AND SCIENTIFIC PRESS.

The history of governmental inspection of mines in the United States begins in the anthracite coal region of Pennsylvania, in the year 1870. Mining laws had then been in force in England since 1842. At each of the anthracite collieries a large structure, termed a "breaker," from 80 to 100 feet high, and containing about 800,000 feet of lumber, was required to break, assort the different sizes, and prepare the coal for market. Prior to 1885 these breakers were generally erected directly over the opening through which the coal was hoisted out of the mines, in order that the coal might be hoisted to the top of the breaker at one lift. On Monday morning, September 6th, 1869, at the Avondale colliery, at Plymouth, Pa., the breaker, which was erected over the shaft, was entirely consumed by fire while the workmen were in the mine. The shaft was the only opening and all the men in the mine, to the number of 108 persons, perished by asphyxiation. This, the first great calamity in the mines of this country, created a profound feeling of sympathy for the underground workers, and laid bare the great perils surrounding them. During the following winter, although a strenuous opposition was presented by a few operators, the legislature enacted a law regulating the operation of coal mines, with the laudable object of providing a greater degree of safety to the employees. This law was approved March 3rd, 1870, and applied only to the mines of the anthracite coal fields. Seven years later, in 1877, after a successful operation of the anthracite law, another Act was passed, applicable to the bituminous coal mines. Since then, both laws have been improved several times, and nearly all the other coal-producing States have enacted laws with similar intent.

The salient parts of the anthracite law are: that competent persons shall be employed by the State to inspect the mines and see that the provisions of the law are complied with; that there shall be an accurate map made of the workings and kept at the colliery; that there shall be provided at least two openings into each mine, fitted with safe, available appliances for the escape of the persons employed therein; that there shall be provided at least an average of 200 cubic feet of pure air per minute for each person employed in the mine, divided into separate currents so that not more than seventy-five persons shall be employed in any one current; that all accidents shall be reported to the inspector and investigated by him; together with rules regulating the conduct of the employees generally, and providing for the punishment of those who violate the law.

At first considerable opposition was presented by some operators to provide the improvements necessitated by the law. It required a large outlay of additional capital to provide a second opening; to make surveys of the workings, from which maps could be made; to provide appliances of sufficient power to produce the large quantity of air required for ventilation, and to provide the many other improvements required by the law. These operators felt that it was an imposition of unnecessary expense, and an uncalled-for hardship, to be compelled to spend so much extra money on what, at that time, appeared unremunerative. However, under the persistent efforts and influence of the mine inspectors, the necessary improvements were gradually introduced. In a few cases the inspectors were obliged to appeal to the courts to compel operators to comply with the law. A few years of experience demonstrated that the money spent in making the required improvements proved to be profitable investments. Accidents, which were at all times expensive, became less numerous. The pow-

der smoke was swept away quicker; the workmen were no longer troubled with headaches, and were enabled to do more work, so that a greater amount of coal was produced per person employed. Previous to the passage of the law, anthracite mining was in many respects conducted in a crude and wasteful manner, and the operators were exceedingly indifferent as to the safety of the employees. There was no accounting for accidents, and no provisions whatever were made to prevent them, excepting such as were necessary for the production of coal. Only the best and most accessible seams were mined, and they were mined in an unskillful and wasteful manner.

The anthracite coal basins of Pennsylvania have peculiar features, presenting difficulties for mining that are rarely met with in bituminous coal fields. The coal measures lie in a series of detached, parallel, canoe-shaped troughs, with occasional projecting branches, and much complicated by numerous abrupt rolls, warping the coal seams into curiously curved surfaces, having dips ranging from the horizontal to vertical. The large basins have minor plications and anticlinals, diverging from the average trend of the main axes of the basins. In some places an anticlinal becomes an overturned flexure, having the coal seam folded directly back upon itself. The varying pitches, caused by numerous local basins, make it impossible to work a mine according to a previously arranged plan. The workings must be conducted in such a way as to be adapted to the conditions found as the work progresses. The coal seams vary in number in different basins, and at different points in one basin. In the deepest parts, from six to ten separate seams are found, varying from 1 to 24 feet in thickness, and aggregating a total thickness of about 90 feet of coal. Seams less than 3 feet thick are not yet mined. The coal seams lie alternately between massive, hard sand-rocks, and the softer shales, and slates. The basins are depressions lying directly under the valleys, and the hills and mountains separating them are anticlinals, where the red shale and conglomerates—the bases of the coal measures—are raised to the surface and denuded of coal. All the coal seams outcrop at different elevations on the sides of the valleys, and the axis of the synclinal of the coal basin lies nearly beneath and parallel with that of the depressed surface of valley. Some of the smaller basins are exceedingly narrow, with steeply inclined sides, meeting almost "V" shaped, at a depth of from 200 to 500 feet, and having the coal seam at the bottom folded upon itself, while the wider and larger basins attain a depth at their deepest points of 2400 feet or more, and embracing a number of minor basins and warpings having inclinations varying from horizontal to ninety degrees.

Prior to the enactment of the mine law of 1870, which first introduced a system of mine inspection, the mines were nearly all working the safest parts of the basins, within a few hundred feet of the outcrops. The top and bottom rocks were generally strong and safe, and little propping and timbering was needed. The seams, where opened, were of almost uniform thickness, and contained free coal of excellent quality, which rendered the mining comparatively easy, and required much less powder than the coal mined in later years. As compared with the mines of the present time, the dangers were exceedingly small, only a few of the mines having any explosive gases. Some of the most gaseous mines had to be abandoned, on account of the many lives lost therein, due to the inadequacy of the ventilation. A few of the mines had fans of from 6 to 12 feet diameter, and a ventilation of from 10,000 to 40,000 cubic feet of air per minute, and some perhaps a little more, but all the non-gaseous mines had little or no ventilation at all, the mines which were not provided with fans depending for their ventilation upon a small furnace under

a shallow upcast, a hanging grate, a steam jet, or upon natural conditions. These means or appliances for ventilating the mines, as can be readily understood, were very far from being sufficiently effective. The mines were not examined by fire bosses, as they are now, before the miners are allowed to enter each morning. Accumulations of explosive gases were removed by the dangerous practice of "brushing" or fanning it into the air currents, and frequently a body of gas was deliberately exploded in order to get rid of it. These practices were extremely dangerous and caused numerous accidents, but now all such practices are prohibited. Timber was furnished only on the surface, and miners would frequently run great risks to avoid going outside to cut their props and bring them in; but now props are furnished, already cut to proper lengths, to the miner in the mine. Employees were permitted to ride indiscriminately in crowds on top of loaded cars in slopes and shafts. All the men that could be packed on a shaft cage were hoisted or lowered at once, and the cages had no roofs or overhead cover to protect them. The discipline was generally loose, having but little regard for the safety of the employees. The employees were permitted to indulge in all kinds of dangerous, reckless practices. There were no records kept of the persons killed or injured, but the meagre accounts given for the first year by the mine inspectors, when all the casualties were not reported, and although the mines were then in the safest parts of the coal basins, show that only from 50,000 to 60,000 tons of coal was produced per life lost, and not more than from 15,000 to 25,000 tons per person injured, and that a large proportion of mine workers over forty years of age were afflicted with miner's asthma. Soon after the provisions of the mine law were put in force through the persistent efforts of the mine inspectors a gradual improvement was effected. The cages were provided with roofs, hand-rails and safety appliances, and no more than ten persons allowed to be hoisted or lowered at one time. The ropes were provided with bridle chains, and all examined daily, and no person permitted to ride on loaded cars either in shafts or on slopes. The operators also soon learned that money spent to procure the best and most approved appliances was money well spent. Larger shafts were sunk, providing upcasts having sectional areas of from 80 to 140 square feet. Where the entries (gangways) were only 8 or 9 feet wide, they are now driven, when practicable, from 12 to 14 feet wide, and the airways the same width. The air was invariably conducted through the workings of the whole mine in one continuous current, but now it is divided into from four to eighteen separate currents, or splits. The result is that, with the enlarged airways and a judicious system of splitting the currents, the quantity of air produced by a fan has been increased by more than four times. All the anthracite mines are now ventilated by fans, varying in diameter from 15 to 35 feet, the quantity of air ranging between 60,000 and 400,000 cubic feet per minute, according to the extent and need of the colliery. The dangers and difficulties have been increasing every year, as the workings penetrate the deeper parts of the basins. Carbonic acid gas is found in some mines in profuse volumes, while enormous quantities of explosive gases are evolved in other mines, entailing a much greater liability to explosions and mine fires. The more tender top rock, and heaving fire clay bottom also add greatly to the perils and difficulties. The quantity of powder used in the mines has also so increased that in 1897 about 9000 kegs, of 25 lbs. each, were consumed per day, or 1.5 lbs. per ton of coal produced. In addition to this quantity of common black powder, over 2,500,000 lbs. of dynamite was consumed in the driving of tunnels, sinking shafts, and driving passages in the coal where fire-damp feeders are strong. High explosives do not ignite the gas feeders so readily as the common black powder. Notwithstanding the difficulties attending the

mining have been so greatly increased, and the liability to accidents have been proportionately augmented, and that the old workings of the past forty years must be cared for, the quantity of coal produced per life lost has nearly doubled. In 1870 the coal produced, per death, was only 59,969 tons, while in 1897 it was 110,725 tons. The number of deaths per 1000 employees in 1870 was 5.601, and in 1897 only 2.83, showing that the rate of fatalities per 1000 employees is reduced proportionately to the increase of the quantity of coal produced per death. The coal producing capacity of the mines has more than trebled for the same number of collieries. In 1897, working less than half time, 46,947,354 tons were produced, valuing \$176,052,577, and 95,812 persons were employed in the mines and 53,745 on the surface, making a total of 149,557 employees. Although the best and most approved machinery is used, the risk is greater in large producing mines than in the small ones, because everything is operated quicker.

The office of the mine inspector was created for the purpose of securing the enforcement of the laws enacted, to reduce the number of casualties in mining; but, in order to bring about this result, the mine inspector had to become an educator to a large number of mine foremen, whose knowledge of the principles of the various branches of mining was very limited. In traveling through the mines the mine inspector has been to a great extent, not only an instructor, but also a conveyor or transmitter of information concerning improvements. He has greater opportunities than any other official. He sees and notes the various appliances in use at all the mines he visits, and his suggestions are very frequently the means of bringing about the adoption in certain mines, where applicable, of improvements similar to those which have been made and used successfully in other mines. His position is by no means a sinecure, for he is called out at night, as well as during the day, when troublesome accidents occur, and has to assume the responsibility for the subsequent proceedings. Each inspector has about sixty collieries to inspect, and they are large, complicated and dangerous mines. He must keep himself well posted as to the workings, in order that he may suggest improvements tending to enhance the safety. The inspectors of the anthracite region of Pennsylvania are all practical men, who had been for years in charge of mines before being appointed to the office of mine inspector. They are not in any sense politicians, and did not receive their appointment through any political influence. They are commissioned by the Governor of the State, on the recommendation of a board of examiners appointed by the judges of the courts having jurisdiction. The board of examiners consists of two reputable mining engineers and three reputable coal miners in actual practice. The Governor has no choice in the selection of the mine inspectors, but must appoint the one recommended in each case. Some of the inspectors have been in office for twenty years. The inspectors are commissioned for the term of five years, but, after becoming proficient in the work and familiar with the mines in their district, it is not thought prudent to make changes, as long as an incumbent behaves himself well and attends to his duties.

ONE of the methods of testing the question of the existence of a perceptible atmosphere on the moon is the observation of a star at the instant when it disappears, or emerges from behind the moon. If there were a lunar atmosphere it should produce some effect on the appearance of the star. No such effect has ever certainly been observed. Recently this method has been rendered more delicate, perhaps, by the application of photography. Photographs of stars, made as they are about to disappear behind the lunar disk, show no indications of change in the intensity of the image, such as would be expected to occur if the moon had a perceptible atmosphere.

Mining Summary.

CALIFORNIA.

Amador.

Jackson Exploration and Development Co.: Extract from manager's reports of work done from May 7th to June 4th—Car-track laid and air-pipe fixed, power transmission rope replaced where broken, timbers framed and put in place for rope pulleys, eleven sets of old timbers taken out of 500-foot drift No. 1 and eleven sets of new put in their place. Part of hanging-wall drilled and blasted for entrance to station. Lower reservoir and ditch at Amador gold mine being cleaned out; 500 feet of 1-inch air pipes disconnected and taken out of shaft from 500-foot level down and replaced by 500 feet of 3-inch casing. Mr. Dye had consulted Mr. Ross (consulting engineer) with regard to sinking to a greater depth than 1000 feet. Mr. Ross said that no possible mistake can be made on the mother lode by sinking. His experience had taught him that it was next to impossible to go too deep—the deeper the better. He advised that the ledge be first proved at 1000 feet, sinking the sump to 1080 feet at the same time, and if it paid at 1000 feet to continue sinking, utilizing part of the profits to pay for the extra depth sunk. If it did not pay at 1000 feet, he saw no reason why it should not, then to continue the sump from 1080 feet to 1100 feet and to test the ledge at the latter depth, but it would then be necessary to sink 75 feet or 80 feet below the 1100-foot level for a sump. Mr. Dye suggested that the sump from 1080 feet be continued to 1110 feet to admit of the skip being filled from the 1100-foot level, and that a small drift be run in at 1100 feet to prove the ledge at that depth. This would save the expense of sinking the extra 70 feet, if not required. Mr. Ross stated that at the Central Eureka mine, adjoining the South Eureka on the north (the latter mine adjoins the Kennedy also on the north), their shaft was 1100 feet down, the ledge was 18 inches wide, with two perfect walls, and the ore would average \$7 per ton. During the second week in May there was a delay of twenty-seven hours, caused by the breaking of the power transmission rope. As the rope had begun to give, Mr. Dye would have to procure a new one. No further sinking in the shaft was done during the week ending June 4th, as the station was commenced. Five feet from the hanging-wall of the shaft the ledge was cut into, pitching at an angle of between 70° and 75°, and accordingly it should be again cut through in sinking lower. Mr. Ross had examined the 500 south drift No. 1 and east crosscut on May 13th, and said that, as it looked as though the hanging-wall had been reached on that level, he should advise not to crosscut farther east at that spot, but to run south, as a little water was showing on that side, and water always follows the ledge. Before leaving on May 13th, Mr. Ross said that the mine looked more favorable than at any time previously. At the 500 west crosscut the vein was 23 feet 6 inches wide; and, although this ore had not yet paid to mine and mill, by Mr. Ross's advice Mr. Dye was continuing to drive the crosscut, not only to determine the exact width of the ledge, but also to ascertain whether any good ore was on the footwall—the same as existed on the footwall of the said ledge in the shaft at the time it disappeared in the hanging-wall. The ore taken out was being sent to the mill with that from the 500 south drift No. 2 for what profit could be made out of it. On May 25th ten stamps were started on ore from the surface crosscut with ore man working twelve hours. At the 500-foot south drift No. 2 the ledge had commenced to improve in appearance, and assays of a sixty-pound sample had showed from \$1.03 to \$4.13 per ton, or an average of \$1.64 per ton, which included all the values contained in the ore, but the ore got gradually poorer until it did not pay to send to the mill. On May 30th a drift north at the 500-foot level was started, nearly the whole mine north of the shaft being unexplored and virgin ground. After drifting 2 feet a two-assay ton test was made, the result being \$6.40 per ton, all values included. May 24—A four-assay ton test of an average sample taken from all over the drift resulted in \$2.53 per ton, all values included. All this would be sent to the mill. On June 4th the ore was 2 feet wide. In the before-mentioned period the Amador Queen mine, No. 1 shaft, was sunk and timbered 23 feet, making the total depth 1007 feet; the south drift No. 2, 500-foot level, was driven and timbered 46 feet 6 inches, making the total length 89 feet; the west crosscut, 500-foot level, was driven 4 feet 6 inches, making the total length 56 feet 6 inches. The north drift, 500-foot level, was driven 3 feet, and the station at the 1000-foot level was driven 12 feet. Number of tons of ore sent to the mill, 54, making a total of 132 tons; number of men employed, twenty to twenty-two.

At the Amador Queen No. 2 the rock is softening. The shaft is down 500 feet.

On the Spagnoli-Clinton the shaft is 1000 feet.

Dispatch: Mason & Griesbach at Pioneer are hauling 200 tons of rock from their mine to the mill and expect to begin crushing shortly.—Sullivan & Axtell of the Live Oak mine, Stony Creek, are having ten tons of rock crushed at the Good Hope mill.—The Oneida Co., Jackson, is having rock crushed at the Zeila mill. This is a test move and if it proves satisfactory a mill will be built by the Oneida people on their property.—At the Zeila repairing the shaft to go deeper on the ledge goes on. Rock is being taken from the present levels without interfering with repairing the shaft, and requisite stamps are kept dropping.—The Argonaut mill is kept busy night and day. The Supt. says that the mill will be kept at work unless the water supply gives out.

Ledger: The Jackson Exploration and D. Co. will sink 300 feet deeper before crosscut-

ting the ledge. A station has been cut at the 1000-foot level, ready for development work there.—The shaft at the Anita mine is down 600 feet. The owners will sink 1000 feet deep before prospecting the ledge.

Republican: Most of the repairing at the Kennedy is completed and soon all the stamps will be running.—At the Valparaiso mine the output continues satisfactory.—At the Red Hill mine considerable work will be done.—At the Christensen gravel mine six men are at work. The property pays a fair profit on the investment.

Butte.

In the Electric mine at Enterprise an 8-foot ledge of good ore was struck. It is said the company will put in a dam and erect a 5-stamp mill within a short time. G. H. Snow of Forbestown is interested in the property.

Clark Bros. near Yankee Hill are said to be taking out gravel that pays 10 cents per wheelbarrow.—Gramps Bros. have started work in their drift mine.—W. Lake is taking out pay gravel near Big Bend.

The Oroville Mercury says that litigation over the Cherokee mine at Cherokee has been settled by compromise and the mine bonded to C. W. Cross of San Francisco for six months, who in turn agrees to relinquish all claims against the company if he fails to make a sale within that time.

Marysville Democrat: It is said that the owners of the Gold Bank mine have bought or bonded the Carlisle claim and that Mgr. Stow will soon operate it. The Big Betay quartz mine is said to be developing profitable ore.

Calaveras.

(Special Correspondence).—The Gwin M. Co. has been notified by the Mokelumne Hill & Campo Seco Water Co., that they can furnish them but 80 inches of water this season. In consequence the Gwin Co. shut down on the 16th as this amount was insufficient to run the hoist. This, however, will be only temporary. The company has ordered a double engine of 250 H. P. which is guaranteed under bond to be shipped from the East within three weeks, and which it is thought will be in operation within six weeks. This shut down at this juncture is rather unfortunate, as the shaft had been completely unwatered only fifteen days and was beginning to pay. The company has broken through from the 1300-level of the new or North mine into the 1500 drift of the old mine about 7 feet above the floor, and made an upraise from the 1400-level of the new mine to the 1500 of the old property for air and drainage. The two shafts are 1100 feet apart.

Mokelumne Hill, July 18th, '98.

The suit of the Gerryman G. Co. against the G. M. & D. Co. has been transferred from Tuolumne to Calaveras county.

The Harris mine near Angels is to be worked, and on a large scale. The Cherokee mine near Altaville has completed the hoist and deep work will be pushed.—The Thorpe mine at San Andreas started up last week and the 10-stamp mill is working satisfactorily.—The Violet mine on Licking Fork is being worked by Goodman & Co. and showing good prospects. They have a pay chute which is said to average 2½ feet in width and yields about \$60 a ton, gold.

Prospect: Sinking and drifting are in progress in the Bonanza mine near Angels, the shaft having reached 175 feet depth. The vein will average 40 feet in width and the rock is of the same general character as that of the Utica. A general mill run yielded from \$250 to \$300 to the ton, the sulphurets producing an average of \$700 per ton.

El Dorado.

(Special Correspondence).—Referring to the item in last issue concerning the projected electric power plant, I am able to state definitely that if the franchise is granted the installation is a certainty. J. J. Crawford who applies for the franchise proposes to build in Ladies valley a cemented earth reservoir, 2000 feet of ditch and lay 4800 feet of 22-inch pipe 5-16 iron. The estimated cost of the plant is \$25,000. He has secured five acres of ground for power site and the right of way for a pole line through the Mebur & El Dorado Fruit Co.'s lands. He has also contracted with the Griffith Con. Co. for a long term of years to furnish water from Ladies valley under 1015 feet pressure, and to deliver to the Griffith Co. 250 H. P. to run their 40-stamp mill (now building), hoist and pumps. If the plant proves a success the Griffith Co. may accommodate their neighbors at a cost of \$7 per H. P. per month. It is possible though, if the enterprise is a success, that the Griffith may conclude to install a plant and supplement its present water power. Under the existing contract for pressure an inch of water is equivalent, theoretically, to 2.8 which would be decreased according to the efficiency of the wheels and loss of transmission. The successful inauguration of this power plant will make possible the resumption of work on several properties that were abandoned because of inability to secure water power.

Placerville, July 20th, '98.

At Pleasant Valley Murphy & Co. are running a 200-foot tunnel in a gravel property.—The Independence mine, at Slate Mountain, is showing good prospects in the extensive development work carried on by Croft & O'Brien. Marquart & Hancock of Granite Hill have completed the washing of 400 carloads of gravel from their mine during the past season and are blocking out new ground.

Nugget: The American Gravel M. Co., near Fort Jim, is running a bedrock tunnel to tap the gravel channel. Over 400 feet have already been driven. The company has 1200 carloads of gravel on the dump, taken from another portion of their mine, which they have been unable to wash up, owing to lack of water.—At the Starlight mine, near El Dorado, the shaft is being sunk from the 400-foot level an additional 100 feet. This company operate their 10-stamp mill by steam, but have been compelled to shut down, not having enough water for the batteries.—Searing and Dennis of the Abbott mine, near

Pilot Hill, are hauling ore from their mine to the custom mill at Placerville. A 75-foot shaft has been sunk and they are now drifting and breaking ore from a 2-foot ledge which assays from \$20 to \$195 per ton. The owners contemplate the erection of a steam hoist.

Nugget: In the Cammillite mine, near Shingle Springs, the shaft is 115 feet in depth. They are drifting from the 100 level on the ledge.—At the Limpensel mine near Placerville they are working on the 250-foot level. The vein is 15 feet wide; the shaft, which is 268 feet deep, will be sunk an additional 100 feet.—The Grand Victory mine, Diamond Springs district, has closed down on account of the drought. The mine will be allowed to fill with water. Operations will resume as soon as fall rains warrant.

Inyo.

The Inyo M. Co., composed of Pomona men, has begun smelting and is running through twenty-five tons of ore per day at the mine near Darwin.

Kern.

Four carloads of ore from Victor to the Barstow reduction works yielded seven ounces gold per ton.—A cyanide plant is in course of construction at Carlock to work the tailings of that camp. It is expected to handle sixty tons per day.

In the Yellow Aster group of mines at Randsburg the vein is 4 to 30 feet in width. There are a number of other veins. Some of the narrow veins show high assays. A mill of fifty stamps is running on ore averaging \$50 a ton, the bullion output having been \$40,000 a month since the beginning of the year.—The Wedge had a mill run of fifty tons of ore netting \$5038.

Los Angeles Review: The gold output of the Rand district the current year has been about \$400,000. The output for the month of July will probably be increased over that of the past three months, as the Yellow Aster Co. will have their usual amount of ore milled this month. During June the Eureka mill ran twenty tons of ore for the Merced mine, going \$70 per ton; twenty tons for the Napoleon, running \$100; twenty-five tons of Wedge ore at \$100; thirteen tons of Kinyon at \$150; forty tons for the Butte, running \$80 per ton.—The new 2-stamp mill at the Little Butte mine is running day and night on Little Butte ore. In this mine a seam was followed down 380 feet before gold was encountered; then a good ledge 3 feet wide was found.—During June the Johannesburg Reduction Works made a mill run for the Yellow Aster Co. amounting to \$20,000 and the Butte a \$7000 run.

Mariposa.

Tippett & Jones are developing the Blue Jacket mine at Hornitos.

At the Geary mine near Mariposa development work is pushed with encouraging prospects.

Merced directors in Boston say "it will be at least two months after the resumption of stamping before an assessment is considered."

Nevada.

Five stamps of the new 10-stamp mill at the Reddick mine near Nevada City have been started and the other five will also be crushing gravel soon.

A 2-foot ledge has been struck in the Texas mine near Nevada City which, on the 225 level, shows well in galena.—The tramway at the St. Gothard mine, North Columbia, is completed, and work on the new mill has begun.

Herald: The compressors and mill at the Brunswick mine near Grass Valley were started by electricity last week. The Electric Power Co. has installed two 80 H. P. motors and they work successfully. It requires something like 30 H. P. to run the mill and sixty for the compressors.—Twenty stamps are dropping at the Gaston Ridge mine near Graniteville.—Chinamen have purchased the bedrock of the Red Dog mine and are making a successful clean-up.—Forty men were temporarily dismissed at the Champion mine because of shortage of water and the mills are not running at full capacity.

Tidings: The Manzanita M. Co. near Nevada City will sell their mine and water right to the Texas M. Co.—Tributers at the Bellfontaine mine, Willow valley, took out ore that went \$16 to the ton, exclusive of sulphurets.

Placer.

A 353 H. P. turbine water wheel has arrived at the Pioneer. The Pioneer directors think that after the completion of the dam and the installation of the electric plant they can safely figure on \$10,000 monthly net earnings.

Plumas.

Independent: C. B. Wingate of the Thistle Shaft mine, as trustee, sold the Feather Fork G. G. property, the purchase being made by W. H. Chickering, on behalf of the Feather Fork Co. The bid was \$5000 for each of the two parcels in which the property was sold. This sale, we understand, was purely formal, the company being the purchasers. The sale places the property in such a shape that the Feather Fork Co. may conclude to resume work there in the near future.

San Bernardino.

S. S. Simon claims to have found a deposit of "fuller's earth" in the Tehachapi country. Fuller's earth of commercial value sells for \$20 per ton.

San Bernardino Sun: Work is about to be resumed at the Desert Queen mine, after a protracted period of quiet, both in court and at the mine.

Transcript: G. W. Sweesy of the Virginia Dale mining district took \$80 from a placer claim in four days.

Shasta.

The Gladstone mine, near French Gulch, employs twenty men. Good ore is being taken from the mine and the 20-stamp mill is running steadily.

The Devenney & Gray mill at Whiskeytown is running on good ore.—The Crowell mill is

crushing profitable ore.—The Bully Hill mine, at Copper City, is shipping ore in carload lots to the Selby smelter.—Levisohn Bros. of New York are having five shafts sunk on a copper property on Stillwater.

Sierra.

W. York has found a second ore body of good value in his mine near Downieville. He is pushing development of the property.

Siskiyou.

H. Barton in a cleanup from a week's work on Oak bar realized over two pounds of gold.—The Distelhorst & Barton dredger, working in the slough at Oak bar, has been taking considerable gold from the bedrock. The channel is rich at that point.—All the river claims in the Honolulu district are paying well this season.

Journal: The river miners at Sawyer's Bar are doing good work this season on account of the low water. They will all do better this season than usual.—The river miners on the Klamath from the headwaters to Happy Camp are hoisting pay gravel. Most of them are working day and night, and will have a long season owing to low water.—The Blue Gravel mine at Greenhorn is working a full force and is reported paying better than ever. The company has developed it on an extensive scale.

Trinity.

At the Wedge mine near Trinity Center the ore is roasted, then run through an arrastra, and nets \$54 a ton.

Tuolumne.

(Special Correspondence).—In the east belt the Grape Vine Canyon group of mines are working full-handed. Recent developments in the Lost Fox mine, one of the group, show a body of sulphurets assaying \$55 per ton, as found in the south tunnel in the 8-foot vein. There are two other mines belonging to the property, the Morning and Evening Star, aggregating in length 4500 feet; the Lost Fox, being the center one, is worked through a tunnel 7 feet high and 4½ feet wide, and has a shoot of ore 200 feet long, averaging \$10 in free gold and 6% sulphurets. There are now 90 feet of backs; when in 700 feet will have 900 feet from surface, owing to the steepness of the mountain side in which the tunnel is driven. Both walls in slate. Course NE and SW; dip to NW. Work is pushed on tunnel and sinking a double-compartment shaft on the ledge, down 400 feet. There is a free water supply from the Grape Vine Canyon creek, with 500 feet of vertical fall. There are eighty acres timber land, owned by the company, who intend to put in a mill. There are about 700 tons of rock on the dump. The office is in Nevada Block, S. F.; G. Burgin Pres., J. Stadfeldt Sec'y.

Sonora, Cal., July 20th, '98.

Banner: The Julia mine, near Sullivan creek, has been bonded to G. W. Kenny. The ledge averages 3½ feet.—The Golden Lion is being worked by Hope & Phillips. The vein runs from 20 inches to 2 feet.—The North Star, East Belt, is said to be producing some high-grade ore.

Independent: The quartz claims at Horse-shoe Bend are being developed by Stover & Shorey. One shaft is down 90 feet and another is 70 feet. The ore assays from \$5 to \$50 per ton and carries high-grade sulphurets.—Good rock has been struck in the Golden Rule.—At Columbia, Conlin & Ferguson have leased the Nate Arnold mine and have begun work.

Democrat: It is said that much gold is being taken out of the Bonanza, Sonora. Both in point of production and development it is a noted pocket mine.—The new hoist has been finished at the Mt. Jefferson.—Another strike is reported in the O'Hara pocket mine at Brown's Flat.—At the Arbona pocket mine is being done at present. The shaft is down 200 feet and a contract is to be let shortly for sinking 300 feet more.—The work of hauling the sulphurets from the Lady Washington mine to Summersville has been completed after a month's labor. All 5000 sacks are being shipped to Selby's.—A 2-stamp prospecting plant is to be erected on the Carlotia.—The first installment on the purchase price of the Providence mine, near Carters, has been paid. E. A. Wiltsee was the purchaser.

Yuba.

(Special Correspondence).—The Good Title mine at Indiana Ranch has practically shut down. There is an oft-told tale connected with operations on this property, and yet at the present time it deserves repeating. The company developing the property are wholesale merchants in Cincinnati, Ohio.

When the shaft had reached 160 feet depth, some of the company came out to see the property. Because they saw gold in the ore, and a mill run, too, showed good values, they immediately desired to build a 20-stamp mill. The Supt. urged that it were wiser to sink at least 200 feet more before building the mill. But he was informed that he was too cowardly. A mill was built. The Supt., who held an interest but who declined entering into a stock speculation, was offered an opportunity to sell his interest, which he accepted.

A young bookkeeper was sent on and made Supt. of the mine. He built a residence at a cost of \$2000 and put in \$1000 on furniture. The 5-stamp mill was enlarged and work continued a short time. The Cincinnati people are wiser but not wealthier out of this venture, and the entire property reverts to the original owners, from whom it was bonded, and who no doubt will now be able to demonstrate by depth whether they have a mine or not.

Dobbins, July 15th, '98.

NEVADA.

(Special Correspondence).—Searchlight district was organized yesterday. There are eighty locations, each one showing free gold. Our camp is reached via Manvel, Cal. Searchlight, July 5th, '98.

At Candelaria the Holmes Co. has completed a plant for the reduction of 4,000,000

tons of tailings, the product of forty stamps which worked for thirty years on the ores of Candelaria, principally those of the Northern Belle mine. Experiments justify the belief that 50 per cent of the value can be secured by amalgamation and concentration.

The Eira mine, at Tuscarora, is said to have a 10-foot vein of \$20 ore exposed on the upper levels. The Dexter of Tuscarora marketed the past year gold bullion and auro-cyanides of the value of \$124,669.78. During the same period the expenditures totaled \$216,834.64; a stamp mill was erected at a cost of \$45,902, water rights bought for \$34,000, a cyanide plant built and new ground bought; the shaft was put down 200 feet deeper and 2000 feet of drifting done upon the vein. Many new placers have been located on the Colorado river in the southern part of Lincoln county. The locations are not confined to any one place, but extend for miles above Temple Bar and below El Dorado canyon.

Ore shipments over the Eureka & Palisade railway last week aggregated 220 tons. The output of the Dexter mill in Tuscarora for June was \$25,000 in gold bullion.

The Picoche Record says that when the present additions to the tank capacity of the De Lamar mill are completed "the plant can get rid of 13,000 tons of ore a month."

Picoche Record: Good reports come from the Magnolia mine, at Ferguson district, over recent developments. When the ore chute was reached last summer in the main drift, the bulk of the work was spent in sinking on it in two or three places. A few weeks ago the main drift was started ahead again on a thin seam of high grade ore, which gradually widened, until now, at 50 feet, the whole face of the drift is in pay ore, 1 foot of which is high grade.

OREGON.

J. Savage is putting an extensive wingdam in Rogue river near Grant's Pass.

J. C. Young, who has extensive mining properties in the Cable Cove, has had 1600 pounds of ore sampled and the result is so satisfactory that he will make a large shipment immediately.

Baker City Republican: G. W. Grayson sold the Virtue mine to O. G. Larabee and C. H. Thompson.

Baker City Democrat: Mgr. Bamberger of La Bellevue mine at Granite says the reduction plant is soon to be enlarged to meet the demand of the large output of ore. The Risdon Iron Works of San Francisco is building on Rogue river near Grant's Pass, dredgers at a cost of \$35,000 for a company that has five others on rivers in California and Nevada. Three engines are required to do the work. One works the dredger, another pumps the water with which the gold is washed from the gravel and the third will operate an electric light plant on the boat, the operations being carried on day and night.

WASHINGTON.

(Special Correspondence).—In Eureka mining district, Colville reservation, Stevens county, the first discoveries of auriferous quartz, named drussite by Prof. Emmons, promised little of economic value at the surface, assaying 60 cents to \$3 per ton. Four feet of depth on the Republic claim showed rock assaying \$100 per ton and led to the organization of a joint stock company. Miners work from eight to ten hour shifts and receive \$3.50 per day wages. The manner of prospecting here consists in crosscutting the croppings and stripping off the surface. The pay ore runs in chutes and the values are not evenly distributed through the veins, hence development is necessarily slow. In addition to the Republic mine are the San Poil, Lone Pine, Pearl, Surprise, Little Cove, Quilp, Mountain Lion, Rebate and Tom Thumb, all showing big and well-defined ledges, with quartz largely exposed that will pay from \$6 to \$80 per ton. The main workings upon the Republic ledge are a shaft in the croppings, No. 1 tunnel, which enters the hill from the west side and penetrates the footwall, No. 2 tunnel, which enters the hill from the east side and penetrates the hanging wall, and a winze which connects those tunnels. All of the payable ore valued below \$100 per ton is reserved for home treatment. Several loads have been sent to the smelters yielding from 11 ounces in gold and 10½ ounces in silver. This mine is owned by the Republic G. M. & M. Co., principal office at Spokane, Wash. They have a mill with a capacity of twenty tons of ore daily, which may be increased to 100 tons, and are using a cyanide-amalgamation process. Owing to the microscopical fineness of the gold in the quartz, it will not amalgamate by the ordinary amalgamating process to save over 83%. Samples have given that, but the average results would be a saving of only 25% to 40%. Ore below \$50 of value per ton was successfully treated in the mill and the tailings showed a loss of only 6%; the general clean-up is expected to result in a saving of at least 90%. A third tunnel is now in about 400 feet and has about 2000 feet farther to run to tap the vein which it will intersect at 340 feet vertically below the No. 2 tunnel level and 560 feet below the surface. The mill process used combines the amalgamation of coarse gold with the dissolution by cyanide and precipitation by an electric current of the finer gold into a mercury cathode, the values being recovered as amalgam. In the case of the Republic ore, the gold is so fine as to require close crushing. A ball pulverizer is used, the pulp passing over a sixty-mesh jiggling screen. The finer material, 95% of which will pass a 100-mesh screen, is carried directly to the cyanide treatment vats.

Republic, Wash., July 18th, '98.

The Wheeler groups near Ryan are running a tunnel and are in 115 feet. The rock carries good values in copper and gold. The Grey Cliff is pushing work night and day. They are 130 feet in the lower tunnel and 165 feet in the upper, and the ore is improving in value. Seven men on the Jim Blaine tunnel at Republic are making about 4 feet in

twenty-four hours. The San Poil runs three eight-hour shifts and makes about 100 feet per month. The Blacktail Co. is drifting on the ledge, working three shifts. The ore is of good grade. S. H. Hayes of Spokane has an option on the First Strike claim on Toroda creek for \$8000.

Near Loomis the Golden Zone mine has a tunnel 400 feet on the ledge and employs fifteen men. The company is running two tunnels each 100 feet beyond the first. The ore will be stopped.

The company, composed principally of Pittsburgh people, has under consideration the manner of treatment of the ore. It is thought it will be by concentration and chlorination from which so far the best results have been obtained.

Supt. Lane has started a force at work on the Pocahontas mine at Republic. It has a ledge of about 5 feet. The Butte & Boston is making good progress. The drift is in 250 feet. In the Gold Bug mine at Garfield the tunnel is now in 220 feet on a 4-foot lead which assays \$52.50 per ton in gold and silver.

The Colwyn mine at Wallace is shipping two tons of ore per week and from the amount of ore on the dump the company expects to keep up this shipment until autumn.

Everett News: The Monte Cristo and Pride of the Mountains M. Co.'s properties were sold at receiver's sale this week to J. B. Crocker, supposed to represent J. D. Rockefeller.

BRITISH COLUMBIA.

The Velvet shaft near Rossland has been sunk 165 feet. The drifting, sinking and raising done at the Velvet is 1011 feet. On the Portland, owned by the same company, 118 feet of sinking has been done. About 55 per cent of the ore mined is second-class or concentrating ore, 15 per cent being first-class ore, the first-class netting \$15 per ton and the second-class produces 20 per cent of concentrates which give a net result of \$20 per ton. The ore shipments amounted to 256 tons, which was treated by the Trail and Nelson smelters. The Storm King mine near Sanca has 4 feet of mineral going from 4 to 20 per cent copper, forty ounces silver and some gold per ton. In the Big Four mine near Ymir a 20-foot wide ledge carries silver, lead and copper of good average value. W. E. Sutton is unwatering the Skyline mine at Ainsworth. In the Dewey mine near Cranbrook an 18-inch vein has been opened that is said to run \$60 in gold and 60 per cent copper. Work has been resumed in the Sunset mine near Rossland, which is down about 315 feet. The last payment has been made by the B. A. C. on the Josie at Rossland. The amount was \$150,000. A new strike was made on the 300-foot level toward the Le Roi ground, said to average \$29 in gold and copper.

The War Eagle at Rossland is shipping 1200 tons per week. The Center Star will begin shipments of equal extent as soon as its new electrical hoist is in place. The Iron Mask is shipping steadily. The Deer Park will send out ore as soon as the new compressor plant is installed. The Le Roi Company, which ships 200 tons per day to its Northport smelter, August 1 increased its tonnage 50 per cent.

At Silverton J. C. Harris sold to the Northwest Mining Co. the Tyro and Boatswain mineral claims for \$7500. From the Hidden Secret mine near Pilot a shipment of fine tons to the smelter gave 165 ounces silver, 4½ per cent copper and \$8 in gold. A strike of a body of carbonates carrying blocks of galena from 25 to 500 pounds in weight is reported from the North Star group in East Kootenay.

There are thirty men employed at the Porto Rico mine at Ymir. The number will be sixty after the completion of the mill about to be built. Work on the 2500-foot aerial tramway has begun. The ore shipments from Rossland for last week were 2140 tons.

Ashcroft Journal: The sum of \$500,000 has been spent in building dredgers for work in the gold-bearing streams of British Columbia the past five years. Now that men are recognizing the fact that suction pumps do not work in the river beds here, and that buckets and elevators do, we may expect good results.

It is reported that the Oleson dredger—the first one—as the company have machinery here for a second one at Quesnelle, will be in operation soon. The Pittsburg dredger is about ready to begin operations. The Deer Park Co. at Rossland has decided to install a compressor plant at once. The shaft is down 245 feet, and three eight-hour shifts are continuing work. Drifting has been done at the 160 level, showing a large ledge of iron sulphides. Five inches of galena running 220 ounces in silver has been struck at a depth of 500 feet on the Sovereign, Slocan, after running a tunnel of 300 feet. Over 4000 feet of air pipe has been laid at the Noble Five mine.

Returns from the shipment of the Mollie Hughes gave 554 ounces silver and \$10 in gold; average returns from the whole ore mined by the company gave \$95 per ton net.

THE KLONDIKE.

From the Klondike via St. Michaels arrived last Sunday over 100 men on the steamer St. Paul, bringing about \$1,500,000, mostly from El Dorado and Bonanza creeks. Some of the men had \$100,000. It is claimed that the Canadian Government had collected 10% royalty on \$20,000,000, and that the Roanoke, due today, would bring \$7,000,000. The men say that the present is a very good season for work. The influx, however, has cut the wages from \$15 per day; it is thought they will be but half that by next season. There are 15,000 men at Dawson, 4000 at the mouth of the Stewart, eighty miles below, and 2000 at Little Salmon. The prices of all the necessities of life are considerably below that of one year ago.

A. Fetz of 1502½ California street, San Francisco, returned from the Klondike last Sunday. He started to Dawson July 27th, '97, and reached there September 28th. He mined on Bear and Hunter creeks. The method of mining was by sinking a 3x7 shaft to bedrock.

In some instances the bedrock pitched from 12 to 13 feet in 15 yards. By building fires both night and day they succeeded in making from 12 to 18 inches depth in twenty-four hours. The slush and gas in the drifts were hard on men's constitution and eyes, and often necessitated sinking additional shafts for air and draft for the fires. In some instances they found gold in the gravel, but mostly on bedrock. Dirt had to be handled twice, raising it and again in springtime to sluice it. When a bucket was raised and emptied it was immediately frozen solid. All claims within about 100 miles of Dawson on the principal and tributary streams are taken. On all gold taken out over \$2500 a tax of 10 per cent had to be paid to the Canadian government. A sworn statement was exacted as to the amount of the output. Thus far El Dorado creek has produced the most gold. The size of a claim is 500 feet on the stream from rim to rim, and if the bench were added \$100 had to be paid to the Government. The upper portion of Bonanza creek yielded well, but the lower part did not pay. Many prospectors will return to America from Northwest Territory. The artificial light in drifts and cabins was in many cases produced from muckluch fish oil. Dogs are fed on rice and fish. Game was very scarce. A man paid \$700 for a bear, another \$1000 for a moose. Potatoes, when Mr. Fetz left that country, were \$1 per pound, eggs \$3.50 per dozen, tobacco \$2.50 per pound. A native Malamoot dog sold for \$150. The ordinary canine sold for \$50. Poles were used for rifles, and in general only coarse gold was sought. In some instances men used quicksilver to save fine gold found in black sand. Ground that wouldn't yield 15 cents a pan was abandoned. Two winners' work will finish El Dorado creek. Claims are held there at \$100,000 to \$200,000. The miner who goes in there now will not be the great money winner. The speculator who has capital will be the successful man, and, prudently invested, he can make as much 'neath home shelter and home comforts. Fetz would not go there again for the purpose of mining. Wages were from \$1 to \$1.50 per hour, averaging from five to seven hours a day, exclusive of board. He estimates that the St. Paul brought down \$1,280,000.

D. T. Edgar of Clovis, Cal., was among the returning Klondikers to San Francisco this week. He left California for Alaska March, 1896, and was at Forty-Mile when the discoveries were made on Bonanza creek. They heard of the discovery two days after they were made and 150 men immediately started for the new find and each located a claim. He has been fairly successful after two and a half years of hardship.

Returning he left Dawson June 26th in company of 176 passengers on the steamer Bella. Their boat passed the steamers May West, 150 passengers, and the Hamilton and Wear, 150 passengers. With few exceptions, every man carried gold and drafts, though the total could not be correctly ascertained. Mr. Edgar and his company worked on Bonanza creek eleven miles from Dawson. When leaving there for his homeward trip flour sold at \$8 for fifty pounds and bacon 60 cents per pound. Water was short this spring and many could not wash their gravel. The cutting and burning of timber has caused the moss to dry and absorb the waters, though rainfall, too, has been less than usual. People who reached Dawson this spring were obliged to go into the interior at least seventy-five miles to find unoccupied ground. They succeeded getting in by horse or boat, but can't get feed in winter for horses. Dogs are preferable, and not less than two should be taken. The main street of Dawson, a half mile long, is as crowded every day as Market street in San Francisco.

Wages were 75 cents to \$1.50 per hour, but they will fall to 60 cents on account of the large influx. This does not include board. There is little work obtainable in summer. At present there are twenty men for every job throughout the Klondike district. Unless new country is found men cannot expect to make anything by going now, and unless possessed of \$1000 and two years' provisions it were ill-advised for anybody to go.

On Hunter creek prospected ground for sale is held at from \$25,000 to \$50,000. On Bonanza creek it is held at from \$100,000 to \$200,000. On El Dorado creek, fifteen miles above Dawson, claims are held, from the forties downward, at from \$50,000 to \$80,000.

The method of working the claims is by sinking from 12 to 24 feet and drifting under the frost, then raising the gravel and saving it for washing in the spring of the year. The ground in the drifts is loosened by fires during the night.

Mail facilities for Northwest Territory are very poor. They had three Canadian mails during the winter. Americans got no mail in or out all the season.

There are 25,000 persons in Dawson and 3000 on Eldorado creek. Yukon river is unusually low. The water in many places is not deeper than 3 feet. Eldorado creek has yielded more than half the winter's gold. Nearly all the rest came from Bonanza creek. Letters from the managers of Canadian banks at Dawson say the Gold Commissioner estimates the production of gold at \$7,000,000.

UTAH.

A shipment of thirty-five tons from the Treasurer mine, in Dry canyon, yielded \$35 per ton. The shipment by the Indian Creek M. Co. yielded \$92, with 103 ounces of silver. The Deer Trail mine, at Marysville, has begun work on a 500 foot tunnel. The Hercules of Stockton made a five-carload shipment of good grade ore. The Centennial Eureka, Eureka, shipped two carloads that yielded forty-seven ounces silver, \$10 gold and 16 per cent copper a ton.

The Dalton M. Co. took possession of the Dalton mine and put a force to work. On account of the expiration of contracts, neither the Bullion-Beck nor the Eureka Hill have made any shipments this month. Work is

progressing as usual. N. C. Gresbeck is developing a saltpetre property near Springville. The mineral is in a soft sandstone formation.

The Carlissa mine, Tintic, made an ore shipment which assays 42 per cent copper. A second vein has been found in the Triumph, Silver City, at a depth of 140 feet. The extent of the vein has not been determined; it is impregnated with sulphides similar to those found overlying the main ore body at the Swansea. Shipments from Tintic were fifty-six cars of ore, two of concentrates, and three bars of bullion.

W. S. Bacon bought one-half of the \$26,000 bond on the Undine mining property at Provo. Work will immediately be pushed forward, and the property developed as rapidly as possible.

Smelter returns from the shipment of concentrates from the Washington, at Frisco, have satisfied the management that the ores may be profitably milled. The Washington will confine its output to the high grade ores. The Galena of Fish Springs shipped sixteen tons of high grade silver and lead ore.

The Godiva mine, in the Tintic district, has started work and is hoisting. The Lower Mammoth made a shipment which returns a high percentage of lead and sulphurets of silver. The Omaha, at West Dip, has settled its legal troubles, and development of the property will begin without delay. The Montreal, at Milford, is shipping copper ores and expects to increase the output the remainder of the season.

Work has resumed on the Manora, at Silver City. The mine at an earlier period was productive of nearly \$100,000. When the sulphides were reached operations were suspended. The intention is to go to considerable depth. The Mercur mill will be enlarged without delay to 350 tons daily capacity. The Butterfield Co. at Bingham have begun work on a 1300-foot tunnel to obtain a more economical outlet for its ores. The Grand Central, at Tintic, output for the first half of July was forty-two cars. The output for the month will exceed that of June 200 tons. In the shipments were several lots that ran well in copper and gold. Ore shipments from Silver City the past week were thirty-three carloads. At Bingham a strike in the 400 of the Winnamuck is reported of good ore.

E. A. Wall has taken a lease on the All's Well group and has resumed sinking. The Swan-Bemis mill last week turned out Spanish ore concentrates at the rate of twenty-five tons daily. The Dalton & Lark, at Bingham, shipped three cars of silver and lead ores and six of concentrates. The Galena of Fish Springs marketed its latest lot of ore on a basis of 47 per cent lead, 110 ounces silver and \$1.40 gold per ton.

Miner: The stamps and vanners at the Sioux mill, Eureka, are being hung up. It is reported that the engine is almost worthless, and that the mill will require a complete overhauling.

IDAHO.

The dredge operating on Snake river near Caldwell made a recent run that indicated that they can handle 2000 yards of gravel per day.

The Montana & Idaho G. M. Co. have begun work on the Hughes & Hunt property near Salmon City. A 4-foot vein of ore was struck which it is said runs \$50 per ton. The Bingham placer keeps steadily at work. The Joshua Hendy hydraulic elevator raises and discharges into the sluices at such a rate that a large sized hole down to bedrock has been excavated to the amount of about 18,000 yards during fourteen days' work. At Florence work is progressing on the Banner shaft. A depth of 200 feet has been attained. There is much activity in placer mining. G. H. Roberts, representing Philadelphia capitalists, has bought the Moore creek bedrock flume property and a payment has been made.

The Eureka Hill mine near Warrens has opened a 5-foot vein of high grade ore. Ten tons of ore from the White Mountain mine netted \$900. In the Candelaria mine at Florence a 19-foot wide vein is producing ore that assays \$40 per ton.

The Morning Star mine near Sandpoint has run a tunnel 110 feet. The ore assays \$34.64 in gold and a small amount of copper.

Baker City Democrat: The Peacock mine in the Seven Devils district has a 65-foot shaft and five or six open cuts exposing the vein, which is about 400 feet long and averages 120 feet in width. A tunnel 20x30 feet is being run to tap the vein at a depth of 50 feet below the 65-foot shaft. The output of the Peacock for June was 6000 tons of ore, which is said to run \$300 to the ton. It is estimated that there are 100,000 tons of ore in sight in the mine. There are several other mines more or less developed. At the smelter, which is ten miles from the Peacock mine, there is used every day of twenty-four hours 32,000 pounds of copper ore, 5200 pounds of charcoal, 11,000 pounds of coke, 12,000 pounds of iron, 4000 pounds of slack and 26,000 pounds of lime. This turns out about three tons of metallic copper ore valued at \$900.

Idaho World: A raise is going through good ore in the New York mine near Idaho City. The company contemplates sinking a shaft 400 feet deep. The lower tunnel taps the ledge 570 feet deep. The Twin Sisters Co. shaft on the Golden Fleece mine near Centerville is down 92 feet. The 5-stamp mill is completed. The stamps weigh 1000 pounds each.

MONTANA.

In the East Pacific mine near Winston sixty men are taking out more than a carload of high-grade ore every day, and within the next sixty days the force will be increased to 125 men. A fifty-ton concentrator is to be erected in the near future. The H. E. Lee party, which has been placer mining near Fort Benton, reports a good season. A clean-up, four men working eight days, gave them \$381.

The Big Bonanza near Walkerville is reported paying. Shipments of silver ore are said to return 100 ounces silver per ton. In

Montana City district the Overland is shipping four cars of ore per week, besides what it sends to the 10-stamp mill, making a weekly output of a little better than 100 tons. Some of the ore smelted nets about \$1400 per carload. The Gold Mint mine and mill at Sylvanite are in operation. The mine is producing about 140 tons of ore per day.

Larabee Bros. & Co. shipped about \$8000 in gold dust Wednesday, mostly from Pioneer. G. Okerman has leased for three years the Baker, Gray Eagle and Equator mining claims near Baker. He has begun work on the Equator, and is working three shifts. On the other claims about 100 men will be set at work as soon as they can be used. The development work on them is in about 200 feet. The claims run well in lead and silver. These properties have lain idle for several years.

The Clancy mine, referring to the revival of the mining industry in that section, enumerates seventeen mines in operation, of which two-thirds were idle less than a year ago. H. F. Burgess & Co. have bonded the First Shot mine, near Basin, and will resume work on a large scale. Pumping machinery and a hoist will be put in and the shaft sunk to the 200 level. They will have less than 4000 gallons of water to handle daily.

Clancy Miner: One by one the mines of Lump gulch are resuming operations, and the stagnation in the mining business consequent upon the strike of two years ago is but little felt here.

Madisonian: The Lester mine near Virginia City has been sold to W. A. Clark who is said to have paid \$100,000 for the property. The ore assays \$200, and the 20 feet that has been exposed will average \$50. It was discovered about a year ago; nine months ago it was bonded to Helena people, who, after working on it a short time, abandoned it, as unworthy of further effort. — The Gold Dredging Co. at Bannack shipped \$10,000 worth of gold last week. — There are in the neighborhood of 400 tons of concentrates at the Snow Shoe mine near Libby ready for transportation.

WYOMING.

H. Andrews, who is developing gold-bearing ground near South Pass received a certificate from the Gold & Silver E. Co., in which he is assured that 94 per cent of the values contained in his ore may be saved by a process combining amalgamation and cyanidation. He will continue work on the property.

Work is progressing on the Nellie Queen mine at Independence Rock. The property produces ore that yields 37 per cent copper and \$3 gold per ton. A carload of ore has been shipped to Deadwood.

SOUTH DAKOTA.

The Gilt Edge mine near Deadwood is shipping fifteen tons of ore a day. — The Little Blue mine at Yellow Creek is shipping two carloads a week which runs \$100 a ton. — The Wasp No. 2 is shipping four carloads a week of ore that will average \$100 a ton. — The Highland Chief Co. of Spruce gulch made a test run of 140 tons of ore which milled on an average \$4 a ton gold.

MICHIGAN.

The last report of the Michigan commissioner of mineral statistics says that during the year ending Nov. 30, '97, in the iron and copper mines of Michigan, sixty-two men lost their lives. The average was 3.70 fatal accidents per 1000 men employed. The Finnish workers suffered most in proportion, twenty-six of that nationality being killed. The falling of ore and rock and the rolling of pieces of rock down the slopes were responsible for the death of twenty-six men. Nine were killed in blasting, by premature or delayed explosions. Six were caught by skips or cages, a portion of these in the attempt to get on moving cages.

News Bureau: The Arcadian copper mine is working 200 men and will double the force before Sept. 1. The mine has four shafts.

The Calumet & Hecla has now 4000 men on its payroll, employed in the mine, mills, and smelters, and it is the largest employer of labor in the Lake Superior district.

The Quincy mine will install a plant of hoisting machinery capable of raising rock from a depth of 8000 feet—about a mile and a half. At present the deepest shaft in the Lake Superior copper district, or in the world, is the Red Jacket shaft of the Calumet & Hecla, which has a vertical depth of 4900 feet.

The Baltic mine will begin producing copper Aug. 1. A three-mile railroad extension will give communication between the mine and the stamp mill of the Atlantic Company, which is to treat Baltic copper. The Baltic has traced its vein nearly a mile, and has five shafts, all of which can be producing within a year.

Between 10,000 and 11,000 workmen are at present employed by the mines of the Lake copper district.

The Buffalo iron mine at Negaunee is being worked by a small force after several years idleness. About 100,000 tons of ore is in sight, and as this is removed the mine is to be surrendered to the owners of the ground by the lessees.

A dozen or more mines of the Marquette and Menominee ranges are producing silicious ore, a strong demand for which has arisen within three years, largely for use with fine-grained Mesaba ores which are deficient in silica and too high in phosphorus for Bessemer pig iron unless mixed with other ore unusually low in phosphorus, as all the high silica ores are.

PENNSYLVANIA.

Out of the coal seam the thickness of choice coal wrought about Pittsburgh is 5 feet, at Charleroi 6 feet, at Brownsville 7 feet and at Fairmount 8 feet. A miner's day's work in the ordinary wide room, cutting and filling, ranges from five to six tons of rough coal at the former place, and ten to twelve tons at the latter. The content of sulphur is prac-

ticable to keep down to 1 percent. The earthy matter, well disseminated in coal, adds mechanical strength to the coke, enabling this to uphold the burden in high smelting furnace, so that the great quantity of air (twelve times the weight of fuel) can be readily driven through. The common method of mining about Pittsburgh is to have rooms of 7 yards wide, separated by pillars 4 yards wide, and driven 75 or 80 yards deep, or more and less, as the dip increases and makes a difference in dividing the 150 or 160 yards space for the rooms driven in opposite directions to meet in between. At Fairmount the general plan is to reach in the steeper coal from one flat entry through to the pillar along the next higher. The size of room and pillar are alike, 6 to 7 yards, or else the pillar is larger. A good practice is to interrupt the long series of long rooms by leaving a solid block for half depth from entry; this block displacing two rooms and three pillars after every ten open rooms. These two usual methods of mining the coal are of equal merit in having the least narrow work of extracost, while aiming to get out all the coal.

COLORADO.

BOULDER COUNTY.

The Franklin mine, near Boulder, has a daily output of twenty tons of smelting and milling ore. — The old Smuggler mill at Ballarat started June 27th to work the dump which has been accumulating for twenty-five years, and contains nearly 30,000 tons of low-grade ore. The mill has a capacity of twenty-five tons per day on this class of ore. The mine is soon to be unwatered, put in repair and worked on the leasing system. It has not been worked for several years.

CHAFFEE COUNTY.

The New Year mill at Granite has started. The stamps weigh 800 pounds each.

CLEAR CREEK COUNTY.

In the Silver Queen mine, on Seaton mountain, a body of silver ore was encountered which ran in 100-pound tests 600 ounces in silver and a fair amount in gold.

EL PASO COUNTY.

The drift on the new ore body in the Half Moon claim of the Mabra, Cripple Creek, has gone through 75 feet of ore and it is 32 feet wide. Twenty-three feet wide of the ore is pure smelting as it comes out. Carload shipments have returned \$55 to \$70 per ton. From two shipments \$5000 was netted. — The Pharmacist only made a production of about 100 tons of \$75 ore during the past month, owing to the large amount of development work in progress. — The Pinto of the Free Coinage group is shipping about thirty tons of \$80 ore a week. — Simmons & Co. of the Zenobia made a shipment of ten tons of \$125 ore, six tons of \$360 ore and two tons valued at \$800 a ton.

The Garfield Con., Cripple Creek, has resumed control of the Garfield Grouse, the lessees having made their final clean-up. The lessees have for two years kept up shipments and made big money. — A strike is reported in the Vindicator mine, Cripple Creek. The new ore body is an 8-inch pay streak running from \$25 to \$1000 per ton. It was found in the 325-foot level. — The Gold Coin is producing 100 tons daily, with the average value showing improvement. In the fourth level the high grade has proven continuous for 100 feet, and its limits have not been determined. The last shipment from this source returned values of thirty-four ounces, or \$800 to the ton.

Errickson & McDonald, in their lease on Columbus, at a depth of 160 feet found a vein which contained 8 inches of good mineral. The ore is two grades. The first is good for \$500 per ton, and the second about \$100. — The output of the Los Angeles last month was in the neighborhood of 500 tons of all grades. — The first half of the year has shown a production in the Cripple Creek district, according to the returns from mills and smelters, of very close to \$7,000,000.

GILPIN COUNTY.

Post: Operations are to resume on the Rollins properties near Perigo. There has been expended a large amount of time and money in these properties, and considerable ore has been exposed in different openings. The former company expended much money in surface improvements and too little in development, and funds were exhausted before getting down to real mining.

GUNNISON COUNTY.

The Big Seven M. Co., near Pitkin, will resume work immediately. Development was stopped in 1897, but the new shaft, down 170 feet, will be continued as rapidly as possible.

HINSDALE COUNTY.

Near Burrows Park a large body of ore has been traced across the Cimarron mountains, showing telluride indications, and three companies have been formed for the purpose of developing properties.

LAKE COUNTY.

The Arkansas Valley smelter at Leadville says that the silver mines in the western part of Colorado are taking out and shipping more ore than they have since the slump in the price of silver. The recent advance in lead and silver has incited this activity. The smelters are running steadily on these ores. — The La Plata mine, Leadville, keeps up its shipment of 200 tons per month. The ore is settled for on a basis of twenty ounces of silver, 16 cents gold and 37 per cent lead.

Owners of the Small Hopes mine at Leadville are St. Louis people, who have divided \$4,000,000 from profits on their Yankee hill operations, and as much more from their interests in mines worked through the Robert Emmet and R. A. M. shafts. They are daily shipping 300 tons of ore from three leases on sulphide bodies, and through the payroll and expense account distributing a large amount of money in the camp. — The Moline M. & D. Co., working through the Wm. Wallace shaft,

Leadville, is shipping daily 40 tons of oxide iron ore. They are also shipping 50 to 100 tons per month of lead carbonates. — An important development enterprise in the mining district of Leadville is the Yak tunnel. It is in 7000 feet and will require two years for the completion of the bore. The tunnel is progressing slowly, with only two shifts at work and using hand drills. The company is stopping out and shipping sulphides. The tunnel will cut a number of producers at depth. — The Catalpa-Crescent is taking out 75 tons of manganese ore per day, which finds its way to Chicago. The Dyatt lease is shipping 100 tons daily of sulphides to home smelters. The water at 1200 feet depth is not very troublesome.

PARK COUNTY.

A carload shipment from the Morning Star mine, on Mount Bros., yielded per ton: Gold, 1.09 ounces; silver, 45 ounces; lead, 9 percent; copper, 3 percent. — P. W. Breene is shipping 200 tons of sulphides daily from the Col. Sellers mine at Kokomo. He has 100 men on the payroll. — Missouri capital is operating the May (Queen group of mines in Freshwater district. The shaft will be sunk 200 feet; several veins have been opened which give fair returns in gold.

PITKIN COUNTY.

The Cowenboven tunnel at Aspen is being driven rapidly, and it is reported that a body of high grade ore has been found.

SAN JUAN COUNTY.

The capacity of the Howardsville mill is to be increased from 20 to 100 tons daily.

SAN MIGUEL COUNTY.

The Silver Pick, Telluride, is producing some rich ore which is shipped in its crude state and reported to run \$750 in gold per ton. The lower grade is treated at the company's 10-stamp concentrating plant, connected with the mine by a tramway over one mile in length, and forty to forty-five tons are disposed of daily. An average of four tons are reduced to one, and from ten to eleven tons, or a carload, of concentrates are turned out every twenty-four hours. The concentrates net from \$1500 to \$2800 per carload—90 per cent gold and the remainder silver and copper.

SUMMIT COUNTY.

The Pence-Miller Gold Placer Co. have one plant at work on the Blue river, near Breckenridge. A second plant is to be installed next month on the same river on the Golden Crown placer. These plants are supplied with water under a head of from 200 to 300 feet by ditches capable of carrying in the neighborhood of 1500 miners' inches of water. — In the Swan River valley the North American G. D. Co. had two of the Risdon placer dredging plants placed in operation early in the season, and hydraulic mining is also carried on near the mouth of the Swan river. — At the Great Wapiti placer and lode mine, embracing 1800 acres of lode and placer ground, three giants are in operation.

NEW MEXICO.

New Mexican: It is reported that the Hearst estate will shortly lease the seventy-seven claims owned by the Carrasco D. Co. and the Santa Rita Copper & Iron Co. in Grant county. — Last week Hillsboro mines produced 145 tons of ore. — The Rebecca group of mines in La Belle is producing \$40 ore. — The Bennet mine in Dona Ana county employs 100 miners. The Tripp mine is furnishing the Andrews cyanide mill in Sierra county with twenty tons of \$10 ore per day. — J. Williams cleaned up \$306 in gold from his Willow Creek placer after seven days' run. — Work has been resumed on the Tyrole and Elizabeth claims at Hematite. The tunnel is in 350 feet and shows 6 feet of ore.

ARIZONA.

A 20-stamp mill is to be built at the Yellow Dog mine near Yuma. — A 120-ton cyanide plant is to be built to work tailings from the Mammoth mill in Pinal county. — A strike of ore is reported in new ground in the Azurite copper mine near Tucson. — The Arizona Copper Co., at Clifton, will add to its present reduction works two 150-ton concentrators and a new furnace. — The Fresnal mines of Wicks and the Allison, in the Baboquivaris, are turning out ore running high in gold and 277 ounces silver to the ton. — The White Hills M. Co. of Mohave county is running but fifteen of its forty stamps, but is boring for water with which to run all the stamps. — The Old Dominion Copper Co., of Globe, will start up its smelter with a new engine and blower this month. — The Sheepstall mine, near the Colorado river in Mohave county, is keeping ten stamps supplied with ore yielding eight ounces of gold and seventy to eighty ounces of silver to the ton.

The erection of the machinery of the Temple Bar Con. M. Co. on the Colorado river, in Mohave county, is progressing. As soon as completed the washing of gravel will begin. — About 500 feet of work has been done on the Gold Bug property near the Black Rock district, Wickenburg. The ledge averages 30 inches in width. — The San Marcus group near Ehrenburg is said to have a vein from 50 to 75 feet wide of good ore. — Fifty stamps are dropping at Mammoth and thirty at Schultz. — Eight carloads of ore have been shipped from Kingman since the 1st of July.

The Rosemont Copper Co. at Rosemont is developing its different properties successfully. There are 1500 tons of ore on the dumps. — Along the Cebar range the mines are turning out considerable ore. The Tennessee mine has in south drift a chute of nearly solid ore 5 feet thick, with no wells. They also have an increase of ore in their upper level to the north. — The Spenezuma M. Co. has thirty men at work near Fort Thomas. The company has eight claims, carrying gold, copper and silver. — Sinking in the Esmeralda mine near Kingman has been discontinued on account of water near the 200 level. Drifting continues. The ore

body is 5 feet in width and runs an ounce in gold to the ton and carries some copper.

The Spenezuma Co. of Arizona is the name of a new mining company operating in the vicinity of Black Rock — Ashton & Reese have sold a quarter interest in some mining property in the Santa Maria district, Yavapai county. — D. B. Gillette and B. B. Thayer, representing the Hearst estate, have secured the Gold Note property near Prescott and will resume operations on the property. They have already spent about \$90,000 in developing the property, and they will make an expenditure of as much more before the property will commence to pay. While there are large bodies of ore opened up it is not very high grade and will require a large mill to make it pay. It is said that this will be erected soon.

The C. O. D. mill, in Mohave county, is turning out five tons of \$60 concentrates daily.

The Ewing 10-stamp mill on the Colorado river in Mohave county has started up on Sheep Trail ore. One hundred tons will be run through as a test. Thirty-five tons of ore will be hauled from the mines to the mill daily.

MEXICO.

The Hacienda San Francisco at Pachuca is running eighty stamps day and night. W. H. Armstrong Jr. is Mgr.

The business of the Mexican Sulphur Co. has been suspended until the war with Spain is over. The offices of the company are at Yuma, Arizona, and Pittsburgh, Pa.; the sulphur mines are 200 miles south of the Mexican boundary line, on the Colorado river. Sulphur is a contraband of war, and President Diaz of Mexico gave the company notice that its shipment must cease.

The Sirena mine, in Guanajuato, is erecting an 80-stamp mill. The owners are American capitalists, who propose to invest \$250,000 in this development of the property, which adjoins the Rozas mine, and contains practically a continuation of the same lode which is known to have yielded \$600,000. — The American Co. working the deposits of tailings in the Guanajuato river are said to be meeting with success.

The Nolan shaft, in El Oro district, is reported to be in good ore. The quartz assays one ounce of gold and thirty of silver to the ton.

LOWER CALIFORNIA.

The Viznaga mine near Alamos shipped \$2000 in bullion last week to San Diego. — El Bolijo mines at Santa Rosalia are said to be producing 1000 tons of copper a month. The copper is shipped to London. It is contemplated to put in machinery to increase the output to 2500 tons a month. A Mathiot is the owner of the property.

AUSTRALIA.

At the Broken Hill Proprietary 21,357 tons of ore were treated for the four weeks ending June 23, including product from ore purchased. The output from the refinery was 1898 ounces gold, 427,865 ounces silver, 2545 tons of lead, 35 tons antimonial lead; the copper matte contained 17 tons of copper and 23,616 ounces silver.

WALES.

Dr. Le Neve Foster, in his annual report on the mineral industry of the North Wales district, remarks that a dredger has been set to work for bringing up sand from the bed of the Mawddach estuary, between Dolgelly and Barmouth, with the object of determining whether gold can be extracted in paying quantities.

Commercial Paragraphs.

The Weber Gas & Gasoline Engine Co., of Kansas City, Mo., write: "Have just completed the installation of three plants for the Avino Syndicate of London, at San Gabriel Station, Durango, Mexico, consisting of hoisting plant, direct-connected pumping plant and crusher plant, all to be operated on gasoline; pumping plant will be operated 800 feet underground."

Under date of April 27, '98, Supt. Geo. S. Baum of the Grizzly Flat G. M. Co., Grizzly Flat, Cal., writes to the Risdon Iron Works, Howard and Beale Sts, San Francisco: "The last dies you sent have been in use since March 1st; our mill has been running twelve hours out of the twenty-four nearly every day since. The dies are wearing smooth and true with hardly any perceptible decrease in their size. The shoes you sent last July are still in the bosses, having been in use since August 23rd last; they range from 2 to 3 inches in depth at present, and will probably last three months longer."

The development of electrolytic processes for the production of refined copper has proceeded very rapidly during the past three years, and at the present time, a very large proportion of all the refined copper is thus produced. The Westinghouse Electric & Manufacturing Company have installed a very large amount of apparatus for this class of service. One of the principal installations is at the refinery of the Anaconda Copper Company, Anaconda, Montana, where ten generators of 270 to 300 kilowatts capacity have been installed. Another very large installation is that of the Boston & Montana Consolidated Copper & Silver Mining Company, Great Falls, Montana, where two 810 K. W. Westinghouse engine type generators are in service. The latest comer in this field is the Raritan Copper Works of Perth Amboy, New Jersey, who are about to erect the largest copper refinery in the East. They have contracted with the Westinghouse Electric & Manufacturing Company for three 600 K. W., 150 volt, engine type generators, 150 r. p. m., with a 9-section switchboard for electrolytic service and the operation of two 75 K. W., 220 volt, engine type generators, which will be used for lighting and power service. The installation will be the most complete of its kind in the world.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JULY 12, 1898.

- 607,209.—FRUIT DRIER—T. Beck, Watsonville, Cal.
 607,331.—KILN—J. Berry, Tacoma, Wash.
 607,335.—GATE—H. C. Belts, Middletown, Cal.
 607,336.—LIVING DEVICE—H. M. Burnett, S. F.
 607,213.—PENHOLDER—J. H. Campbell, San Jose, Cal.
 607,321.—JOINING RAILWAY BARS—W. G. Curtis, S. F.
 607,347.—MOWING MACHINE—V. Daniele, S. F.
 607,223.—EARTH AUGER—E. H. Dyer, Alvarado, Cal.
 607,359.—MUSICAL INSTRUMENT—A. J. Forrest, Seattle, Wash.
 607,334.—SHAPING CUTTER—J. Hatch, S. F.
 607,237.—SUCTION DREDGE—F. H. Heath, Tacoma, Wash.
 607,246.—WATER WHEEL BUCKET—G. H. Johnson, Sisson, Cal.
 607,379.—BELT REPAIR KIT—W. M. Jones, Santa Monica, Cal.
 607,332.—SCREEN FOR DOORS—J. H. Koons, Seattle, Wash.
 607,118.—CAR FENDER—W. H. Martin, Los Angeles, Cal.
 607,120.—WAGON—H. D. Morton, S. F.
 607,072.—WAVE POWER—J. M. Palmer, Fort Grant, Cal.
 607,123.—BUTTER MOLD—Maria Pfening, Santa Barbara, Cal.
 606,133.—CENTRIFUGAL PUMP—J. Richards, S. F.
 607,135.—STATION INDICATOR—G. Rischmuller, S. F.
 607,153.—THRESHER FEEDER—A. W. Severance, Walla Walla, Wash.
 607,198.—GROCERS' CADDY—C. M. Symonds, S. F.
 607,098.—STATION INDICATOR—H. C. Turner, S. F.
 607,200.—STATION INDICATOR—W. A. Turner, S. F.
 607,315.—INSULATOR—C. L. Wingard, Walla Walla, Wash.
 607,153.—WOODEN PIPE—W. J. Woodward, National City, Cal.
 607,317.—ENGINE—G. L. Woodworth, Palo Alto, Cal.
 607,320.—WRENCH—J. N. Young, Alameda, Cal.
 29,045.—DESIGN—M. L. Altop, Sacramento, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GROCERS' CADDIES.—C. M. Symonds, San Francisco, Cal. No. 607,198. Dated July 12, 1898. This invention relates to an improved containing caddy especially designed for the reception of tea, coffee and such other articles as it is required to hold in bulk, but which are sold in small quantities. It is especially designed to provide a caddy which may be filled at the factory or other depot, and which may be then closed for shipment, and after being removed from its outer case, the lower part can be immediately opened to prepare it for use. The caddy has a rectangular opening in one side, near the bottom, and a segment is hinged in the lower part of the opening having an opening in the curved face, a second segment within the first one is independently hinged and has short legs projecting from the upper angles of its rear edges adapted to rest upon the bottom of the case when the segment is closed so as to leave a small open space at the bottom. Within the case are oppositely inclined directing plates which direct the contents toward the discharge opening, one of said plates extending from the hinge connection and forming a close smooth joint therewith to permit the introduction of a scoop for the removal of portions of the contents of the case.

MOMENTUM WATER-WHEEL BUCKET.—Geo. H. Johnson, Sisson, Cal. No. 607,246. Dated July 12, 1898. This invention relates to improvements in buckets for water-wheels of that class in which the water is delivered into the wheel-bucket under a high head or pressure, such wheels being technically known as "hurdy-gurdy" wheels. The buckets are formed in pairs, with one bucket in advance of the other, and uniting in a common radial plane along the adjacent edges for a portion of the length of the bucket, then curving outwardly and independently away from each other for the remainder of the distance, thus insuring a perfect clearance of the reactionary water from the sides of the wheel. The nozzle is so placed in line with the partition between the buckets that it delivers water alternately into the buckets on each side of the partition.

FRUIT DRIER.—Thomas Beck, Watsonville, Cal. No. 607,209. Dated July 12, 1898. The object of this invention is to provide an apparatus for the more perfect desiccation of fruit, vegetables and other substances which it is desired to deprive of moisture. It consists essentially of a polygonal chamber having peripheral doors opening through each of the faces of the polygon; fruit trays and supports which carry the trays so as to leave a space between the front edges of the trays and the inner faces of the doors, with jams by which this peripheral space is divided into a number of vertical flues corresponding with the number of doors and series of superposed fruit trays. A centrally disposed rotary fan acts to force air outwardly over the trays, thence it is discharged upwardly through the vertical flues. A heating furnace is disposed in the lower part of the apparatus, the air thus heated rising into the central chamber and being distributed and discharged outwardly by the fan.

Recently Declared Mining Dividends.

- Mercur, Utah, \$25,000; July 20.
 Quincy M. Co., Michigan, \$3.50 per share, \$350,000; payable Aug. 10.
 Sacramento, Utah, \$5000; payable July 27.
 Elkton Con., Colorado, 2 cents per share, \$25,000; July 20.
 Alaska-Mexican M. Co., 10 cents per share, \$18,000; payable July 28.
 Alaska-Treadwell M. Co., 37½ cents per share, \$75,000; payable July 28.
 New York & Honduras Rosario M. Co., 10 cents per share, \$15,000; July 15.
 Homestake M. Co., South Dakota, 25 cents per share, \$31,250.
 Crowned King, Arizona, 2 cents per share, \$6000; July 20.

Recent California Mining Incorporations.

- Turner Flat D. G. M. Co., Sonora; capital stock \$100,000, subscribed \$25; E. L. Rehn, J. J. Collins, J. Blois, N. F. Pickle, E. J. Landers.
 Anaconda G. M. Co., San Jose; capital stock \$350,000, subscribed \$201,500; F. L. Argalt, H. Morton, P. Berg, T. W. Hobson, J. R. Curran, E. V. Hunt, A. J. Smith, J. Paul, H. Argalt.
 Brescia M. Co., San Francisco; capital stock \$191,250, subscribed \$4250; J. Rocca, L. Slesinger, U. Remensperger, I. M. Kallach, J. B. Brescia.
 Ivanpah Smelting Co., Los Angeles; capital stock \$150,000, subscribed \$500; R. F. Kellman, G. D. Copeland, B. W. Wattington, J. D. Hanbury, T. M. Loop.

Catalogues, Etc.

Catalogue No. 5, Metallurgical and Mining Machinery, issued by the Union Iron Works, San Francisco, contains 164 quarto pages of more than ordinary practical value. Progress and improvement in mining and milling for fifty years are illustrated herein and the latest in several departments are minutely described with sectional drawings and details as to construction, giving prices, weights, sizes, with practical pointers regarding what may be needed in general requirement. Much that is new and which has not heretofore appeared is published. Sixteen pages are devoted to tables of measurements, capacities, values, etc. The cost of such a work is considerable, running into the thousands. One engraving therein cost \$400. The book will be sent to any address upon request addressed to Union Iron Works, 222 Market St., San Francisco, Cal.

Air Compressors, Catalogue No. 32, from the Ingersoll-Sergeant Drill Co., 26 Cortlandt St., New York City, describing and illustrating the air-compressing product of that factory, complete as to details and of value as a compendium of information on the subject. There are 96 pages of well prepared data of different classes and styles of air-compressors built by the Ingersoll-Sergeant Co., who will send the book to any address upon application to their New York office, or to their local agents, the Parke & Lacy Co., 21 and 23 Fremont St., San Francisco.

Obituary.

At Dutch Flat, Cal., on the 17th inst., W. A. Doolittle, Supt. Alta gold mine, died.

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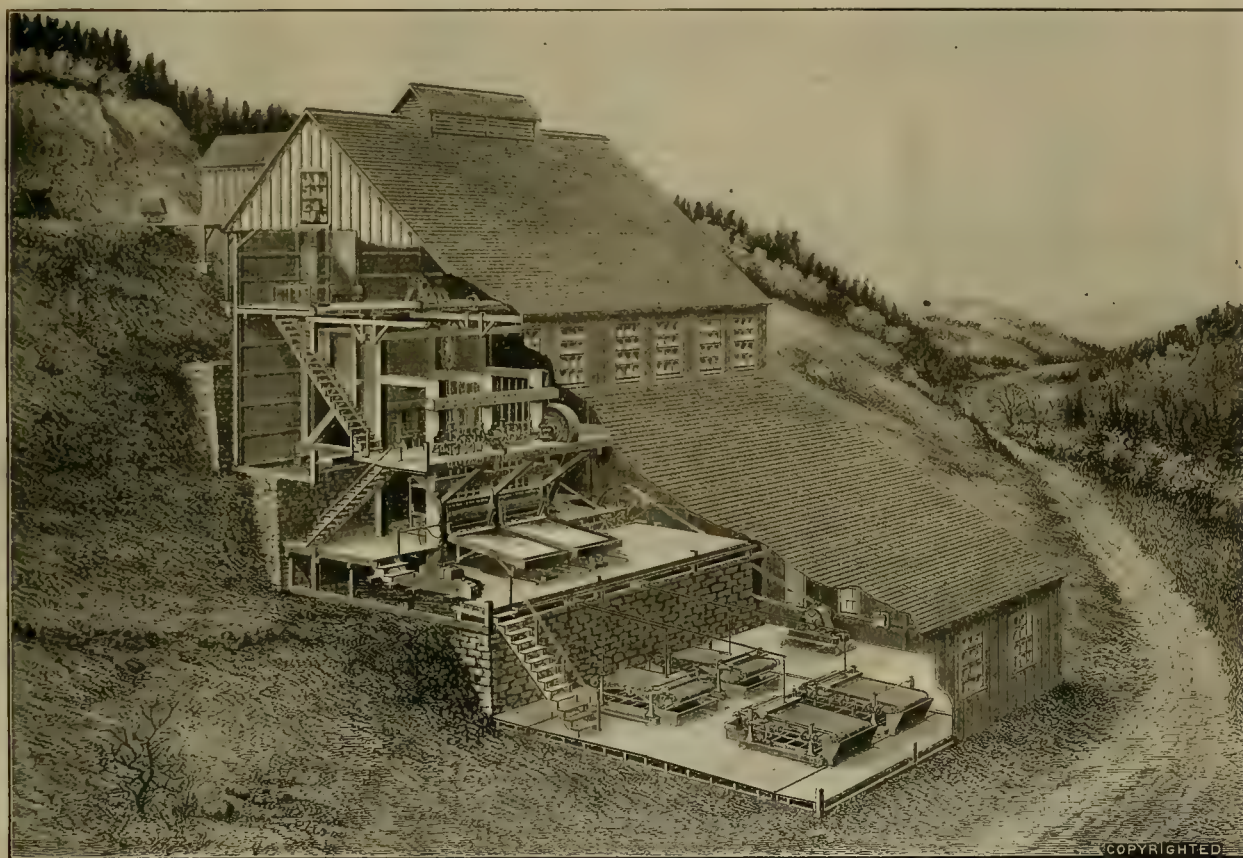
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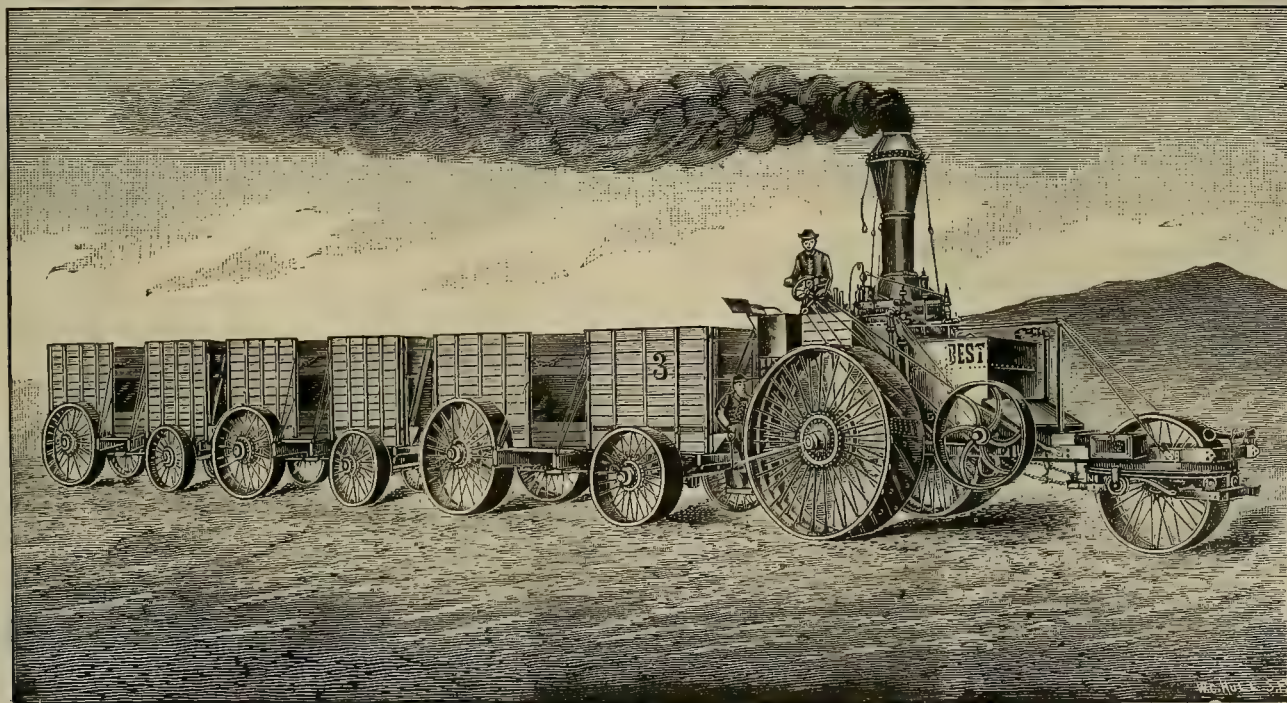
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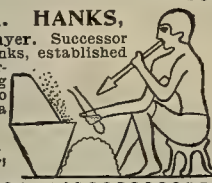
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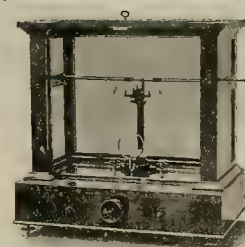
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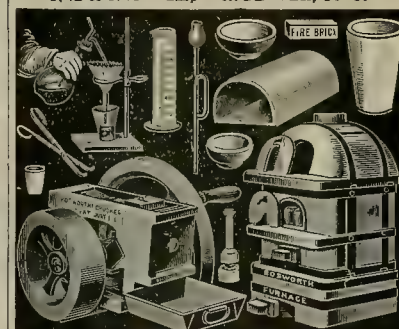
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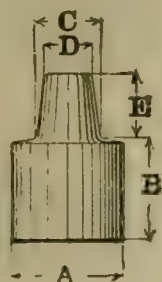
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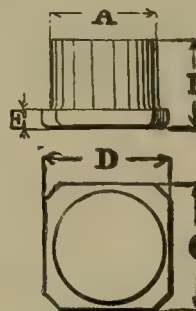
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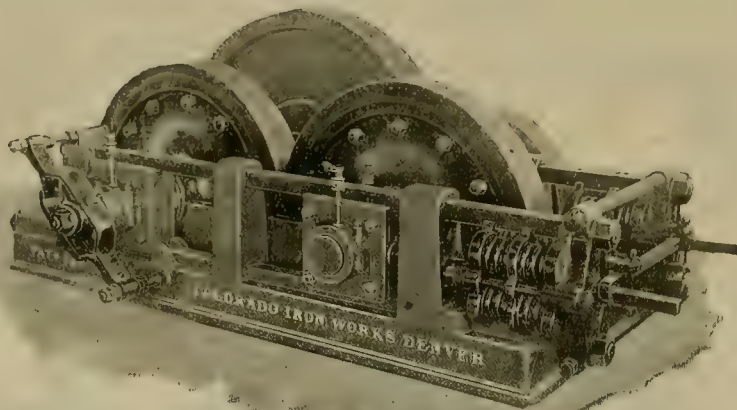
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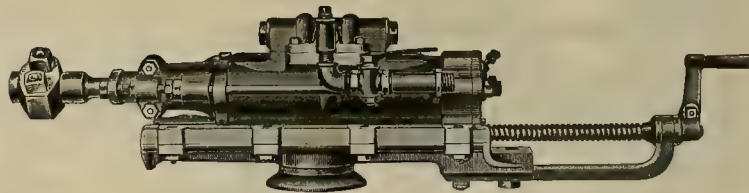
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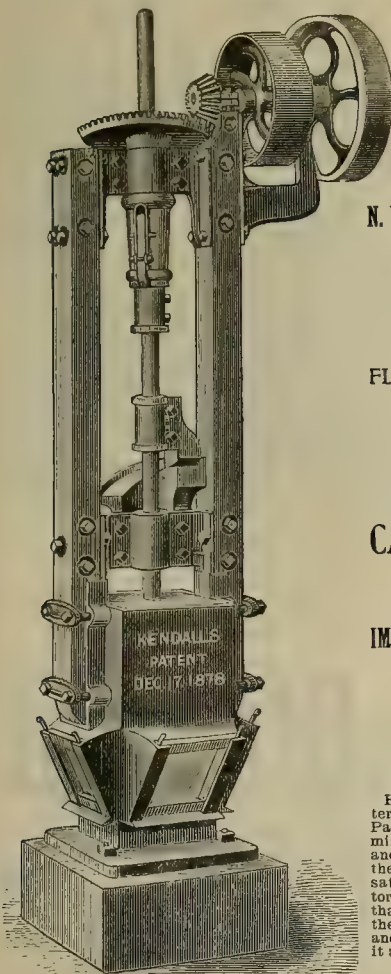
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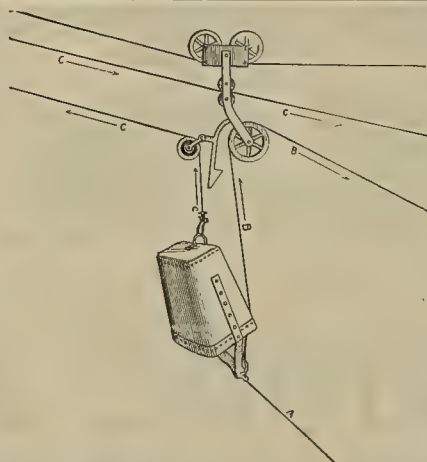
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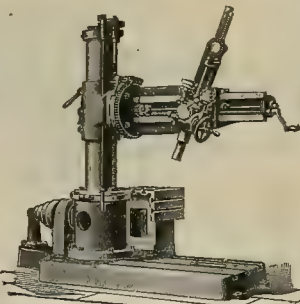
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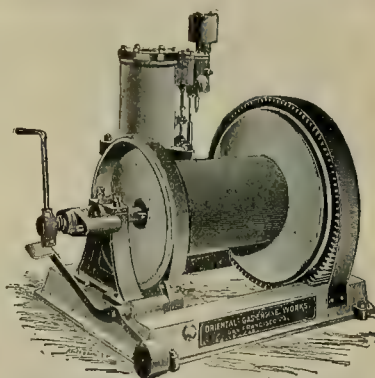
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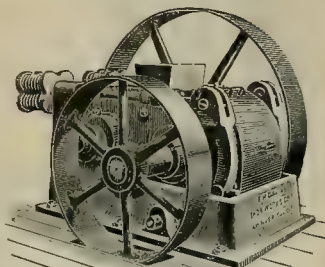
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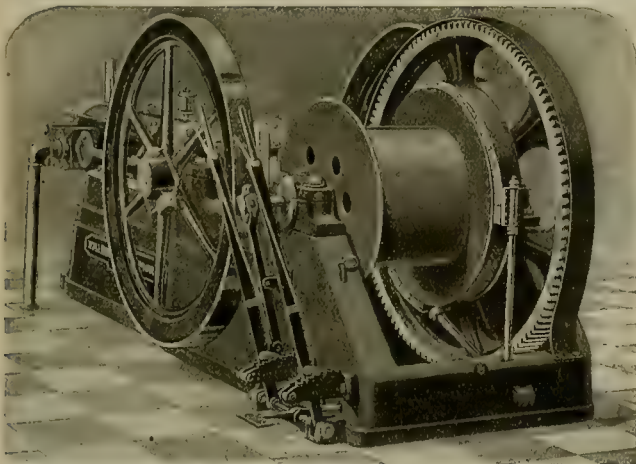
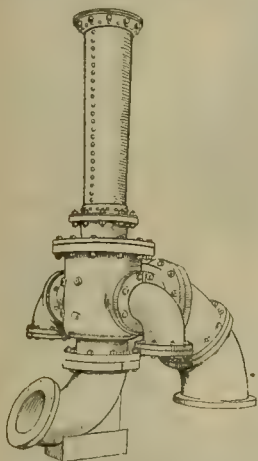
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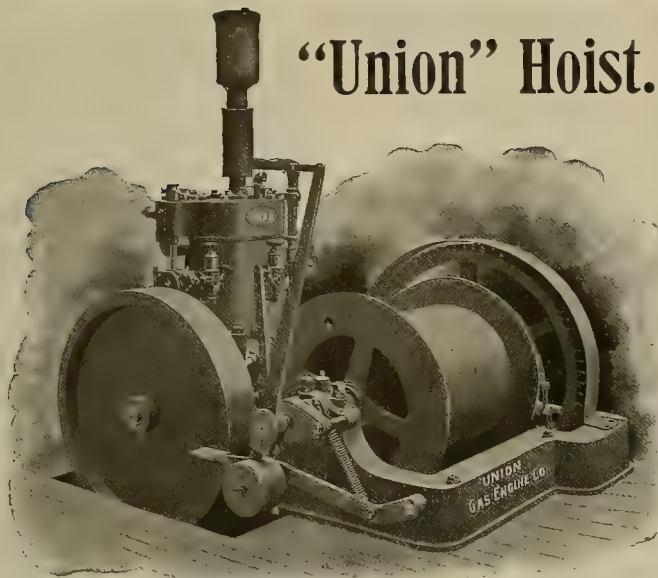
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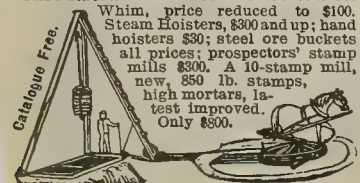
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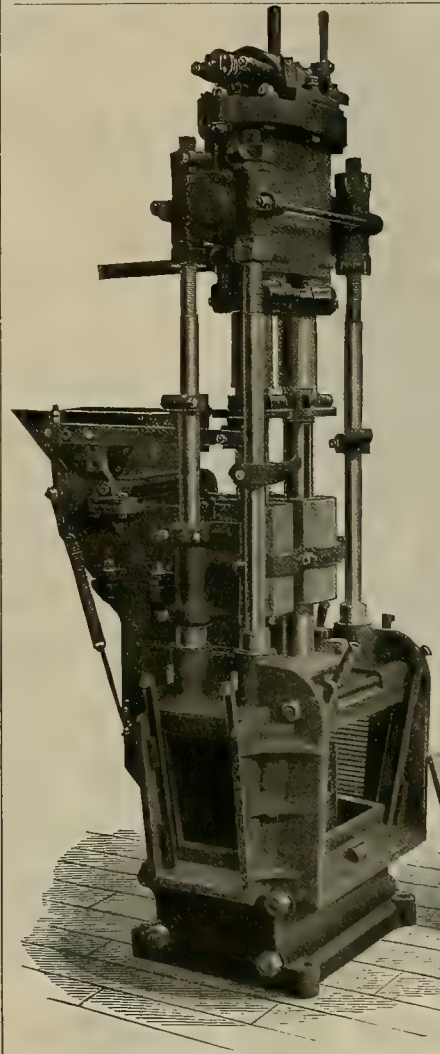
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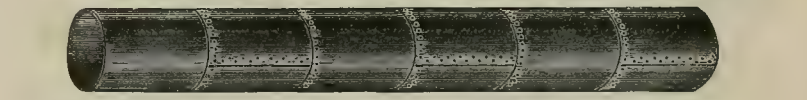
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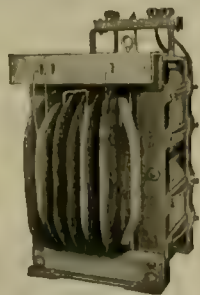
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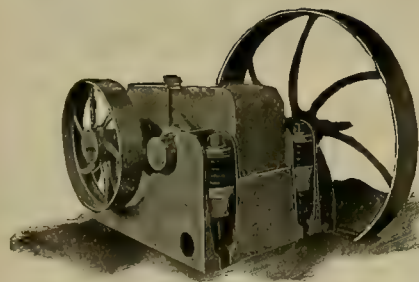
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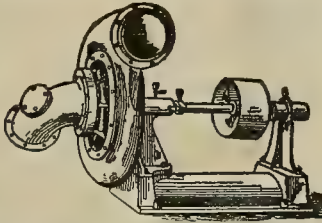
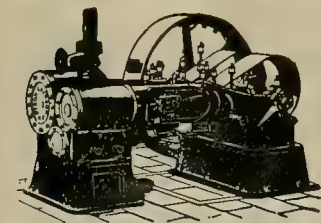
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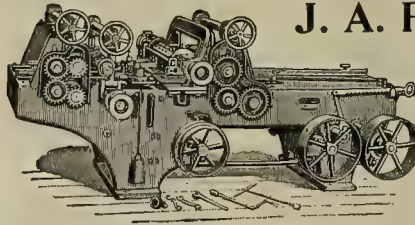


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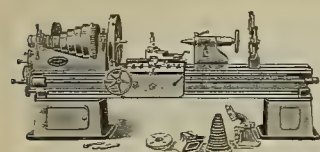
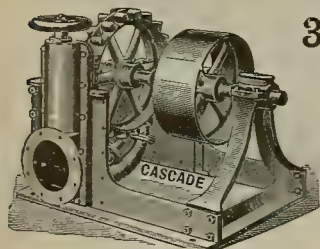
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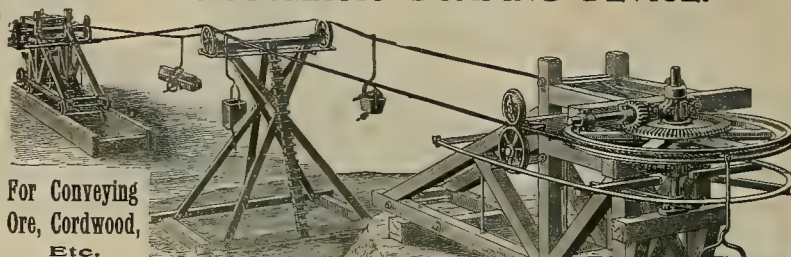
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**AUTOMATIC ORE LOADER AND
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For Conveying
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Yours very truly, J. P. WOODBURY, Supt.

VULCAN IRON WORKS,
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P & B Roofing

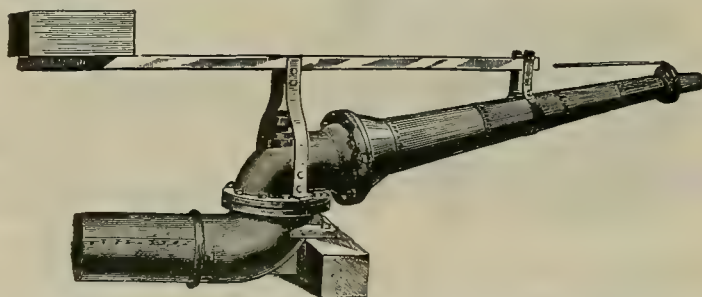
Is superior to shingles or iron, and is especially adapted to mill construction on account of its resistance to

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Double-Jointed Ball-Bearing Hydraulic Giants.



The above presents an improved Double-Jointed Ball-Bearing Hydraulic Giant which we build. The improvement consists of the introduction of a Ball Bearing by which the pressure of the water is reduced to a minimum and the direction of the nozzle changed at will with ease. Catalogues and prices of our specialties of **HYDRAULIC MINING MACHINERY** furnished upon application. **JOSHUA HENDY MACHINE WORKS, 38 to 44 Fremont St., San Francisco, Cal.**

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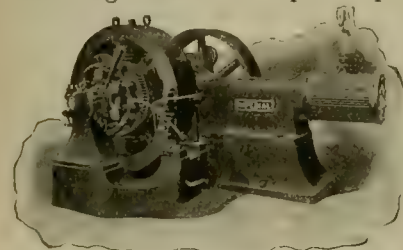
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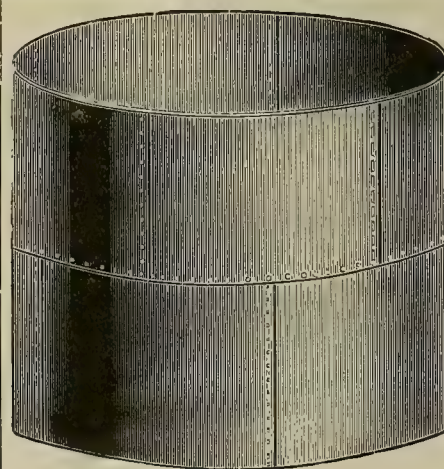
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WELL CASING, OIL TANKS,

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General Sheet Iron Work.

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Market Reports.

The Markets.

SAN FRANCISCO, July 21, 1898.

SILVER.—London, 27½¢; New York, 59½¢; San Francisco, 59½¢, nominal; Mexican dollars, 45½¢. New York exchange, eight, 15. According to a ruling of Internal Revenue Collector Scott, orders drawn in the United States payable in foreign countries, though in the form of checks, are subject to a tax of 4 cents on each \$100 or each fraction thereof, under the fifth paragraph of schedule A. The paragraph referred to is that setting forth the tax on bills of exchange.

COPPER.—Lake, quiet, 11.50.

LEAD.—New York quotes 3.95 asked; smelters quote 3.80; local, pipe, 6@6½¢; sheet, 6½¢@7¢; pig, 5½¢.

IRON.—American, soft, \$20 and \$22 per ton. **SPELTER.**—5 and 5½¢.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18¢.

ANTIMONY.—9½¢, 10.

BABBITT METAL.—16¢.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.25; cut, \$2.00; 10 to 20d, wire, \$2.30; cut, \$2.05; 8d, wire, \$2.35; cut, \$2.10; 6 and 7d, wire, \$2.45; cut, \$2.20; 4 and 5d, wire, \$2.55; cut, \$2.30; 3d, wire, \$2.70; cut, \$2.45; 2d, wire, \$2.95; cut, \$2.70. In carload lots, 10¢ per keg less.

QUICKSILVER.—Domestic, \$42.50@43; export, special rates.

POWDER.—F. O. B. San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½¢; less than one ton, 17½¢. No. 1* 60%, carload lots, 13½¢; less than one ton, 15½¢. No. 1** 50%, carload lots, 11½¢; less than one ton, 13½¢. No. 2, 40%, carload lots, 10¢; less than one ton, 12¢. No. 2* 35%, carload lots, 9½¢; less than one ton, 11½¢. No. 2** 30%, carload lots, 9¢; less than one ton, 11¢. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8 00; Coos Bay, \$5 00; Seattle, 6 00; Southfield, 7 50.

Cargo lots, Eastern and foreign: Wallsend, \$7 50; Cumberland, \$10 25; Brymbo, 7 50; Cannel, 10 00; Pennsylvania, hd., 14 00; Welsh Anthracite, 12 50; Scotch, 8 00; Rook Springs, 7 60.

COKE.—Foreign, \$13; domestic, \$11 per ton.

CHEMICALS.—Cyanide of potassium is quoted jobbing, 31@32¢ per lb.; carloads, 28¢; sulphuric acid, 2½¢ per lb. for 60%; nitric acid, 12½¢; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½¢ per lb.; blue vitriol, 4½¢ per lb.; borax, refined, 5@8¢ per lb.; chlorate of potash, 9½¢@10¢; roll sulphur, 2½¢.

LUMBER.—Retail: Pine, ordinary sizes, \$17@18.50; redwood, No. 1, \$18@20; No. 2, \$16@18.

Mining Share Market.

SAN FRANCISCO, July 21, 1898.

During the week the Commissioner of Internal Revenue reversed his former rigid ruling, and decided in effect that if the par value of a stock is \$1 per share, the tax is 2 cents on a certificate of 100 shares or fraction thereof, and, in the same ratio, on stock up to a par value of \$100 per share, on which the tax is \$2 on 100 shares or fraction thereof. This allows the mining stock brokers to see a little daylight. The Comstock companies are preparing to diminish their capital stock, and also make the "par value" of each share \$2.50 or \$3, instead of \$100, as heretofore. Meanwhile, pending the contemplated resumption there of deep mining, work on the main Comstock lode is practically suspended, with the exception of the Sierra Nevada Co. The movement in favor of unwatering the levels and going deeper has got so far as to having the companies favor a concert of action which will result in a joint report from Comstock mine superintendents on the feasibility of the proposition.

Regarding the reorganization referred to above, Collector Lynch of this city has ruled: "That when a corporation with a capital stock has passed a resolution to change the par value of the shares of its capital stock, an agreement to sell the said stock to be delivered at a date subsequent to the date of reorganization will be subject to a tax of two cents (2c) on \$100 of the par value of the stock issued under the reorganization. In other words, any contract for future delivery of such stock will have to pay a tax at the rate of 2 cents on \$100, par value of the stock, at the date of delivery." This enables brokers to continue dealing on basis of the proposed reduction in advance of the organization.

San Francisco Stock Board Sales.

SAN FRANCISCO, July 21, 1898.

9:30 A. M. SESSION.

| | | | |
|-----------------------|----|-----------------------|----|
| 100 Caledonia..... | 20 | 200 Savage..... | 13 |
| 100 Con Cal & Va..... | 33 | 200 Sierra Nevada.... | 45 |

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage.

Money loaned mines.

Mining companies organized, their property experted, financed and managed.

Mines, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

Examine mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

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Marquette, Mich., U. S. A.

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Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

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MOTORS FOR STAMP MILLS.

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Gives exclusive attention to the development and utilization of water powers by the most modern, economic and improved methods.

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Nine Thousand
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Now Running,

Aggregating some 700,000 H. P.

ELECTRIC POWER TRANSMISSION.

Pelton wheels afford the most reliable and efficient power for such service and are running the majority of stations of this character in the United States, as well as most foreign countries.

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We have a Sensitive, Simple Governor that will positively regulate speed of wheel. Specially adapted for electric railway and lighting plants.

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Fourth—No throttle valve necessary in exhaust pipe.
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Sixth—All moving parts can be covered and protected from falling dirt.
Seventh—No packed joint between chamber and pump to give out and need renewing.
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Ninth—All parts easily accessible and fewer than in any other pump.

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Drainage and Irrigating Pumps,
Special Fire Pumps,
Independent Air Pumps and Condensers,
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E. G. DENNISTON, Proprietor
Telephone, Main 5981. Send for Circular.

Assessment Notices.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of June, 1898, an assessment (No. 10) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 257 12th street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 4th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 5th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
F. METTMANN, Secretary.
Office—257 12th street, San Francisco, California.
The Secretary will also receive payments from 12 to 3 P. M. at his business office, 225 Sansome street.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 29th day of June, 1898, an assessment (No. 4) of Two Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 14, Nevada block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
WILLIAM McPHERSON, Secretary.
Office—Room 14, Nevada block, No. 309 Montgomery street, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of July, 1898, an assessment (No. 84) of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 29th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
ALFRED K. DUBROW, Secretary.
Office—Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 16th day of May, 1898, an assessment (No. 1) of 1 1/2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 7, fifth floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
R. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 8th, 1898.

R. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to August 6th, 1898, and the day of sale to MONDAY, September 6th, 1898.

R. L. CHENEY, Secretary.
Office—Room 568, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that, at a meeting of the Board of Directors, held on the 10th day of June, 1898, an assessment (No. 10) of 2 1/2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of July, 1898, will be delinquent and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 8th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
A. F. FREY, Secretary.
Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Thorpe Mining Co., the day of delinquency of the above assessment has been postponed to August 16th, 1898, and the day of sale to WEDNESDAY, September 7th, 1898.

A. F. FREY, Secretary.
Office—Room 44, Phelan building, San Francisco, California.

MARINA MARSICANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 9th day of July, 1898, an assessment (No. 14) of 2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 7th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
CHARLES BOVONE, Secretary.
Office—217 Sacramento street, San Francisco, California.

DELINQUENT SALE NOTICE.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice.—There are delinquent upon the following assessment (No. 3) levied on the 16th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------|-----------|-------------|--------|
| Charles Rehn..... | 75 | 2,000 | 100 00 |
| Charles Rehn..... | 76 | 1,000 | 50 00 |
| Charles Rehn..... | 77 | 1,000 | 50 00 |
| Charles Rehn..... | 79 | 500 | 25 00 |
| Charles Rehn..... | 81 | 499 | 24 95 |
| Charles Rehn..... | 82 | 1 | 05 |
| Charles Rehn..... | 161 | 150 | 7 50 |
| Adelheid Rehn..... | 176 | 250 | 12 50 |
| W. J. Pattosion..... | 207 | 200 | 10 00 |

And in accordance with law, and an order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, room 57, No. 916 Market street, San Francisco, California, on SATURDAY, the 23d day of July, 1898, at the hour of 12 o'clock M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

GEO. W. FLEISSNER, Secretary.
Office—No. 916 Market street, room 57, San Francisco, California.

NOTICE OF DIVIDEND.

Jamison Mining Company, rooms 50 and 54, No. 120 Sutter street, San Francisco, California. June 20th, 1898. Semi-Annual Dividend No. 2.

At their meeting of June 20th, 1898, it was resolved by the Board of Directors of the Jamison Mining Company to pay to the stockholders of the company from the surplus funds in the treasury a dividend of Nineteen Thousand Five Hundred Dollars (\$19,500.00), being five (5) cents per share on the capital stock of the company.

The dividend will be payable at the office of the company on the 15th day of August, 1898, to all stockholders of record on the 5th of August, 1898. Transfer books will be closed at the close of business on the 5th of August and reopened on the morning of the 16th of August, 1898.

SAM. W. CHEYNEY, Secretary.

ANNUAL MEETING.

The Regular Annual Meeting of the Stockholders of the Tuscara Water Company will be held at their office, No. 310 Pine street, rooms 15 and 17, San Francisco, California, on WEDNESDAY, the 27th day of July, 1898, at the hour of 1:30 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year and the transaction of such other business as may come before the meeting.

J. W. PEW, Secretary.
Office—No. 310 Pine street, rooms 15 and 17, San Francisco, California.

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PRESCOTT, ARIZ., February 26, 1898.

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as well as almost every other make of steel. A guarantee has always been given, that if not giving satisfaction or proving defective, money will be refunded. In all these years I have not had a single bar returned.

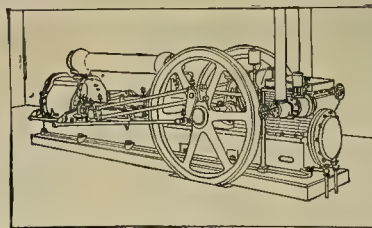
Its adoption and use by almost all mines of this district, is certainly evidence as to the unequalled merits of Canton Steel.

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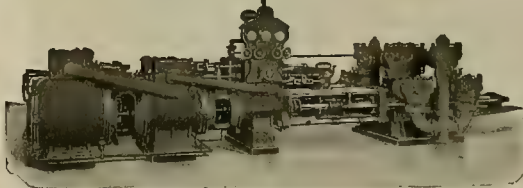
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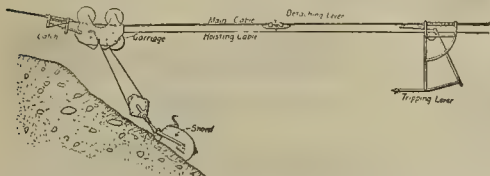
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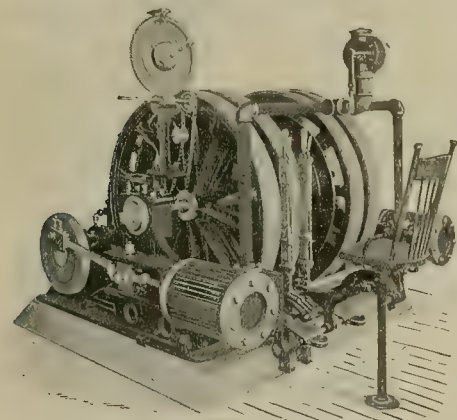
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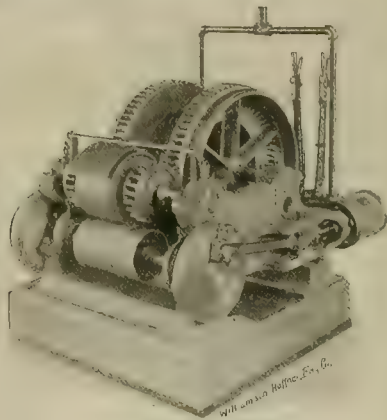
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February 19, 1897. "Our furnace is now running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it. For 24 hours ending 7 A. M. to-day 102 tons were roasted."

The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, Utah (one furnace); The Metallic Extraction Co., Cyanide, Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, Colo. (three furnaces); The Selby Smelting & Lead Co., Selby, Cal. (two furnaces); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); Broken Hill Proprietary Co., Broken Hill, New South Wales (one furnace); Puget Sound Reduction Co., Everett, Washington; Colorado Ore Sampling & Reduction Co., Creek, Colo.; Consolidated Kansas City Smelting & Refining Co., for the Arkansas Valley Smelting Works, Leadville, Colo.; Robert Lanyon's Son's Smelter Co., Iola, Kansas (two furnaces); Mountain Copper Co., Ltd., Keswick, Cal.

Catalogue on Application.

MINE BELL SIGNALS. Adopted, Used and in Force in Accordance with State Law. FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches the Mine Bell Signals and Rules provided for in the Voorhies Act;

passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 330 Market St., San Francisco

MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1986.—VOLUME LXXVII.
Number 5.

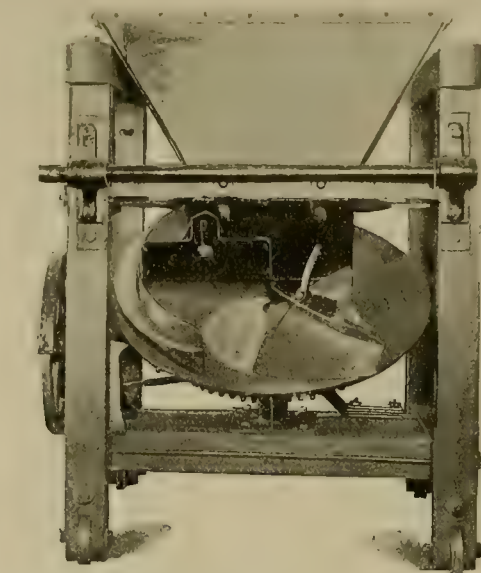
SAN FRANCISCO, SATURDAY, JULY 30, 1898.

THREE DOLLARS PER ANNUM.
Single Copies, Ten Cents.

The "James" Ore Feeder.

The "James" ore feeder, herewith illustrated, is a machine for automatic feeding of ores to stamp batteries and other crushing machinery, adjustable in operation, and designed to feed ores wet or dry, coarse or fine. On a cast-iron feed table below the hopper is a bevel gear cast on its under side: motion is given the feed table by an extension of the tappet arm connected with a friction device which engages the sides of a friction wheel fastened on a shaft; on the opposite end of this shaft is a bevel pinion which meshes into the bevel gear on the bottom of the feed table. Part of the ore is scraped off by an adjustable wing projecting from the base of the hopper and dropped directly into the chute by the rotation of the feed table. This table is in the form of a disk, supported under the hopper, inclined bodily and provided with an upward projecting cone in the path of the feed. The discharge edge is placed on a horizontal line, the cone in the center forming a support and preventing the ore from crowding against the front of the hopper or spilling over the discharge edge unless the table is rotated. The shape of the feed table makes it impossible for the feeder to spill.

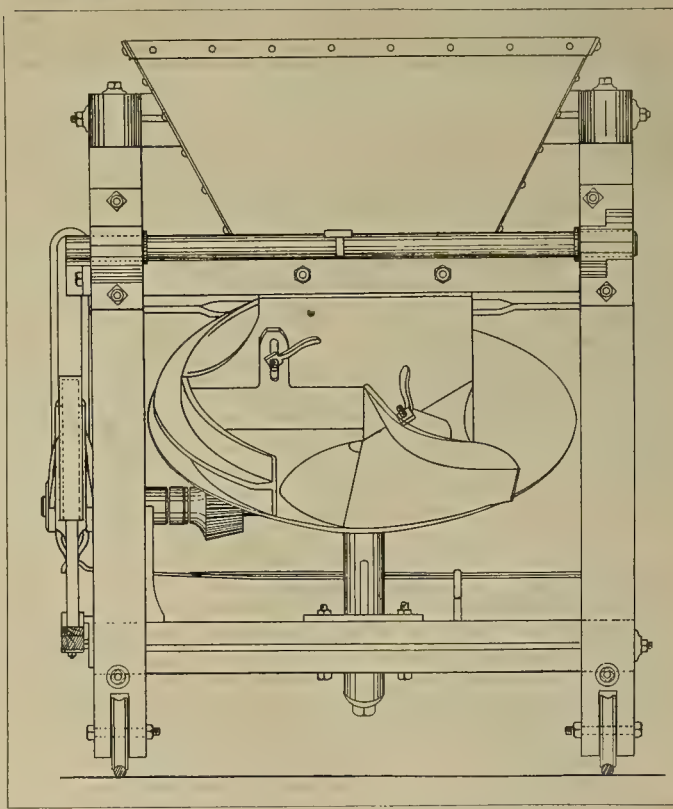
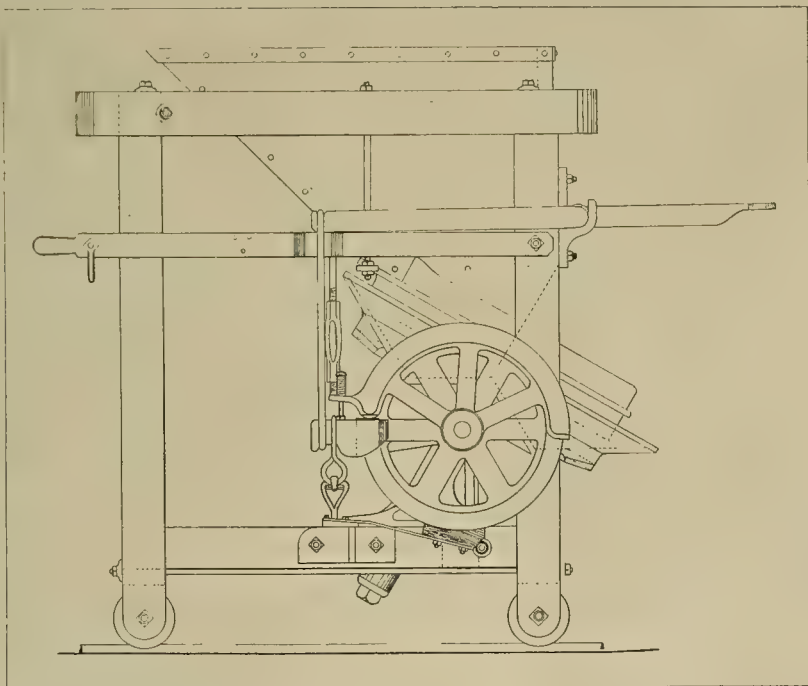
The advantages claimed by the makers are, that the feed is positive and will not gig back no matter



the friction device and arm as described. Upon the other end of this shaft a pulley is placed, which is driven by a belt run-

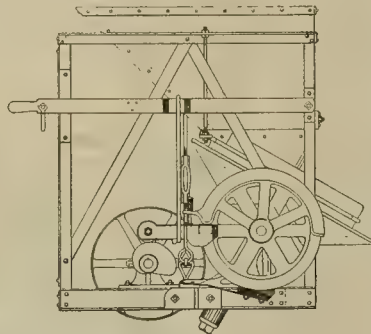
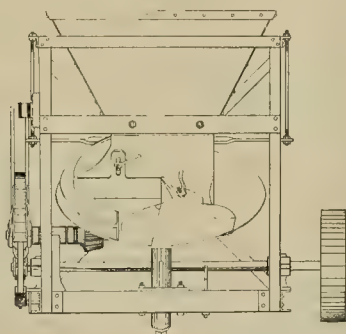
ning from a pulley on the mill shaft. The feeder when arranged as above is adapted for feeding roasting furnaces or driers, and when manufactured for this class of work the agents, The Parke & Lacy Co., 21 and 23 Fremont street, San Francisco, furnish a frame of iron instead of wood. The shipping weight with wood frame is 750 pounds; with iron frame, 1000 pounds.

THE Salt Lake Tribune cites the fact that when Manager Allen of the Centennial Eureka was, during the debates in the Mining Congress, arraigning the law defining extralateral rights because of its lawlessness, and calling attention to the ugly practices that had been countenanced by it, he used for illustration the fact that his company had paid out no less than \$200,000 that they might defend themselves against any possible attack from that source. This enormous sum had been paid out for ground from which the company had never marketed a ton of ore. It had never returned the purchasers a cent, nor did they ever expect it to. That \$200,000 was simply spent on the acquisition of ground on which



how slight the motion to the arm; it cannot possibly spill ore of any character and will definitely measure out from one to fifty tons per day of any class of ore.

When used in connection with the Huntington mill, Dodge pulverizer and similar quartz-crushing appliances, in which the tapping motion of the stamp mill is not obtainable, the ore feeder must be driven from a revolving shaft on the mill. In such cases the feeder is provided with a shaft upon one end of which is placed a cam through which motion is imparted to the feed table by



THE "JAMES" ORE FEEDER.

some adventurer might set up an "apex" and under his assumption make a whole lot of trouble. Asked later about the statement, Manager Allen explained that, while the company had not been threatened, it had simply decided to shell out the fortune and take the ground "for protection." The Centennial Eureka is not alone in those experiences. Under existing laws a showing of value in mining property is often the immediate signal for such a move, with indirect overtures for a "compromise" if the inducements are sufficient.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

Office, No. 380 Market Street, San Francisco, Cal.
Telephone Number, Davis 771

ANNUAL SUBSCRIPTION:

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Entered at the S. F. Postoffice as second-class mail matter.

J. F. HALLORAN.....Publisher

San Francisco, July 30, 1898.

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DURING July steamers have been arriving from the Yukon, via St. Michael, with passengers, many of whom were extremely fortunate, others with the usual individual tales of disaster. So far, this year, it is estimated that about \$10,000,000 has been received from that region.

The promoters of the Colorado Pike's Peak Tunnel and Railway Co. exhibit good example of perseverance, whatever may be said of the worth of the enterprise. Originally it was the idea to spend \$10,000,000, more or less, in pushing a tunnel under Pike's peak and the Cripple Creek district, emerging in the vicinity of Victor. Capital was coy, and the promoters of the scheme now assert their intention to raise \$1,800,000, half of which will be spent in constructing a tunnel 18 x 18 feet, the other half in building reduction works at Canyon City. The project is an ambitious one, but the plan in its fruition would seem more interesting than prosperous.

The article on pages 107 and 108 is of timely interest concerning one form of California gold mining destined to renewed prominence. In conjunction with other good work being done, the Government could well afford to survey this lava-capped channel, and locate it, that such mines might be worked with the minimum of prospective expense. Men whose standing and experience entitle their opinions to respect say that there is still \$1,000,000,000 in gold locked therein. The proposed survey would cost probably \$200,000, and would be a good Government investment. This is believed to be a matter worthy the attention of the California State Miners' Association.

REGARDING the important matter of advocacy of the creation of a national Department of Mines and Mining in the recent session of the International Mining Congress at Salt Lake City, Utah, a leading official of the organization in a letter to the writer says: "The question of a Department of Mines and Mining did not come up for discussion until the last day, when the attendance was light owing to excursions to nearby mining camps, and the committee appointed at the convention last year to report on this subject did not present any report at all; in fact, none of its members were present. The resolutions adopted governing this most important matter, and the authority given the President of the Congress to appoint a committee to urge the matter, together with the decision of the organization to maintain permanent headquarters, with a view in part to agitating this very question among the mining people of the country, all goes to show the earnest and determined purpose of the people represented here to have such a department. We realize, however, as we did not realize last year, that we have many difficulties and strong opposition to overcome, and we also realize that persistent, aggressive work in that direction throughout the entire year is absolutely essential to the attainment of our de-

sires." It is to be hoped that such realization will not deter all concerned from active effort to overcome inertia.

EXPERIENCE is a good educator in mining as well as other branches of business. The diatribes of former years against the assessment principle have almost ceased, and in some States, notably Washington, the treasury stock plan is giving way to the assessment idea. While much that has been urged against the plan of assessing mining stock is so, and while nothing can be said too condemnatory of its abuse, yet the fact remains that no other device has ever been found to satisfactorily secure the working of a mine where unanimity did not prevail among the stockholders. Spokane, Wash., mining companies are among the latest to see plainly that assessable stock is the kind that best insures the development of a mining property, and while new companies in that section are adopting that plan in incorporating, old companies are reorganizing and amending their by-laws "so as to authorize the levy of assessments on the capital stock of the company from time to time, as the business of the company may require."

THE testimony of Hooley, the London "promoter," given in the London bankruptcy court last Wednesday, gives interesting confirmation of what has been generally understood—that part of the London press was as venal and corrupt as that of Paris, and that editorial influence is the subject of purchase in Great Britain. On Wednesday last Hooley swore that, in connection with one flotation, it cost him \$315,000 to "square" the London newspapers. For an "editorial" in the *Financial Post* Hooley says he paid \$10,000. Other things also came high. An introduction to Lord Ashburton cost him \$10,000; he paid the Earl of Winchelsea \$50,000 for the use of his name as chairman of one of the schemes that he was "promoting." The *Pall Mall Gazette*, which has long sniffed in scorn at "the venal American press," is also said by Hooley to have had considerable of his money. These disclosures are interesting inasmuch as they throw sidelights on the methods of promoters who buy influence as they would beef, and then throw the blame of failure on American mines and mining methods, making those last the scapegoat for their own nefarious practices.

THE Amador, Cal., *Republican* last week received a letter from a "mining professor" in Pennsylvania, asking the editor if there was "any danger of gold mining giving out" in California. It is not uncommon for editors of newspapers in every mining center in the west half of America to get similar inquiries. Mining "professors" in Pennsylvania and elsewhere are sometimes seized with sudden fear that the gold mines of Colorado, California, Utah and elsewhere may, at the present rate of production, be "exhausted." Such inquiry would elicit no answer but a smile from the recipient. Probably were a similar inquiry sent to a Lake Superior newspaper office regarding copper, or a Pennsylvania one regarding the probable exhaustion of coal, the result would be the same. Gold and silver mines are equally permanent with coal and copper mines. In the commonwealth of Colorado there are over 76,000 gold and silver veins discovered and opened. In that part of the United States with an ocean coast line equal in extent to that from Maine to Georgia, known as California, are something under a hundred thousand similar precious metal veins opened. So with several other great commonwealths west of the hundredth meridian. With improved machinery, reduced cost, railroad development, increased population, lessened interest on capital, and the constant demand, these will all come into active development. For every mine that "gives out," a hundred new ones are opened up. In California, as in Colorado, mining is the basic industry: when it flourishes, so with other pursuits; when it languishes, trade of all kinds is depressed. Every farmer, fruit grower, stock breeder, merchant and manufacturer in California is affected primarily by the condition of the mines. That they are of a permanent nature is a matter of congratulation to the State. The Pennsylvania man who wrote to the Amador, Cal., newspaper might do well to bear in mind that a well selected property in any mining State is a good investment, present or prospective.

On the Comstock.

The present war tax on mining stock sales and transfers will hasten the inevitable change on the Comstock, Nev., lode. The principal companies are now arranging for a reduction in the par value of the shares from \$100 to \$2.50 or \$1. From recent prices they might as well make the par value 10 cents or even 1 cent a share while they are about it, especially if the controlling idea be to evade the present prohibitory stamp tax. To completely get around that last requirement, however, all they need do is to go back to the original Comstock method of the early '70's and designate the property values by the "foot" instead of the "share." What is called "the South African system of stocking a mine," viz., organizing a \$1,000,000 capitalized corporation, with stock at \$1 per share, selling at two or three cents, originated a generation ago in California and its immediate success made many imitators. The difference between mining stock and industrial stock tends to justify such action. A corporation organizing to build a factory or a railroad or a mill figures on the amount of money required and the original capital stock approximates that amount. Ordinarily in the case of a mining company it makes small difference to the speculator whether the stock is one cent or \$10 a share, the gamble is the inducement, the dealers caring little as to actual par values, and low priced stocks giving increased chance for profit. This, of course, does not deal with the intrinsic value of the mine, the honesty of its owners or the ability of its superintendent; it being looked at from the speculative point of view.

At this time also comes up again for correct solution the proposition to drain the lower Comstock levels, originally suggested in these columns and editorially endorsed. That it should be done, and that the project presents no insuperable engineering difficulties, is agreed. The question resolves itself into one of ways and means, and how the money shall be raised is now the topic of discussion. To raise it by assessment is impossible. Securing federal aid has been suggested; the issue of bonds by the State of Nevada guaranteed by its Legislature has also been advocated. These are questions in which "the street" does not interest itself; if anything in the nature of investment in the property as a business proposition is done, it must manifestly be done by the owners. This is the one great obstacle, and what used to be the chief aid in Comstock development now becomes its chief hindrance. It was the stock gambling that enabled the Comstock bonanzas to be unearthed. Large sums were thus secured for bold ventures. Had it been private mine owners depending on the profits of ore on one level to go down another hundred feet, it is unlikely that the great feats of mining on that famous lode would ever have been accomplished, private owners being afraid or unable to take chances made possible by large public purchase of stocks. The public didn't care what men were paid or what machinery cost; they were only intent on "making a turn" on the stock, and this lavish indifference enabled the Comstock managers to make development investments that a private concern, not listed, would find ruinous. It was noticeable how the investing, gambling public, who knew little and cared less about the properties they gambled in, could do bolder and more successful mining than real miners with small resources. But now the same continuing spirit that fed the days of bonanza deserts the Comstock in the days of its borasca. The street no longer gives assistance, and upon the men who work the mines falls the burden of providing funds to rehabilitate them.

On page 105 is the conclusion of T. A. Rickard's article on "The minerals which accompany gold," etc., in which he decries the idea that, universally, mines are richer in depth. California experience disproves this idea, and goes far toward maintaining the affirmative. In this regard it must also be said that while the miner will oftentimes hear it said: "Greater depth will give you greater value," yet the old, practical miner rarely seeks greater depth, unless he finds value on the surface, or by systematic effort has first proved to his own satisfaction that by depth he will expose extensions of the ore body in which he or some one else has already taken values from the surface or near the surface.

Concentrates.

COMPARISON is constantly and cordially invited.

In Tuolumne Co., Cal., on June 23rd, 406 stamps were dropped on ore.

The Dexter, Tuscarora, Nev., directorate are looking for a new superintendent.

The Goldstone mine and mill at Lemhi, Idaho, are sold to Montana people for \$75,000.

The Rocky Fork Coal Co. at Red Lodge, Montana, is shipping coal at the rate of 1000 tons a day.

A \$10,000 addition to the mining building at the State University, Berkeley, Cal., is being erected.

It is calculated that there is in the United States to-day \$157,000,000 more gold than on July 30th, '97.

On the Comstock at Virginia, Nev., only four whistles now blow—the Union, Chollar, Overman and Alta.

The Crowned King M. Co. of Yavapai county, Ariz., paid \$24,000 in dividends during the month of June.

UNWATERING old mines in California is one of the kinds of mining work favored by the present dry season.

GREAT FALLS, MONTANA, will buy the water works from the company that has been operating them, for \$375,000.

CHOTEAU COUNTY, MONTANA, is building an irrigating dam at the Belknap Indian Agency that will cost \$40,000.

THE State of Washington has shipped 150 cases of ore samples to be exhibited at the Omaha, Neb., exposition.

When the machinery at the Chloride Point mill, Mercur, Utah, is completed it will handle 100 tons of ore daily.

MRS. JENNIE WALTHAM runs the hoist at the Golden Bar mine, Randsburg, Cal., and also acts as superintendent.

THE Dexter mine at Tuscarora, Nev., contemplates building an electric power plant. John Derr, Salt Lake City, Utah, is Pres. of the company.

AMADOR CO., Cal.'s, water ditch supply comes mostly from four lakes in Alpine Co., in the high Sierras, eighty miles east of Jackson, Cal.

THE ore at the El Refugio mine, Chihuahua, Mexico, goes 57% silver, 43% gold—about the same proportion as the Comstock in its prime.

AFTER the payment of the recently declared dividend the Pioneer Placer M. Co. of Placer Co., Cal., will have a cash surplus of about \$140,000.

NEARLY 11,000 workmen are employed by the mines of the lake copper district in Michigan. This is an increase of nearly 4000 men in four years.

JUDGE McDONALD of Spokane, Wash., has signed a decree disincorporating the Josie, B. C., G. M. Co. and releasing the trustees and officers from further liability.

THE Mercur, Utah, *Miner* issued a splendid illustrated edition in honor of the visit of the International Mining Congress delegates.

DURING July, Denver, Colo., and London, Eng., papers of the same date have been received at this office on the same day.

THE local executive committee of the Mining Congress, Salt Lake City, Utah, has decided to make the mineral exhibit of the congress permanent.

M. W. HARRINGTON got judgment for \$10,000 against the Eureka Hill M. Co., Eureka, Utah, for injuries received while in the employ of defendants.

FROM the Klondike, on the St. Paul and Roanoke, during July, came to San Francisco about \$2,300,000. Of this, the U. S. Mint coined \$500,000 direct.

THE Clear Creek, Colo., Power Co. has been incorporated—capital \$1,000,000—by Boston and Ohio men to build an electric power plant on Clear creek, Colo.

THE International Mining Congress' local committee of Salt Lake City, Utah, has authorized the publication of a complete stenographic report of the proceedings.

A NINE MILE SPUR TRACK will be built by the D. & R. G. R. R. from Leadville, with side tracks, to the Ibex and other large mines. It will be equipped by Oct. 1.

THAT for the first time in forty years no faro game is in operation on the Comstock, Nevada, is mournfully alluded to by the local press as the saddest and surest sign of decadence.

THOS. KERNS, the Park City, Utah, mine owner, has agreed to buy \$150,000 worth of bonds of the State of Utah. They are refunding bonds running twenty years and bear 3½ per cent interest.

COLORADO'S COMMISSIONER OF MINES LEE has prepared a needed bill to be presented to the next Legislature in regard to abandoned shafts in mining camps that have been left unprotected.

ANNUAL assessment work on unpatented mining claims is usually estimated by days' work at the ruling local rate. No allowance is made for time or expense going to or returning from the claim.

THE deepest gold mine in Tasmania is the Golden Gate—1330 feet vertical; in Victoria the Bendigo Goldfield, 3000 feet. The deepest shaft in Colorado is on the Geyser mine, Custer Co., 2556 feet.

EXCHANGE of foreign gold coin for United States money has never been much of a business in San Francisco, as foreigners upon arriving usually take their coin to the U. S. Mint and have it recoined at a trifling expense.

THE only published statement regarding the output of the Ulica mine, Calaveras Co., Cal., covered the period from Jan., '93, to Sept., '95, inclusive, during which time the yield was \$4,154,026.52, and the expenses \$1,683,414.24.

CARBONADO is used mainly in the form of diamond dust for polishing and in crystals for calking into the bits of diamond prospecting drills. It is not used in steel making, nor can it be used to "point" drills except as stated.

A "WET ORE" is one that has a high percentage of lead or copper—40% for instance, of lead, 20% copper. "Dry ores" contain but a very small percentage of either metal. Smelters do not generally pay for less than 5% of lead.

THE Centennial Eureka mine at Eureka, Utah, is installing an electric signal system in its shaft, which is 1400 feet deep, with a winze, making it 200 feet deeper. By this system it is believed that accidents will be reduced to a minimum.

ABOUT the busiest place in San Francisco upon the arrival of the steamer St. Paul from St. Michael was the assay office of the Selby Smelting and Lead Works, where a very large quantity of gold was deposited by returning Klondike miners.

CURRENT contemporary comment on the recent session of

the Mining Congress at Salt Lake City, Utah, is not favorable. Several valuable technical papers on mining topics were read, which are being published first in the MINING AND SCIENTIFIC PRESS.

THE recent claim of the Denver, Colorado, *Times*, that "Denver is the commercial and financial center of the Northwest," has started St. Paul, Minneapolis, Spokane and Seattle papers asking, "Where is the 'Northwest,' anyway?"

THE period within which annual work is required on an unpatented mining claim begins on the 1st day of January succeeding the date of location. Any one locating a claim since Jan. 1st, '98, has legally till Dec. 31st, '99, to do the requisite \$100 of work.

IN New Mexico considerable money is being put into placer mining, especially around Elizabethtown and La Belle. Meanwhile, as of old, dry washers are saving considerable gold for individuals who cannot command the requisite capital to undertake large enterprises.

AN off-hand rule for finding the required length of a belt is to add the diameter of the two pulleys, multiply the sum by 3½, divide the product by 2, add to the quotient twice the distance between the center of the shafts; the product will represent in feet the length required.

THE Omaha and Grant people who control the Pilot Bay, B. C., smelter, are waiting for the Crows' Nest pass railway to reach the Kootenay river to bring them coke and coal. When the road is built to that point they plan to start the smelter and resume work on their mining properties at Ainsworth.

DURING May, in Gilpin Co., Colo., Mgr. Rickard extracted from the Centennial mine, at about 500 feet below surface, 3000 tons of ore at an average cost of \$3.93 per ton for all charges, development, office expenses, ore treatment at mill and smelter. The value of the ore ranged from \$10 to \$100 per ton.

SOME of the difficulties of California mountain transportation of mine supplies were illustrated last week in the experience of L. Moore, who, in delivering a 5-stamp mill at the Globe mine, Canyon City, Cal., had to draw the machinery up with block and tackle over parts of the trail inaccessible to loaded pack mules.

A BUTTE, Montana, subscriber writes: "Any one of your regular ordinary weekly issues would be a specially fine edition of any other mining journal." The way that new subscriptions and renewals keep coming in, even in these times of war and drouth, coupled with many kindly comments, is naturally gratifying.

NOW that Wells-Fargo stain an honorable record for a generation by fighting the war tax of 1 cent and making their patrons pay it, support could justly be withheld. Packages of four pounds or less can be sent through the mails at oftentimes lesser rates than that charged by the old company whose dishonorable attitude excites surprise.

RECENTLY the recorder of San Bernardino Co., Cal., applied to the Superior Court for a writ of mandate to compel the recorder of Virginia Dale mining district to deliver to him all records of the district. The judge held that the mining law is constitutional, and directed the district recorder to turn all his records over to the county recorder.

THE Canadian Pacific Railway Company, that boomed the Stickeen river route to the interior of Alaska, to the material loss of hundreds of prospectors who tried it, has gone out of the Alaskan transportation business, which is very much to its credit. Other less pretentious and more fraudulent "transportation companies" should do likewise.

IN California gold ore carrying 65 cents per ton has been profitably worked. At the Spanish mine, Washington township, Nevada Co., in the month of November, in thirty working days Supt. F. W. Bradley mined and milled 4047 tons of ore. Including every detail of expense, the mining cost 31.4 cents per ton; similarly the milling cost 20.8 cents per ton—net profit 13 cents per ton.

A MINING transfer was recently filed in the Kittitas Co., Wash., auditor's office that required \$750 in revenue stamps to be affixed. It was a conveyance of Fish lake mining property and the par value of the stock was given as the consideration involved. It is very likely that the "consideration" will be considerably less when the parties have the chance to change it, which has been offered them.

A CHANNELL, superintendent Compagnie Salines et Mines de l'Altair, Mexico, reports an improvement in dry washers, combining a concentrator therewith, saving nearly all the gold and reducing 60 tons to 1. In that locality the dry placer ground goes about 45 cents to the ton, so that a 60 to 1 reduction would give a gold value of \$27 per ton of concentrates. The machine is locally stated to work satisfactorily.

GOOD babbitt metal is made by melting say 4 lbs. copper, to which is slowly added 12 lbs. Banca tin, 8 lbs. regulus of antimony and, subsequently, 12 lbs. more tin. After the first 4 or 5 lbs. of tin have been added, the heat should be reduced to a dull red, then add the remainder of the stated metal. This is for hardening. For lining 1 lb. of the above compound melted with 2 lbs. Banca tin will produce a lining metal of the proportions of copper, 4 lbs.; regulus of antimony, 8 lbs.; tin, 96 lbs.

ON page 110 the Yuba Co., Cal., special correspondence gives the latest phase of the "debris dams." The State and Federal government is in accord thereon, the money was long since appropriated and is available, and it would seem that the present low water would form a very desirable occasion for beginning the long-deferred work. This item, like a good many others in "Concentrates," is a condensed answer to a question by mail. In many such cases the question itself is sufficiently indicated by the answer.

THE California mineral land bill will claim congressional attention next winter. During the last session the bill was introduced by Senator Perkins in the Senate and Congressman De Vries in the House. The Secretary of the Interior and the Commissioner of the General Land Office reported in favor of it, the latter estimating the cost of compliance with its provisions at \$1,095,000. In the report favoring it from the House Committee the cost was estimated at \$300,000. Subsequently the commissioner accepted the reduced estimate as correct, and sent a letter to Congress endorsing the statement. Congressman Barham was given charge and had secured the promise of Speaker Reed to be recognized, when war matters swept all minor legislation to one side. Congressman De Vries says that the bill prepared by A. H. Ricketts affecting lands already patented to the railroad awaits the endorsement of the California State Miners' Association, but it is

understood that the latter bill will be pushed independently on its merits.

IF a locator has failed to comply with the law as required by the Revised Statutes, he has a remedy if he applies it in time. It is his duty if he desires to be protected, in the absence of any other location in compliance with law having been made upon the premises covered by his location, to relocate by legal subdivisions and record his claim just the same as if no location were ever made of the claim. But if he has failed to do this and others have located over his location, his right to the claim is forfeited and he cannot reclaim it, and to proceed against the junior locator in a court of jurisdiction will avail nothing.

R. T. WARD, manager of the Horsefly G. M. Co., 105 miles north of Ashcroft, in the Cariboo mining district, B. C., says that in three days from one flume they cleaned up over \$5000 and that the ground on bedrock will run from \$3 to \$5 to pan. The company has two hydraulic elevators and two monitors and uses electricity for lighting purposes. Its hydraulic plant complete cost \$102,000; sawmill and other improvements, \$50,000. The company has 380 acres of ground, has forty shafts to bedrock and, Manager Ward says, enough in sight to keep the plant in operation for twenty years. Mr. Ward has been working on this property for the past twenty years.

PROF. SILLIMAN and M. LAUR, a French engineer of mines, have described the ridge between the Middle and South Yuba rivers, Cal., and made some curious estimates of the amount of gold contained therein. Laur estimates that the region under consideration, worked at a rate which would yield \$12,000,000 of gold annually, would be exhausted only after a period of 524 years, which would give as the gold product over six thousand millions of dollars. The moderate estimate of Prof. Silliman gives the area of places where gravel deposits have been worked on this ridge as fifteen square miles, and its probable yield in gold is estimated at \$544,610,000.

THE "Electric Marine Salts Co.," North Lubec, Maine, claim to be producing gold from seawater aggregating \$2000 a week, at an expense of \$300 per week. This beats Dr. Emmons' production of gold from silver. The North Lubec people paid a 3% dividend on 500,000 shares stock July 15th. The company is capitalized at \$10,000,000, par value \$1 per share, said to be selling at \$1.50 per share. The company has a reservoir in into which the seawater flows and a sluiceway "in which are located accumulators which have chemicals which treat the water electrically," and through which the water "passes to waste in the ocean." The whole thing is given columns of serious comment in Eastern papers, and the statements are doubtless believed by people who like that sort of thing.

UNDER act of Congress, communities of Alaska miners can make their own laws. The miners' meetings in Alaska have generally made gulch claims 500 feet long, following the course of the stream and from rim to rim of the channel. The claims on Little Manook creek are 1000 feet long, having been located by men from Circle before the rush began, so that there was ample room for all. On Alder creek the length is 1320 feet—the legal limit. On the creeks which were discovered later the claims are 500 feet long, and in some cases where they had been done they were cut in two. There is no object on the Little Manook in making the claims wider than from rim to rim, for the only pay dirt is in the pay streak, which is well defined, from 20 to 30 feet wide and 1 to 3 feet thick on bedrock, which is 20 to 30 feet below the surface.

"CONCENTRATES" said last week that in a 5-stamp mill, 1, 5, 2, 4, 3 is considered a good arrangement, and gave some reasons therefor. E. B. Preston, who is good authority on that subject, says: "A good splash is one that shows a wave passing along the lower edge of the screen, moving backward and forward from end to end, or a similar wave motion that has its initial point from the center stamp. The succession most frequently adopted in California is 3, 5, 1, 4, 2; 1, 5, 2, 4, 3; 1, 3, 5, 2, 4, and 1, 4, 2, 5, 3; the last spreads the pulp very evenly from end to end. The greatest amount of discharge is obtained, apparently, by dropping the center stamp first; while the most crushing is done, other conditions being equal, by dropping the end ones first. Any arrangement of the stamps will answer, however, that distributes the pulp evenly and discharges it well."

WARNING has been sent out by the U. S. Treasury Department to all persons who contemplate going to the gold regions in Alaska and the Northwest Territory to beware of fraudulent transportation companies. Three cases have been brought to the attention of the department where cleverly worked contracts promised not only to bring the gold seekers into the Klondike, but also to furnish them with the necessary equipments and supplies. In many cases a list of bankers and business men, who were located as a rule in Europe or Mexico, is appended to the prospectus as references. Instead of taking the promised care of the passengers, the wily employees of the transportation companies have carried them up to some northern port and there abandoned them. As a rule, the price charged for transportation and all other accommodations has approximated \$500. It costs less than \$75 to carry passengers to these points.

GENERAL MGR. HUNTLEY's report of the operations of the De Lamar, Idaho, Mining Co. for the year ending March 31st, '98, was read at the London meeting on the 28th ult. Ninety thousand three hundred and five tons of ore, with an average assay value of \$12.26 gold and \$2.16 silver, yielded \$464,523; 30,000 tons sent to smelters yielded \$13,049; the total cost of the year's operations was \$415,701. Of the Pelatin-Clerici process plant Mr. Huntley says: "This 50-ton plant commenced operations June 6th, '97, and ran quite successfully until February 6th, '98, when it was shut down with the rest of the mill machinery. Although its first cost was considerable, it saved much of it, showing a marked decrease in the general milling cost per ton, as will be seen by a comparison of this with former years. It has not been dismantled like the pan mill, in reorganizing the works for leaching, in hopes that it may some time be of service. It was a step in the right direction, but not far enough. The shutting down of this and the pan amalgamation mill was not because of the failure of either, but was due to local costs and conditions at De Lamar and the decreased ore values." The total cost of operation was \$9.53 per dry ton. Another cyanide plant now about completed will, it is expected, reduce the general milling cost nearly \$2 per ton. During the last seven years the mine has paid from 2½ to 25% net annual dividends.

Advanced Methods of Concentration.

An extempore address by J. W. NEILL of Utah, at the Salt Lake Session of the International Mining Congress, July, '98, and specially reported for the MINING AND SCIENTIFIC PRESS.

The ideas I wish to present are perhaps largely personal or based upon observation and some investigation on the subject of concentration, which affects the miner when his high-grade shipping ore has been exhausted and he gets down to the "dumps" to his low-grade ore. As long as he can ship his ore to the smelter direct the subject of concentration does not affect it.

In Utah we are particularly fortunate in that our camps surround our valley at a distance ranging from twenty to forty miles, so that the cost of transportation from the mine to the smelter is small. Our smelting works are equipped with the latest machinery and the charges are always moderate. The question of concentration therefore, has presented itself to us in Utah only within the last few years. I think it has been developed in Utah in a manner which will interest many of you, and I hope that most of you will take advantage of the different excursions to see the mills which are now in operation in Bingham and other places.

By concentration the operation is what might ordinarily be called "ore dressing" as it is generally understood. I intend to include in my remarks on the subject not only the wet concentration of ores, but also that concentration which is known as the matte smelting, which I believe to be as important a branch of art as the wet concentration, and one which has been neglected. Wet concentration is almost entirely based upon the difference in specific gravity between the minerals carrying the metals and the values of waste material the gangue recovered. In other words, we have different earthy materials with their gravity approximating two and a half units of specific gravity; we have galena with seven and a half to eight; we have pyrites of iron and copper with a gravity of four and a half to five; the other metals ranging in between the two. Now, this difference, we will say, of two units or two and a fraction of units of specific gravity and the separation between the earthy materials and the valuable materials can be readily affected by means of concentration. These ores are in the rough. First, by a crushing of the ore, to reduce it to a suitable size so that this difference in specific gravity can be brought to bear; that is to say, if I have a piece of quartz the size of this pitcher and a piece of galena of the size of the glass of water they may actually weigh the same. The specific gravity of those two would therefore be the same. To separate them I must reduce everything so that the particles of the same size are subjected to the same operation, as in that condition the specific gravity can work and we make our separation. I do not intend to go into details on the ordinary concentration methods at all. The general methods of reducing the ore are well known, and then separating it by means of tables of the various kinds, vanners and other machines. Advances in the machinery line have been general. Possibly the most interesting of late and one which has made quite a stir has been the Wilfley table, which is being quite largely introduced. The separation of minerals which are close in their specific gravity, for instance the iron pyrites, zinc, etc., where the difference is only a fraction of a unit is far more difficult. To attain this result in the older works, as in Germany, where labor is very much cheaper, the separation is effected at the start of the operation before the ore is introduced into the machinery at all, and is effected by means of hand sorting. In one of the works which I have in mind, one of the largest concentration works in the world which was erected some fifteen or twenty years ago at a cost of \$1,500,000, they employ from 450 to 500 boys from the ages of eight to fifteen years who sort these minerals from the rock. In other words, the German knows that he cannot by his mechanical means separate these minerals so close to specific gravity; therefore he takes time by the forelock and before the ore is crushed too fine he sorts out the pyrites from the rest of the material and provides a separate treatment by itself. In this country that would be practically impossible.

In Germany, we are taught, or were taught a study there that metallurgy was the science of extracting metals from the ores. In this country we learn by experience that metallurgy must be the science of extracting the money from the ore. The difference between the two is a very important one.

Of all the advances which have been made in the matter of concentrating methods one, that was widely known and advertised about two years ago, I would like call your attention to, and that is the Peck centrifugal concentrator.

Mr. Peck of Chicago developed the idea that by giving the material to be separated a great acceleration the difference in specific gravity being all multiplied by the same figure would be greater, and that by this means the separation could be more readily effected.

He worked upon this for a number of years and spent a great deal of money. I do not think I am

exaggerating when I say that there has been at least \$500,000 spent in development of this process. He changed his first apparatus radically and absolutely from a vertical cylinder to a horizontal cylinder. This process, at the time it was heard from very much, was noised abroad as a curio; for it handled ore and saved 100 per cent and did it for a certain number of cents per ton. These claims have since been abandoned I think. Those of us who have had the privilege of seeing the machine recognized its good points and its shortcomings. As many of you many not have seen it, and as the opportunity will not be given in Utah, I will describe it as merely a horizontal cylinder, larger at one end than the other; the cylinder 12 to 18 feet long and 4 feet in diameter, of hammered steel, turned as true as a watch crystal, is made to revolve in massive bearings with a speed of from 600 to 1000 revolutions a minute. Inside of this cylinder is another of slightly smaller dimensions made of wood, which revolves upon other bearings, revolving inside of the bearings of the main steel cylinder. It is driven by belting and is arranged by delicate machinery to be absolutely under the control of the operator. To this cylinder the pulp of ore is laid on certain pipes controlling their valves and the material from the cylinder is discharged out of the opposite end into other valves and suitably arranged for carrying off the waste material and also the concentrates from the cylinder.

Imagine yourselves, therefore, this cylinder, revolving in that direction and the other cylinder within it revolving in the same direction; the outside one at a speed, we will say of 700 revolutions a minute, and the inside one at a slightly less speed, the pulp fed in from the left side. It is at once taken up by the cylinder and given this enormous velocity; the materials are thrown violently against the perforator of the cylinder, the heavier materials are there held while the violent agitation set up by the slower motion of the inside cylinder washes out and delivers the sands at the other end of the cylinder.

That operation is continued for a few minutes at a time. As the concentrates accumulate in the cylinder against the walls, to which they adhere very compactly, the inside wooden cylinder gradually recedes, the delicate machinery being so adjusted that its rate of recession is exactly in proportion to the amount of concentrates it has accumulated. In this way the space between the wooden cylinder and the outside cylinder remains about from half an inch to three-eighths of an inch. When the charge of concentrates has been collected in the cylinder the ore stream is shut off and the outer cylinder is slowed up. Instead of then running at 700 or 800 revolutions, it has slowed up to 300 or 400. The inside cylinder continues to operate at the same speed and, of course, a contrary motion is set up inside, which at once loosens the particles all over from the sides of the cylinder, and they are discharged in turn into another trough, where they are settled. In this way the operation of the cylinder goes on, first loading, then discharging.

As I saw the machine operating, it was taking from thirteen to twenty-one minutes to load and from five to twelve minutes to discharge it. It was concentrating about seven and one-half to ten tons of slime to one ton of concentrates, and the saving which was being made was told me, and I took some samples from it and an assay was made, which would indicate that a saving of from 60 to 80 per cent was being effected.

The material upon which this machine was working, I must state, had all been so reduced that it would pass a 100-mesh screen, this screen having 10,000 apertures to the square inch. That means that this machine needs for the successful operation a practical pulp. The material is floured to the finest degree; it is absolutely necessary for the operation of the machine that it should be in that condition. It is apparent to those conversant with hard ores that the comminution of a large amount of material to this fineness is a very expensive operation.

That has been the cause of the failure of the machine where it has been applied to the handling of raw crude ores, and I think will always be an obstacle in its application to such ores as a concentrating machine by itself.

The machine has been very successful, however, in the handling of pulps which were suitable to it, such pulps arising from the handling of crude ores by other methods, such as pulp tailings from concentrates and tailings from the old pan amalgamation on the Comstock. On the Comstock one of these mills handled up to 270 tons per day, every cylinder producing concentrates at a rate of about twenty-seven tons, in that manner a saving of over 80 per cent in the values produced from tailings.

This machine, therefore, which was held to be a curio, I do not hesitate to pronounce an advance in methods of concentration when applied to the right place. By that I mean that with this machine from a business basis the mine owner who wishes to concentrate his ores, and who already knows his ores will slime, need not fear to crush those ores to the necessary point of comminution in order to effect separation of pulp and slimes which he will make. Give him a centrifugal concentrator at the end of his mill, and I believe that the separation or concentra-

tion saved will more than counterbalance the cost of the operation. That, of course, is a question of dollars and cents. I would say that the cylinder takes a great deal of power, about 115 H. P., and it handles on sulphiding ores about 1510 tons; and, as I said before, the manner of concentrating ore which is less metallic contain from twenty-five to thirty in one. Many of you who are acquainted with concentrating propositions will realize the possibilities which this machine would give. I would also suggest in this same line that one gentleman here has said that in Mercur there are 500,000,000 tons of \$2 ore exposed. Many of us who have had experience with the Mercur ores are aware that those ores slime very badly; that they are apt to percolate on account of this slime, and that the gold values could not be saved. Might it not be possible to crush these ores with it, take the slime resulting from this wet substance and run them through such a centrifugal concentrator and make a material which would pay to handle with cyanide or some treatment, or possibly by direct shipment to the smelter?

These are some of the thoughts I wish to present in a general line. The ordinary process of wet concentration is, as I have said before, an ore dressing, and the material which is usually produced is sent to some smelting works for further treatment. There are many kinds of ore which are apparently not fitted at all for concentration. The Tintic district of Utah is one of these. The ores from the Eureka Hill, from the Mammoth Sue and the others, to my observation, did not seem to be in the least suited to concentration. Yet, at the present time there are in operation in Tintic three very large mills, one of 100, one of 60 and one of 40 stamps, which are successfully operated to-day upon the ores of Tintic, and not by concentration which we know locally as the combination process and the other. By this method the ore is stamped, passed over to the amalgamator, and the pulp finally passed through the vanners, where a percentage of the value is saved in the shape of concentrates. The pulp is passed from these vanners into the tailing pits, where it is accumulated. From these it is passed on to pans, where it is amalgamated. The values, or as much as possible of the values, saved by raw amalgamation and the tailings are then passed out. The first mill that I know of on this plan was built in 1881. The process was brought more prominently to notice in the working of the Montana Company's mill at the Drum Lummon mine at Marysvale, Montana, and was introduced into this State by Mr. Robinson, who came here from Montana to introduce it. These mills handle from two and a half to three tons to the stamp. They save from about 65 to 80 per cent of the metal values of the ores. Of this amount, taking 80 per cent as the saving, 50 per cent of savings in the pan and on the plates is shipped as bullion—silver bullion in this case. Owing to the nature of the case that bullion is, I fancy, from sixty to seventy fine. The balance of the material is shipped as concentrates, carrying from a few per cent up to 30 per cent of lead, from twenty to sixty ounces silver, and from \$5 to \$15 in gold. This material is bought at good figures by the local smelters and all the smelters of Colorado, and the cost of marketing this product or marketing the bullion in this way is \$1 a ton on the crude ore. The mills are handling their material at a cost of \$2.50 to \$3.50 per ton on the ore, which, with the other dollar added, would make it from \$3.50 to \$4 per ton on the crude ore. They are, I might say, to-day the life of that camp. Without these mills the ore of the value of \$15 per ton would be of no value whatsoever to them, as the cost of milling and freight to the Tintic miners is ordinarily about the same per ton. The revenue which they bring to their companies is undoubtedly sufficient to pay for the extraction of the high-grade ore which goes to market. This is a process which embodies concentration of ore dressing with the actual recovery of silver in bullion values.

I would like to call your attention to another method, another combination of processes, which, while it is not in commercial use as this process is at Tintic, is yet of sufficient interest to you all to deserve a brief mention; and that is the process or method for treating mixed ores carrying iron pyrites, galena, zinc, copper, pyrites, all the sulphides of the metals which are now so valuable to us here in Utah. This character of ore is most common and best known to us in Utah as occurring in Bingham. The ordinary wet concentration of this ore gives us a concentrate carrying, we will say, on an average of 20 per cent of lead, 5 to 15 per cent of zinc, 20 per cent of iron and a few per cent of salina. This material is of course bought by the smelters. If there is any copper contained in the pyrites associated with this galena, that copper enters the concentrates, and the local habits have always heretofore been that both copper and lead are not paid for in the same ore. Therefore, either the copper or the lead is lost, or only one paid for by a very largely reduced price. The method which I am going to describe to you was invented and has been developed by myself quite largely. It consists in taking the ore as it comes from the mine and subjecting it to a roasting or heating process or operation. This roasting or heat-

ing operation, I must say after the ore, of course, has been crushed, as carried out in any of the well known furnaces, is only carried to the stage where the free sulphur and pyrites, either copper or iron, burns with a blue flame and gives sufficient heat to carry on the operation in nearly all the Bingham ores; and when this flame has disappeared and the ore is all a deep dark red color of heat the operation is finished. If the ore is withdrawn from the furnace at this stage and tested, it will be found that in the material which has heretofore been non-magnetic, the iron has become magnetized. It can, therefore, be separated from the other minerals, the galena, the glen and gangue, and this separation is practically complete as far as the mechanical separation has been made by the crusher. This operation, therefore, gives us at the first start iron concentrate of high grade, carrying very little lead and zinc and copper and little saline. The tailings from that operation contain the lead and the glen unchanged, and they are now in an admirable condition to be separated by ordinary methods of wet concentration. The iron is in an admirable condition for further treatment, and the saving in freight and smelting charges on this material is in the most cases sufficient to pay for the operation of roasting. By this method I have handled copper ores turning out tailings which run a trace of silver and gold and less than two-tenths of one per cent copper. I have made separations between glen and iron pyrites by which 47 per cent of iron and glen, 47 per cent zinc, has been turned out with the first operation.

It is needless to call the attention of these gentlemen in the region of this arid West to the advantages which this process would give in districts where water is scarce. The concentrates are given to us in a condensed form and are at once a shipping product. Of course, applied to ores carrying gold and other metals that are contained in the pyrites, the saving is only to that extent; but it leaves the material left behind in an admirable shape for amalgamation or for cyanidation.

These, then, would be steps in concentration, suggested. The concentration by fire, as known to most of us as pyritic smelting, deserves in Utah more attention than it has received. Particularly is this method adapted to the treatment of Tintic ores, which are being treated by the combination process, and many others which are not being treated at all. By this method the ore is treated in many places in the State. It is in use in the Tasmania and 500 tons a day are being treated by it. And in this method concentration can be effected in accordance with the degree of silver contained in the ore at the start.

In other words, in the ores that are heavy in silver the process would be more directly a pyritic smelting. It is needless to point out the advantages of this method. The costs of plant are less than those for the large combination mills, that would handle the same kind of ore by nearly half. The cost of treatment will not exceed those of the combination mill more than a couple of dollars a ton. I think there are many gentlemen present who will undertake to erect mud mills which handle 150 tons and do it at a cost not to exceed \$5 a ton. It figures itself down, therefore, in a proposition of this kind—95 per cent of \$15 as a certain given figure, less \$5 for the smelting; multiply that same number (\$15) by 75 or 80 per cent of values of the mill; take from this cost of the same process, cost of handling and concentration, and it will soon figure itself out which process will give the most money in a case of this kind. There are to-day in Tintic many thousands of tons of low grade ore, \$15 and less, waiting to be carried out and realized on. At the same time, there are awaiting the same treatment in Tintic and in Bingham other thousands and thousands of tons of pyritic ore which would act as fuel and as flux for these same ores. They are waiting for the brains and the dash combined to act upon them. Those of you who go on the excursion to Bingham will see the pyrites there in most extraordinary abundance. Those of you who go to Tintic will be probably informed by those posted in that district that there is a zone in the mountains there from 900 to 1200 feet wide, which will practically carry all the way across ores in value of \$9. Of course, there are places which do not carry it, but that is probably an average, at any rate, of that vast territory; and I venture to say if all this ore were to be handled and added to the large amount of pay ore now handled that the expansion to our Utah industries would be a very pleasurable thing for us all to witness.

I have no notes with me, and I fear I have exhausted your patience and will draw to a close. I am much obliged for your time and attention.

Mr. Christy (Cal.): I would like to ask what the cost is per ton for treating tailings by the Peck process?

Mr. Neill: My own experience of the Peck process is that it can be made at a cost of \$2 to make this thing operative. Of course, the exact cost cannot be ascertained. I would say from what I have heard that the cost was less than \$1. It averaged between, say, 85 and 95 cents under certain conditions.

Mr. Cutting (Nevada): I can say something about the Peck process. In one mill where the Peck process was worked they saved less than 50 per cent. New machinery was put in, and on the tailings

where the Peck process was a failure they are now working tailings with the old pan mill process and also the cyanide process. So we can hardly agree with the gentleman that the Peck process of concentration is a step in advance.

Mr. Esler: I would say that I am from Montana, where they put in a 500-stamp Peck mill, that resulted by experiment in about 100 tons capacity, and it has been so successful that, at first being 100-ton capacity, they are now putting up a mill of 500-ton capacity. It has been a perfect and great success there.

The Minerals Which Accompany Gold and Their Bearings upon the Richness of Ore Deposits.*

NUMBER II.—CONCLUDED.

By T. A. RICKARD, State Geologist Colorado.

To say that mines get richer in depth is, in such a region as West Australia, a cruel cynicism. If anyone is inclined to believe it, let him wander over the desert and count the idle stamp mills which lie rusting in the sweltering sun, and the long succession of abandoned shafts which now serve only to water the passing camel train.

A general hypothesis that the gold in the oxidized ore has been leached out so that it is beneath its normal richness, which will be found unimpaired below the water level, is stated to be evidenced by the removal of the iron pyrites, the cast of the crystals of which now appear as cavities in the quartz. In some of these gold is found, but in others it is absent, proving, so it is said, that the gold has been removed from the cavities which are now empty. The occurrence of films of fine gold, called "paint gold," on the face of fractures is instanced as an illustration of secondary reactions. Finally, the alkaline composition of the waters in the mines is quoted in proof of their solvent power.

Although the chemistry of the oxidized zone is far from being thoroughly understood, yet in its incompleteness it is sufficient to disprove these arguments. When iron pyrites is decomposed the sulphide becomes a sulphate, and this in turn, by further oxidation in the presence of water, is resolved into sulphuric acid and the hydrated oxide of iron. The native sulphur frequently seen in the cavities left by the removal of the cubes of pyrites is not a direct product of decomposition, but is traceable to later secondary reactions in which the organic matter of the surface has served as a reducing agent. The gold intimately mixed with the pyrites, and probably originally deposited with it, remains, because the noble metal is insoluble to the waters which dissolved the iron.

The occurrence of gold in pyrites is now less of a mystery than it used to be. Microscopic examination has disclosed the existence of the gold in the planes of the pyrites, and the leaching of the gold by cyanide solutions without any apparent deformation of the pyrites is no less suggestive. It is, indeed, true that in some of the casts left by the removal of the sulphides gold does not occur, but this is frequently due to the fact that it is very difficult to break a piece of cellular quartz without shaking the gold out of the cavities in which it lies loosely. Hence their emptiness may mean nothing. At other times this may, indeed, be due to the real absence of the gold, and against this observation we then balance another—namely, that the pyrites as we find it unaltered below the water level also varies in its gold contents, so that in the same vein it is sometimes barren and sometimes rich, accounting in this way for the uncertain presence of free gold in the oxidized zone. The "paint gold," frequently noticed in the gossan, appears to be the result of secondary and comparatively recent reactions. It is, however, only a proof of precipitation, and, therefore, presupposes a previous leaching, but not necessarily in the vadose region. It evidences local enrichment rather than impoverishment.

Of the solvent power of surface waters upon the gold there is only supposition, and this supposition must first overcome the fact of the occurrence of such organic matter in the ground approaching the surface as would reduce any known salts of gold should they be in solution. In the Sugarloaf mine, near Kunanalling, I saw the roots of trees at 74 feet, and in the Great Boulder Main Reef mine, at Kalgoorlie, I saw some which had penetrated the rock to 85 feet below the surface. In the former case the oxidation of the enclosing rock ceases at 130 feet, and in the latter at 175 feet. The region is an unusually dry one, which has undergone erosion with extreme slowness; and this is doubtless the reason why roots in search of moisture should penetrate so deeply.

The waters of the mines are all brackish; they are many times more salt than the sea. Analyses made at the Great Boulder Proprietary mine exhibit the following results: Solids, 8.9 per cent, and of this 6.2 per cent was chloride of sodium, 0.45 chloride of magnesia, and 0.73 sulphate of lime. The water

*Condensed from a paper read before the Institution of Mining and Metallurgy.

from the Lane shaft gave the maxima of 11.9 per cent solids, containing 8.8 NaCl, 0.51 MgCl₂, and 1.1 CaSO₄.

Certain results obtained in the treatment of the zinc precipitate in the cyanide works of the Associated mines have led the mill manager, Mr. Grayson, to deduce the solubility of gold in sulphuric acid when tellurium oxide is also present, and thus to offer a chemical theory for the alleged leaching of gold in the surface ores. As it stands this theory is questionable, because the solubility of gold under the conditions stated is not known; but Mr. Richard Pearce, in a recent letter, has drawn my attention to the fact that such solubility would occur when free chlorine is liberated, as would be the case, it may now be pointed out, when sulphuric acids and chlorides are brought together in the presence of tellurium oxide, which would then take the part usually given to the black oxide of manganese. The occurrence, therefore, of waters rich in chlorides, of sulphuric acid derived from decomposing pyrites and of tellurium oxide obtained from the oxidation of tellurides, are all recognizable amid the conditions at Kalgoorlie, and thus afford a theory which, while it has no very strong evidence to commend it, is at least tenable from a chemical standpoint.

In many cases the supposed enrichment in depth can be easily explained. For example, a shaft passes, in course of sinking, from poor into rich ore. The lode, it would appear, has become better in depth. The fact is that the shaft was started off the ore shoot, which has a pitch such as to bring it across the line of the shaft at a certain level.

It would be just as reasonable to argue that the ore occurred in vertical bands because the levels pass in and out of the shoots. In another suggestive instance a vertical shaft was sunk in a very wide lode which is not quite perpendicular. The shaft was started on the hanging wall side, where the ore is now known to be always poor, and in depth it approached the foot wall, where the lode is richest. It was assumed for a time that an enrichment in depth characterized the lode.

The extensive development of the gold field has afforded an explanation of the checkered nature of the early explorations. It has been found that the quartzose lodes are uniformly poor, and that the rich ones have a chloritic and magnesian matrix, which renders them susceptible to easy degradation and erosion. Thus it is easy to understand the current misunderstanding. The first veins worked were naturally those which had outcrops. They outcropped because they carried much quartz, and were harder than the enclosing country. They also happened to be poor; therefore, the first attempts at mining were unprofitable. On the other hand, the rich lode had a composition into which the carbonates of lime and magnesia entered largely, rendering them softer than the rock enclosing them, and, therefore, they suffered erosion at least as rapidly as the surrounding country. The detrital deposits of the surface capped the tops of the rich ore bodies, and it was not until an accidental exploration had pierced the cap of this "cement" that the first of the soft and rich lodes was uncovered. The discovery of the others followed in due course.

The idea of an enrichment in depth was based on the fact that the mines, which were at first unprofitable, became subsequently marvelous ore producers. Careless observation and that wishing which is father to much loose thinking served to bolster up an erroneous idea, and to spread the statement that the ore became richer at the water level. It is a matter which does not affect the reputation of the really good mines so much as that of the forlorn hopes, the poverty of which is excused by a lack of depth, thus leading directly to the spending of much money on the foundation of a fallacy.

From a careful investigation into the matter and the sifting of much evidence I was forced to the conclusion that Kalgoorlie was no *lucus à natura*, and that where rare enrichments occurred in the sinking of a shaft the fact could be traced to the structural relations of the ore deposits. I regret the conclusion. It would have encouraged those in other regions had there at last been found a district where Nature had placed the best ore where man could with most difficulty reach it, and, apart from its economic aspects, the occurrence would have been one of transcendent scientific interest.

Thus the tellurides, like rhodochrosite, tourmaline, zinc blende, pyrites, and a host of other supposed indicative minerals, must be discarded as helps no better than the will-o'-the-wisp, which leads the wanderer into a morass worse than the darkness itself. Better no guide at all than a false one.

But those who invest in mines may ask whether I would deny that there are men of such ability and experience that they can come to safe conclusions as to the prospective value of a mine from the character of the ore. To this I would answer that I know of no such short cuts to the valuation of mines. A moil and a four-pound hammer are of more use than a book full of sounding theories; a careful sampling of the workings is of more immediate utility than a treatise on mineralogy. Successful mining must be based on facts; all the rhetoric and fond imagining in the world cannot alter them. It is the province of the mining engineer to determine the facts, to

get alongside them, as Huxley would say, and when a theory comes floating by leave it, as Joseph left his coat in the hands of the harlot, and flee. Experience has proved that indicative minerals are delusive; so let them go. But the mineral contents of an ore, though they have no bearing on the mining, decide its metallurgical treatment, and, therefore, need careful examination. The importance of the character of the ore from this point of view is too often overlooked by those enthusiastic mineralogists who permit themselves to make the most sweeping deductions on matters of much greater uncertainty.

Careful sampling is worth a bushel of suppositions, and the painstaking determination of the working costs is better than any amount of geological generalization. Mining is not a scientific pursuit, although at times it may to the observant have seemed to be either that or one big insanity. But mining is an industry. The good sense which financial men have of late years contributed to its operations has done much to bring it from a windy mistiness to the solid footing of a sound business. The main purpose is not to develop the waste places of the earth, nor to spoil the scenery of the mountainous ones, but simply to win a profit by extracting ores out of the ground. It is a plain matter of profit and loss. On the one side is the value of the gold in the ore, and on the other is the cost of the processes needed to obtain it. To arrive at the former there is only one way—namely, to sample the workings systematically. The result will be reliable in proportion to the care taken. Any shirking of difficult places in the mine, any avoidance of hard portions of the vein, any assistance from untrustworthy hands, will vitiate the result. Against this must be placed the cost of operation. Here it is that experience is needed. The sampling is largely mechanical, like assaying, and requires patience and care more than anything else. In the estimate of the costs there have to be included many items of expenditure, such as the breaking of the ore, the development work, the equipment, the milling, the management; and to arrive at these the previous actual charge of mines is the only proper preparation. Then comes the question of the quantity of ore available, or likely to become available, by further exploration. This is the *pons asinorum* of mining. That which some describe as ore in sight is often really ore out of sight. The over sanguine estimation of ore reserves has ruined more enterprises than all the bad management and over capitalization of which complaints are daily made. It is ever a difficult matter and requires cool judgment, wide experience, and a careful investigation into the circumstances and structure of each particular mine.

When the value and tonnage of the ore available have been arrived at, and when working costs have been determined, then the engineer has nine-tenths of the evidence needed to submit to the client whom he is advising. The other data which will influence an opinion are more uncertain in their character. The geological considerations may affect the cost of mining, and the mineralogical the expense of milling. As such they must not be overlooked, but the padding of a report with a large amount of geological disquisition, where it is not immediately *ad rem*, is very nearly an impertinence, seeing that it is not expected that it will be understood by the person or persons for whose guidance the report is written.

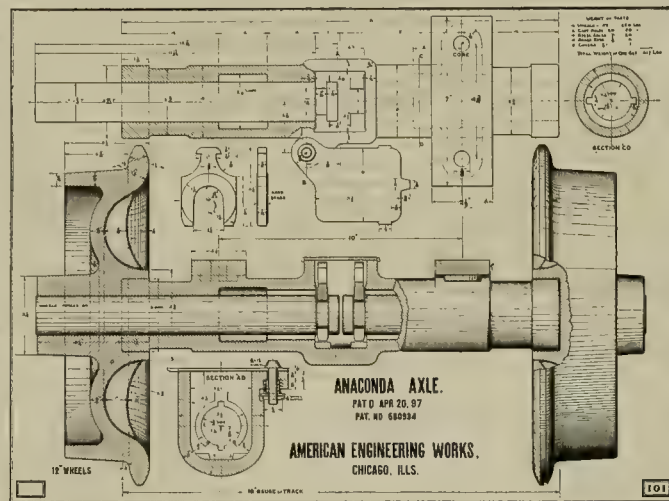
In concluding this contribution I would express the hope that it may lead to a useful discussion. If there be any technical men who seriously entertain the idea of an enrichment in depth due to the leaching of gold in the oxidized ores, then it would be of much service to the industry if they would frame a defence and an explanation of views which daily experience must otherwise condemn as nonsense. Nor in denouncing one generalization would I make the equally grave mistake of advocating its opposite—namely, that all mines must necessarily become poorer in depth. There may be causes, founded on geological structure, why a change in the value of the ore in a vein may take place in any direction, upward or downward, in dip or strike, and it is an undoubted fact that there have been instances where an increase in depth has led to the discovery of richer ore. Bendigo is a telling illustration. The gold-bearing quartz occurs along the anticlinal axes of sedimentary rocks. In sinking a succession of saddle formations is penetrated. No single one of these has any notable vertical extent, yet the series as a whole is wonderfully persistent. This explains why the last resort of a perplexed mine manager is to advise the sinking of the main shaft. At Bendigo the advice is well founded, but when the managers from this district go to West Australia and recommend deeper exploration every time they encounter poor ore, they do so without regard to the total unlikelihood of the conditions. Again, it cannot be denied that in certain regions alterations of comparative richness and poverty appear to coincide with the penetration of the workings through successive zones of rock. The Gympie district is a case in point. There the veins cut through a series of shales, limestones, conglomerates and sandstones amid which there are several beds of black slate. The gold occurs in paying quantity only when the veins are traversing the slates. Every district deserves a study unbiased by the record of its neighbors; each

mine must be taken on its merits and inspected without predudice. It is, however, one thing to examine a mine with the assumption that gold veins in general become enriched in depth, and it is quite another thing to recognize that while it may occur in a particular case, it is an expectation which experience does not justify.

In closing, let me state again the problem which I set out to discuss, namely—Whether the occurrence in the ore of certain minerals can be trustworthy evidence in arriving at the prospective value of a lode only incompletely developed and in a new country. Please note that it is of a young mine rather a mere outcrop that I speak, and that I deal with a new region and one in which the experience of many mines has tested the value of such evidence. Nor do I refer to the enclosing rock, but to the minerals in the ore itself, for to me the character, and especially that structure of the rocky encasement of a vein, has a bearing many times more important than any mineralization.

The Anaconda Self-Oiling Axle.

The Anaconda self-oiling car axle, patented April 20, 1897, for mining cars and narrow-gauge cars for contractors, furnace and industrial use, is made in halves, both wheels being pressed on. A cast-iron sleeve serves as a support for the axle and as an oil reservoir. This sleeve is bored to fit the axle. The center part, for two-thirds of the length of the sleeve, is counter-bored to provide ample oil space. The sleeve enters about 1½ inches into the hub of each wheel, with a sufficiently close fit to prevent the loss of oil. The object in having the axle divided in the center is mainly to allow for variations of travel in passing around curves, also to be able to press the wheels separately on each half-axle: 1½-inch cold rolled steel is used for the axles, being slightly tapered at one end before the wheels are pressed on; the other end of the half-axle is provided



with a groove, into which is placed a small fork-shaped brass casting straddling the axle and serving to hold same in position. At the center the sleeve is enlarged and provided with an opening of sufficient size to let the two forks drop in. A pressed wrought steel cover is hinged over this opening, serving to retain the forks in position and to keep out dust and dirt. This cover can be readily slipped to one side to permit oiling, or, when it may be necessary, to take out the forks and remove the wheels and axles. Each sleeve is provided with two lugs for attaching either wooden or iron car bodies. All parts are made to exact gauges, and are interchangeable. Oiling is necessary once in three or four weeks, and no other attention is required.

Over 5000 cars equipped with these axles are being used by the Anaconda Copper Mining Co. in Montana. They are also in use at other mines in the western States. Axles are made to suit 18 inch, 20-inch, or 24-inch gauges. Wheels of any type and either 10-inch or 12-inch in diameter can be supplied. The wheel usually furnished is 12-inch in diameter with chilled tread, of form as shown in cut, by the American Engineering Works, 204 Dearborn St., Chicago, Ill., who keep a number on hand for immediate shipment, and also keep all necessary parts for repairs.

A set, consisting of four wheels with axles, sleeves, etc., complete, for 18-inch gauge with 12-inch wheels, as shown in cut, weighs about 320 pounds.

ONE PER CENT of aluminum in brass is very extensively used for electrical purposes, as it gives a brass casting free from pinholes, and of greater strength than can be secured otherwise from the same grade of brass. It follows, therefore, that by the use of a small percentage of aluminum in brass a cheaper grade can be used to do the same work than would otherwise be possible. In cases where maximum results are desired, care must be taken that only pure metals are used. Much of the copper and zinc commonly used contain considerable amounts of impuri-

ties, and the nature of some of these absolutely prevents the production of good alloys with aluminum. In all cases an analysis of the metal supplied should be demanded, and for aluminum alloys, to exclude all containing more than one-fourth per cent of iron, arsenic or antimony, or more than two-hundredths of per cent of bismuth.

Gas Engine Experiments.

The explosion of the gas in the cylinder of a gas engine produces great heat, part of which is employed in expanding the products of combustion and making them move the piston. P. Pinckney has conceived the idea of combining a steam and a gas cylinder tandem fashion and making the water jacket of the gas cylinder serve as a boiler to supply steam to the steam cylinder. To do this he makes the piston of the gas cylinder double, with a water space between. This communicates with the jacket, but the stroke of the gas cylinder is so arranged that the jacket never comes into communication with the gas space of the cylinder. The object of the water piston is to make use of a larger part of the heating surface of the cylinder than is reached by the jacket alone. A proper feed has to be arranged to maintain the requisite quantity of water in the jacket as portions of it become converted into steam.

The noise and odor of gas and petroleum engines have, it is reported, been considerably suppressed by M. Chevalet, who places inside of or on the top of the cast-iron chamber in which the products of the explosion are generally received a few scrubber rings, such as are used in gasworks. A considerable diminution of the noise was effected by a scrubber 40 cm. (15½ inches) diameter placed over a 3½ H. P. petroleum engine and also upon a 1 H. P. gas engine.

COMPOUND pipe, consisting of a cast-iron tube bound with wire, invented by M. R. Jacquemart of Meurthe-et-Moselle, is being used for a water main in the Oise valley, France. It is stated that this system permits the use of pipes 6 feet 7 inches in diameter, with a thickness of only ¼ of an inch for tolerably high pressures, 13-foot lengths of this diameter weighing only four and one-half tons. They are cast with five rings or bands, 8 inches wide and ½ inch thick, for keeping the wire winding in place, which is effected with steel wire ¼ inch in diameter, annealed and galvanized, there being a layer of asphalt between the wire and the cast iron. As soon as the pipe is taken out of its mold it is put into a lathe, and one end of the steel wire is fixed in the cast iron. By revolving the pipe on its axis it is wound with wire at the desired tension, generally about eight tons per square inch. A pipe 2 feet 4 inches in diameter and ½ inch thick, doubly wound with ¼ inch wire under a tension of five tons per square inch, on being tested only showed signs of giving way under a pressure of 485 pounds per square inch, while it burst at 529 pounds per square inch.

THE Society for the Encouragement of National Industry, Paris, offers the following prizes, to be awarded during 1899: First prize of 3000 francs (\$600) in connection with the manufacture of permanent magnets. Research may be directed to the composition of the steel for the magnets and such materials other than iron which may enter into it, or to the degrees of temperature for the liquids used for tempering, and the processes of annealing and other necessary accessory operations which are likely to obtain this result. Second prize, 2000 francs (\$400), for an incandescent electric light which must not exceed a maximum of two candle power (decimal system). Third prize, 2000 francs (\$400), for any set of electrical appliances or tools suited to the requirements of domestic life and to small trade.

THE Westinghouse Electric & Manufacturing Company, of Pittsburgh, Pa., has established a regular training school for its apprentices. It was planned by Philip Lange, superintendent, and there is a long list of applicants waiting to enter. Apprentices are taken on a three months' probation, being paid 5 cents an hour; if satisfactory they are promoted and paid 8 cents an hour. Apprentices more than 21 years of age receive 10 cents, and serve three years, while those younger serve four years. Wages are advanced each year, and at the expiration of the term of service, each is paid \$100 additional. Engineering, draughting, mechanics and electricity are taught while the student is being paid.

Said of the "Mining and Scientific Press."

A journal that thousands esteem of sufficient value to annually pay the subscription price therefor may be safely regarded as an "A 1" medium for advertisers.—Carriage Monthly, Philadelphia.

Gold in Ancient California River Channels.

The resignation of Felix Chappellet as manager of the Mayflower mine recalls the richness of that section of California, the success he attained in locating and working that portion of the ancient river channel known as "The Mayflower," on the Forest Hill Divide, Placer Co., Cal., and, incidentally, the unique character of that form of mining and the great richness of that section.

Ross E. Browne has given an intelligent technical account of that region, a section that gives good example of a class of gold mining peculiar to California.

The extensive workings on the Forest Hill Divide have developed a good idea of the prehistoric geological formation, and besides yielding about \$30,000,000, have aided in solving some of the problems that present themselves in handling similar propositions elsewhere.

The Forest Hill Divide is a ridge on

ancient river or rivers, and that it was valley-like in places, being some miles in width and 1000 feet in depth in the deepest place. It was no small stream that found its way through this depression; the gravel deposits show a width of 1000 feet in places. How long the river flowed on without obstruction is unknown, but at some time there came a volcanic eruption followed by a flow of volcanic matter in the form of a semi-fluid, or mud, from the craters on the summit of the Sierras. The flow naturally occupied the watercourses, solidifying and sealing up the river channel as it was deposited from the flow down the trough. This flow filled up the valley or trough to a depth varying from 100 to 180 feet, as shown by the excavations in the mines opened. This volcanic matter is called cement, and in places is firm as artificial concrete. Some good samples of this cement were shown in the Placer Co. exhibit in the Golden Jubilee Mining Fair in San Francisco in February, '98.

The river channels were changed by this volcanic deposit, but still followed

ing new channels which in the ages that have elapsed have cut deeper by hundreds of feet than their predecessors, forming the deep canyons and gulches of the forks of the American river and tributaries.

There is but little doubt that the modern courses are in some places occupying the sites of the ancient channels, cutting through and down deeper into the bedrock, leaving cross-sections of the old river bed in plain sight upon the canyon sides where the new river had come into the old bed and cut it off or left it with the same effect. So the modern streams have assisted in the fragmentary condition of the ancient channels under the lava cap.

Ross E. Browne says that from the frequent displacement of the streams during the second period, there have arisen various complications in the channel systems. Although the mining developments are extensive in portions of the district, it still remains a difficult matter to separate the channel systems of the second period, and it is not always easy to distinguish between those of the first and second periods. In a general way, it may be said that the channels of the second period differ from those of the first as follows: Their beds are narrower, rims steeper, and accumulations of bedrock gravel incomparably smaller. Regarding the gravels in the deeper channel bottoms, and their immediate volcanic cappings, it may be said that the characteristic channel deposit of the first period consists of a large body of gravel of exclusively bedrock material, and a light cement capping; the characteristic channel deposits of the second period, either of a small body of bedrock gravel and a heavier cement capping, or of a large body of volcanic gravel and a heavy volcanic conglomerate and cement capping.

Where one deep channel cuts across the deposit of another, the channel which does the cutting belongs, as a rule, to the second period. The channel which has been cut may belong to either period. There occurs occasionally very large accumulations of bedrock gravel between the deposits of volcanic cement, which are evidently

described. On the contrary, the presumption is against it. Had the second period been closed by a broad, flat-topped lava mantle, completely covering the earlier divides, one should expect to find the modern channel, independent of the cement channel in its course, occasionally cutting and occasionally avoiding the same without a very definite guidance and leaving as much of the old lava-capped divide as of the cement channel to form the present ridge. Such, however, is not the case on the Forest Hill divide. The prospecting shafts and tunnels have invariably developed the existence of a trough-like depression under the volcanic cap. The ridge for twenty-six miles shows under the cap a practically continuous depression in the bedrock surface. There is good reason for regarding this as the main cement channel of the district. It is difficult to establish satisfactorily the cause which led the modern river to avoid the older cement channel to so marked an extent. In picturing the periods it has been assumed that the old river bed, or rather the valley, was filled with volcanic material to a level high up on its widespread rims, but not to actual overflowing; that the thick volcanic mud formed a more compact conglomerate of the heavier debris in the central line of flow, and a lighter and more sandy cement toward the shore lines; and that these conditions tended to divert the streams toward the marginal lines of the deposit. The streams would necessarily cut across the deposit at the juncture of the volcanic-capped tributaries.

The gravel deposits of the old river beds contain the gold, and these places are still the scenes of active mining operations. The deposits are commonly referred to as "channels," and the channels bear the name of the respective mines, although in some cases the channels contain the deposits of one and the same water course and are the same ancient river bed.

The gold in the gravel originally came from the quartz ledges in the bedrock, traversed by the old rivers and tributaries. Throughout the entire bedrock occur seams and ledges of

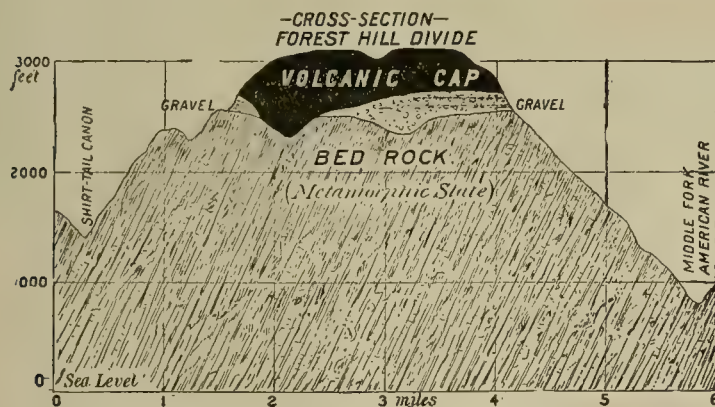


the western slope of the Sierras, twenty-seven miles long. Along its north side flows the north fork of the American river, the middle fork flows in the canyon forming the boundary of the south side of the Divide. It is thought that the present bed of the north fork is 3000 feet lower and the middle fork 2500 feet lower than when these streams first started to flow down through their present courses.

In the course of years extensive mining carried on in the gravel deposits of the Divide goes to show that what now

the same general direction to the basin of what is now the Sacramento, as the watercourses were still confined by the rim or walls of the trough or valley.

It is reasoned from the large quantity of gravel and sand deposited over the volcanic cement that a great period of time passed before the next great lava flow capping the channels of the second period occurred, but it is evident that several minor flows happened in the interim which diverted the watercourses and mixed with the river deposits masses of volcanic matter. The



is a ridge was just the reverse in the topography of the country before the period of volcanic eruptions covering the country with a cap of lava. The ridge contained the channel of a river bed; it was the trough of Nature's drainage system of that section for that period, and where the present river beds are the country was higher than the ancient channel bed. The formation underlying all the surface deposits, the base or bedrock of the country, is metamorphic rock which vary in character. Active mining has been carried on there for forty-five years and by the hydraulicking of banks from 50 to 200 feet high, and by the driving of miles of tunnels and the excavation of tens of thousands of yards of gravel, miles of the bedrock thus exposed give insight into the changes that have taken place on the surface of the bedrock during part of the present geological epoch.

It seems that the trough above described was the watercourse of an

frequent displacements of the streams is shown by the fragments of channels found on this level. The rivers of this age at times and places cut down through the cement cap of the first period to the bedrock, obliterating the deposits and evidences of the original channel by following its course for a distance or cutting directly across it in other places. The deposits here described are known as the upper lead.

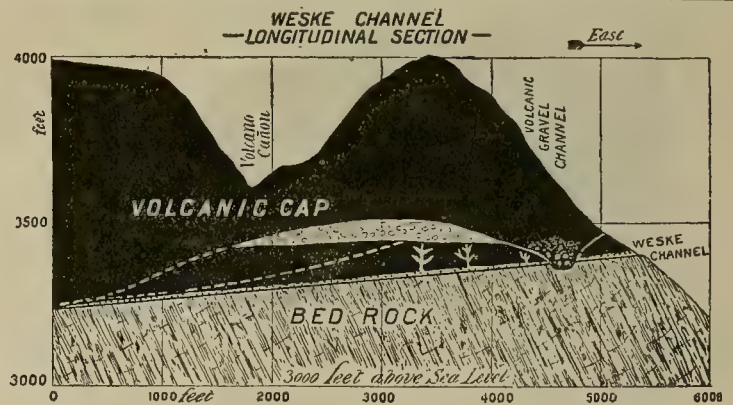
Following the second period came the volcanic eruptions with great flow of masses of lava or cement, which filled the trough or valley, making a cap over the bedrock at the upper portion of the Divide 1000 feet deep and 300 feet at the lower end.

Then followed the final work of Nature in creating the topography of the Forest Hill Divide. The trough was filled higher than the bordering country and the streams started new courses along the edges of the cap, along the line of least resistance, erod-

ing new channels which in the ages that have elapsed have cut deeper by hundreds of feet than their predecessors, forming the deep canyons and gulches of the forks of the American river and tributaries.

The section given in the cut of "Weske channel, longitudinal section," shows an interesting occurrence. The cement filling the bed to a depth of 100 feet is a more uniformly fine-grained sediment than is commonly encountered. It encloses a number of oak and cedar trees standing on the banks of the channel, with the roots intact in the gravelly soil and bedrock. One of these is a cedar nearly 100 feet in height and 4 feet in diameter at the base and stands perfectly upright, and, considering its age, is in a surprising state of preservation. These standing trees show also that the first flow of the cement was not torrential, though moving with a certain velocity. The existence of a current and its direction are plainly indicated by the structure of the deposit immediately surrounding the trunks of the trees. In certain districts in the State the ancient channel system, together with its dividing ridges, was completely covered by a broad lava-cap or mantle prior to the starting of the modern channel system.

There appears no definite indication of such a mantle in the district herein



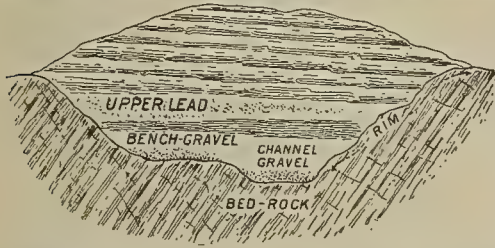
gold-bearing quartz; and where belts of soft laminated slates appear, there is found a greater quantity of the gold-yielding silicates. All of the gold found is in the form of nuggets or scale and shows the effect of abrasion or hard usage in contact with the gravel in its journey down the rapid streams to the place of its final resting. In uncovering the bedrock in removing the gravel deposits, some very large ledges have been found, but none so far as known have proven very rich.

It is assumed that the ledges were richer nearer the original surface and that in ages past they have been worked down perhaps for several hundred feet by the erosive action of the elements.

As a rule, the richest pay is found in with the bedrock, although in some of the mines pay is found in the gravel for the entire depth of the deposit. Scales of gold become embedded in the seams of bedrock, and especially where occurs the softer laminated slates it generally pays to remove the surface of the bedrock for several inches.

It is a common idea that the gold will be found in greatest quantities in the deepest holes or depressions of the river beds, but the experience of the

miners in these ancient channels is to the contrary. The richest dirt is found in the channel on the brow of the lower side of a hole or depression. Mr. Ross Browne, who has given this matter study, says that the effect of the swiftness of the current upon the pay is important. An underloaded current, i. e., a current charged with less detritus than it is well able to carry, is apt to cut its bed and prevent the accumulation of gravel. A greatly overloaded current will deposit



too rapidly to admit of the concentration of gold dust. It is apparent, therefore, that a suitable relation between the velocity of the current and the amount of material carried is an important factor in forming a streak of pay gravel. If such a relation exists, and is undisturbed for a considerable period of time, and the material passing over the riffled bed carries sufficient gold, a rich body of pay gravel may be formed. An increase of grade, or narrowing of the channel, will cause an increase of velocity, and the same stream may be underloaded in a narrow, steep section and overloaded in a broad, flat section. Furthermore, a stream may be underloaded in the center of the channel and overloaded on the rims, or it may be underloaded on the outer rim of a curve and overloaded on the inner rim. Other conditions being the same, when the average grade of the channel is very great, one should expect to find the pay in the broad, flat sections, on the rims and high up on the inner rim of the bend;

deep lead, or the channel system of the first period. His discovery gave new life to the mining industry there, proving that, instead of the mines having been exhausted, many of them would yet supply the world with millions of dollars of gold and hundreds of men with years of employment.

It was first attempted to mine the deep channels by shafts through the volcanic cap, but large quantities of water were encountered in every case, and the cost of pumping entailed such heavy expense that this method was abandoned, and long, deep drain tunnels are driven in through the bedrock to points underneath the trough or channel bottoms, upraises at intervals, and the gravel breasted out is dumped through these openings into cars holding about one ton each. The loaded cars are taken out of the mines in trains of a dozen to twenty-five cars, hauled by

a mule to the mills, if the gravel is of the kind to be crushed, or to the sluice boxes, if the free or loose kind that only needed washing. Some of these drain tunnels are very long and cost thousands of dollars and many months of tedious work before the pay was reached. The cost of running such a tunnel used to be about \$25 per linear foot, and when mine owners were compelled to run a mile of this kind of work they had to expend a fortune in dead work. The work can be done now at very much less expense. That these tunnels should be successful it was necessary that they should be below the grade of the channel bottom, and to thus properly locate the tunnel the best of judgment and engineering talent was required. Especially is this true of the first few tunnels located. The depth of the volcanic caps could be easily ascertained by sinking a shaft through it to the bedrock, and by drifting thence the locality of the channel could also be definitely established; but to find its grade or fall was a more difficult mat-

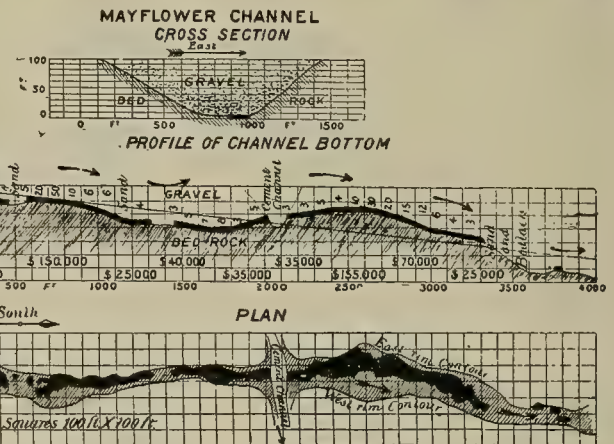
by means of his shaft, he must allow for a fall or pitch about 18 or 20 feet in that distance. When contemplating the anxiety of the mine owner who first staked an investment of \$150,000 and months of hard work on the correctness of this theory, one can imagine the exultation and gratification experienced when the completion of the work demonstrated the correctness of the calculation.

Twice in this article the fact has been referred to that Mr. F. Chappellet had done much to clear up uncertainty and aid in practicable and profitable getting of gold from those ancient river channels, or as it is called in California, "drift mining." How this was done will next be taken up.

What is called the "Paragon channel" was discovered at a point on the north side of Volcano canyon, in 1853, and after some of the embankment was cut away by hydraulicking in later years a complete cross-section of the main channel of the first period was then exposed. The channel from this point bears a northerly course for a

territory. There are about two miles of the deep channel within the claim, the larger part of which has been mined out. The company still has a large amount of gravel to handle in the upper leads and also several hundred acres of rich ground to work by the hydraulicking process.

The mine was first known as "a hydraulic proposition," and was worked by that system until the Debris decision compelled the owners to shut down. It was then that Mr. Chappellet decided to sink down through the cement forming the bottom of his hydraulic pit in search of the channel which he felt certain was there. The hard cement had been generally accepted as the bedrock by many miners, and there were few to agree with his theory. He had reasoned out that the slate was the formation of the earlier geological period, and, therefore, the real bedrock of the country; and that the rims of this rock, exposed on the sides of the ridge, pitched to the center, plainly showing a trough or depression, and that the cement was clearly a formation of comparatively recent age,



mile, then turns sharply to the west southerly, making almost a complete horseshoe. The gravel is cemented together, it is assumed, by the percolation of silicious waters. It is of blue and gray color. About 25 per cent of the gravel is large boulders, which are left in the mine, filling up spaces breasted out. The average width of the pay gravel extracted is 50 feet. The entire length of the channel within the limits of the claim has been worked for a distance of about 7000 feet, and connection is made with the workings of the adjoining claim, the Mayflower, into the territory of which latter company the channel continues, though it is there known as the Mayflower channel; thence into the ground of the Excelsior, Dardenelles and some minor claims, and there known by the titles of those mines, although it is one and the same ancient river bed. The gravel from the channel was so strongly cemented that it had to be put through a stamp mill, and had to be drilled and blasted out of the mine.

The Mayflower mine, which has the continuation of the deep channel as above described, was opened by Mr. Chappellet as part owner and superintendent. In the character of the gravel of the two channels, the method

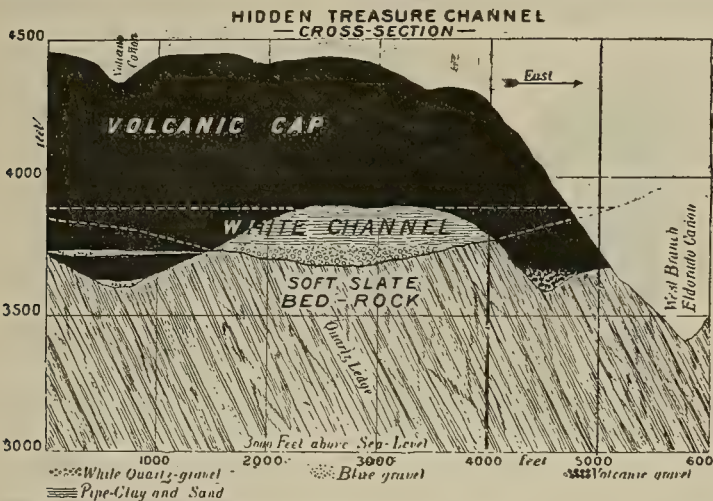
and, consequently, there must be a channel underlying it.

Firm in this opinion and regardless of any adverse comment, he commenced sinking his shaft, and, after going down 200 feet, struck the slate or bedrock, but had not penetrated the cement. Finding the bedrock pitching sharply to what he thought was the center of the ridge, he concluded he had not reached the bottom, so started a drift east; and, after running 100 feet, struck down a winze 22 feet to bedrock, which he still found pitching to the center of the ridge. He ran another drift 50 feet and sank another winze 90 feet and 100 feet in and 14 feet down, thus feeling his way until success crowned his efforts and the Mayflower channel was discovered. It was a great triumph for Mr. Chappellet.

The gravel proved to be rich. A mill was erected near the mouth of the shaft and it was attempted to work the mine through the shaft, but the flow of water was too strong to be successfully handled. The man who had found the channel was not to be balked, for then it was he conceived the idea of running a tunnel from a point some two miles down the canyon, so as to tap the channel and drain it. He also planned to work the mine through the tunnel, thus avoiding the expense of hoisting works.

From the entrance of the tunnel to the point where the channel was reached by the best location that could be made the distance was 5585 feet—over one mile—driven through hard slate for the entire distance. The cost of the tunnel was about \$150,000. It took one year and a half to complete it.

The completion of the tunnel and the tapping of the channel were another great victory for the superintendent, for he had now twice demonstrated the correctness of his theory, as well as the existence of the ancient channel with its valuable gold deposits.

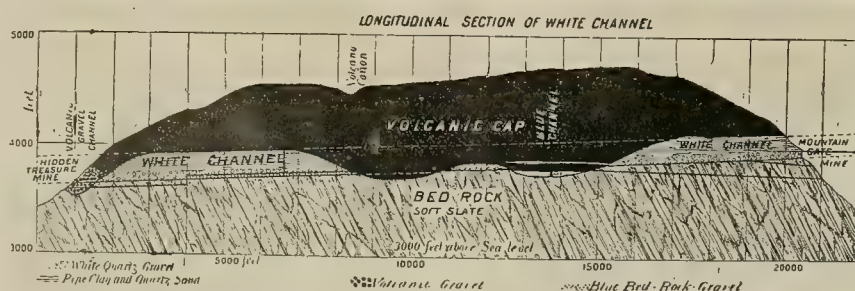


when the average grade is very small, rich gravel will be more likely to occur in the sections where the current is relatively swift. In the Forest Hill district, where the average grades range from 60 to 80 feet to the mile, the general experience in working the bottom leads seems to be about as follows:

In the larger channels of the first period the best pay is found on the brow of the steeper pitches on the down-stream course and on the inner rims of the bed. The pay generally favors one rim for long stretches. Near and at the foot of steep pitches, and in very narrow sections, there occur potholes and the deposit is barren, consisting of round boulders and sand. In the channels of the second period there is a scarcity of gravel in the narrower sections, hence the broad, flat sections are preferred, even though the gravel may not be so rich.

Felix Chappellet of the Mayflower is believed to have been the first to make the first complete development of the

ter. At that time it was not definitely known whether the pitch was east or west. The grade of the caps and the grade of the rims, however, indicated to the observing miner that the bottom



of the trough had a corresponding pitch to the west, and that if he wanted to have his tunnel reach a point under the bottom of the channel, say, 1000 feet west of where he had found the bottom

of mining and milling and the yield of gold, the Mayflower does not materially differ from the Paragon, except that the mine was operated on a larger scale and the company owned more

Mining Summary.

CALIFORNIA.

Amador.

Republican: The mines of this county that depend upon water for power are being supplied regularly, and the prospects are fair for a continuation of the supply.—The Good Hope mill is crushing rock for Sullivan & Co. The ore comes from a claim near the Monte-richard mine, near Jackson.—The Zella is closed down for repairs and sinking.—Adams & Folger will develop the Fleming claim near the Zella.—The mill at the Kennedy mine has been put in order and work at the mine continues with a full force.—The Amelia is down about 675 feet.—At the Argonaut mine work is going on satisfactorily.—Hard rock has been blocking rapid sinking at the Anita mine for some weeks.—A good quality of rock is coming out of the Oneida mine and hauled to the Zella mill.

Ledger: The Emerson shaft at the Wildman-Mahoney mine is being pushed. The property is to be equipped with a compressor and power drills.—The south shaft at the Kennedy mine is being operated by steam, but will soon change to water power.—At the Amador Queen No. 1 the shaft is being repaired.—At the Bailoi mine, Sutter Creek, Supt. Porter is crosscutting at the 200 level in the new shaft.

Butte.

The Best mine, near Magalia, is running regularly.—The John Dix mine is running steadily and twenty men are employed.

The Feather River Exploration Co., operating near Oroville, owns a large tract of land on the west bank of the Feather. The dredger built last winter is working steadily and the company talks of building two more in the near future. The machine was floated in the river, and after working out a bar, has now attacked the mainland, the intention being to cut into the land, leaving a channel for the water to follow. On fourteen acres adjoining this company's land Corwin & Daniel-witz are working by bucket and cable. Mr. Cartwright, who owns thirty-five acres of land, also on the west bank of the river, is in communication with San Francisco with a view to having a dredger built to work his land. Adjacent to Oroville the Con. G. M. of California, Ltd., owns 120 acres of land and intends to build a dredger. Considerable prospecting has been done on this property. Ditzler & Faris are washing considerable dirt, their aim being to erect a dredger in case they find it will pay.

At Nimshaw the Ethel mine has temporarily closed down.—At the Boulder a crew is working, and on the Matheson claim a full force continues.—The Butte Queen near Chapparral continues work.

Feather river near Oroville is so low that parts of its bed are dry and a number of Chinamen are at work with rockers cleaning out crevices and washing the gravel deposited therein.

Calaveras.

(Special Correspondence).—The San Justo mine, at Carson Hill, is an illustration of successful work by good management in working low grade ores. This property was owned by Remington and associates of New York, who expended \$340,000 upon it, built a 40-stamp mill, chlorination works, fifteen-drill compressor and five houses. They operated two years, but the management was too high-grade for the low-grade ore. The mine was shut down and the shaft filled with water. Last December Dr. Flint, C. A. Hamilton and Senator Flint bought the property, unwatered it, and retimbered the shaft to the 700 level. They have milled ore from the 200 and 300 levels, and are opening a level at 600 and 700 feet. The ore mills from \$3.50 to \$4 a ton. The sulphurets run 5 per cent on the 600 level and yield about \$80 a ton. On the 700 level a mill run on 100 tons yielded \$14 a ton. The ore bodies are from 30 to 80 feet wide. The stamps used weigh 850 pounds. The water power plant is the property of the company. The ore is mined and milled for \$1.30 per ton. The company has installed a system of thorough discipline and business economy, and they hope, by careful management and practical knowledge of treating low grade ores, to make this a profitable property.

Angels, July 25th, '98.

The Violet mine at Licking Fork is being worked by Goodman, Barnhart and Balsley, and showing good prospects. They have a pay chute which averages 2½ feet in width, which yields about \$60 to the ton in free gold, and have a 3-stamp mill nearly completed for reducing the rock.—The shaft of the Machavella mine at North Branch has been unwatered and a ledge 12 feet in width has been found.

After four years of quietness the first work towards reopening the Sheep Ranch mine, at Sheep Ranch, commenced on the 7th inst., W. H. Clary Jr. Supt. There will be employment for a small force, only for some time. New hoisting works and mill will be built, it will be eight months before water can be pumped out of the mine and the shaft retimbered. The company intends to build an electric plant on the San Antonio creek near town to run the mill, pumps and air compressors.

Del Norte.

J. P. Crawford & Co. are extensively working gold-bearing sands in Smith River valley, near Crescent.

El Dorado.

(Special Correspondence).—Near El Dorado Clark & Richards have begun work on the Hill Ranch, adjoining the Pocahontas mine, and are taking out a good class of ore.

Hayward & Poundstone have secured a lease on the Bonaset mine in Jayhawk district. There has been considerable development work done on this property. It is said

that the new company will begin operations without delay.

The Pine Hill G. & S. M. Co. near Rescue, who have done a great deal of underground work and ceased, pending some domestic adjustments, are about to resume work. The property belongs to South San Francisco capitalists.

The West Side mine at Grizzly Flat has an 800-foot tunnel at 250 feet depth. The company has 200 tons of ore cut out, upon which their 10-stamp mill will start in a week.

Placerville, July 25th, '98.

The Lucky Marion mine near Greenwood is being unwatered and development work will be crowded.

The Sutherland gravel mine at Grizzly Flat will not close down, as has been reported. At a recent visit of W. H. Sutherland and D. H. Jackson to the property it was determined to continue work.

Kern.

The shaft of the engine at the Little Butte mine broke recently and the mine has been closed down until a new one can be put in place. It is expected that work will be resumed about the 10th of August. This is the second time this year that the same accident has happened. The ledge in the drift at the 480-foot level is 4 feet wide. The Johannesburg reduction works cleaned up after a forty-ton run of Butte ore, running about \$75 per ton; at the present time the stamps are dropping on a fifty-ton lot from the same mine.

A decision has been rendered in the case of the Windy claim in favor of L. A. Scott and against the Ashford Bros. who in the spring of '96 located the Rocket and did some work. At about the same time L. A. Scott located the same ground under the name of the Windy claim. One morning when the Ashford brothers went to work they found Scott in possession and ready to back up his claim with a shotgun. The case was taken to the courts with the results noted above. While Scott was in possession he sunk about 40 feet and took out in the neighborhood of \$1500, \$1200 of which is held by injunction in a bank awaiting the result of the trials. In the fall permission was given by the judge for both parties to do their assessment work.—The Yellow Aster is shipping fifty tons of ore a day to the Barstow mill.

The Los Angeles Review says that the Long Tom mine, near Bakersfield, has been sold to Pittsburgh capitalists for \$160,000, of which \$10,000 was cash. There are about 7000 tons of tailings on the dump, estimated to be worth from \$7 to \$8 a ton, and which the new owners propose to cyanide.—J. W. Waltham has taken a bond on the Golden Bar mine at Johannesburg and prospecting has begun.

Lassen.

(Special Correspondence).—The Hayden Hill Con. M. Co.'s tunnel in Hayden Hill district is in about 2000 feet.

The Hayseed has encountered good ore in the drift on the 280 level and the mill will soon be started. The indications point to a widening of the ore body with depth.

The Independent is becoming one of the reliable bullion producers of the camp. A one-third interest in the mine was recently sold to Dr. A. G. Schlosser of the Golden Eagle Co. The new cyanide plant for the treatment of Golden Eagle ore will soon be in running order. The MacArthur-Forrest process is used and the plant has a capacity of forty tons per day. Supt. Stone estimates that there is ore enough in sight to keep the plant busy two years.

Adin, July 25th, '98.

Los Angeles.

The San Gabriel M. Co. near Azusa is running a tunnel under the bed of the creek to drain the gravel above to bedrock. The tunnel is in 1500 feet.

The new mill at the Puritan mine at Acton is complete and in running order.—Upon the return of U. S. Senator White from Washington operations will be resumed at the Red Rover mine.

Nevada.

A new 20-stamp mill for the Delhi mine on the Middle Yuba river above Columbia Hill is being built.

The new hoisting works at the long abandoned Le Compton mine near Nevada City are nearly finished and development work will soon begin. The property was at one time a good producer.

Placer.

The June statement of the Pioneer G. M. Co. reports as follows:

| | |
|----------------------|---------|
| Value gold bars..... | \$6,665 |
| Total expenses..... | 4,918 |

| | |
|-----------------------------|---------|
| Net income..... | \$1,747 |
| Tons of rock crushed..... | 505 |
| Number of men employed..... | 44 |

The June statement of the Pioneer G. M. Co. compares as follows with previous months:

| | Tons rock crushed. | Value gold bars. | Total expenses. | Net income. | Value ton per ton. |
|----------------|--------------------|------------------|-----------------|-------------|--------------------|
| 1897. | | | | | |
| July..... | 650 | 14,156 | \$5,109 | \$9,055 | \$21.77 |
| August..... | 807 | 13,241 | 6,582 | 6,659 | 17.65 |
| September..... | 765 | 14,543 | 6,090 | 8,453 | 19.11 |
| October..... | 610 | 11,858 | 5,712 | 6,146 | 19.44 |
| November..... | 508 | 9,337 | 6,279 | 3,058 | 18.38 |
| December..... | 530 | 8,387 | 6,139 | 2,248 | 15.79 |
| 1898. | | | | | |
| January..... | 721 | 8,384 | 5,217 | 3,147 | 11.60 |
| February..... | 940 | 14,160 | 5,824 | 8,336 | 15.06 |
| March..... | 1,150 | 15,731 | 6,473 | 9,258 | 13.63 |
| April..... | 960 | 13,102 | 6,432 | 6,680 | 13.64 |
| May..... | 630 | 8,676 | 5,465 | 3,211 | 13.77 |
| June..... | 505 | 6,665 | 4,918 | 1,747 | 13.20 |

| | | | | | |
|-------------|-------|----------|----------|----------|---------|
| 6 mos. '98. | 4,906 | \$66,698 | \$34,319 | \$32,379 | \$13.60 |
|-------------|-------|----------|----------|----------|---------|

Accompanying the Pioneer statement the directors make the following announcement: "The small amount of rock crushed in June is owing entirely to the diminishing water supply. The work on the dam and flume is being rapidly pushed, and plans for the electric plant, recently contracted for, are being pre-

pared. The directors expect it will be in place by the time the dam is finished."

Near Forest Hill prospecting is being done at the Mayflower and a small crew is at work at the Breece & Wheeler claim at Bath. A. F. Westfield has struck pay gravel at his claim on Shirt Tail canyon.—At the Eureka, F. Chappellet, Jr., Supt., the tunnel is in 3000 feet, where an upraise has been driven 200 feet. The upraise is in a soft formation. Twelve men are employed.—At the Hidden Treasure mine near Centerville 235 men are employed. Men are working on tribute in the old tunnel at Sunny South and are said to be making good wages.—Mining on the river near Michigan Bluff is active. Supt. Roumage has a large force at work at Horse-shoe Bar and from present indications he will have a very profitable season's run.—Owing to the scarcity of water W. S. Davis will not be able to work his mine at Mammoth Bar this season. G. F. Huber and L. L. Chamberlin are working a small crew at the Gold Slide on the American river.

Plumas.

P. Hansen, in his claim near Meadow valley, found a nugget that weighed \$120.—Near Butt valley A. Cameron is taking out pay gravel.—J. Rickard is developing a quartz proposition at Horsehoe Point and expects soon to erect a mill.—White & Bennett are constructing a wing dam to work a river-bed claim.—The Dunn Bros. continue to operate their 2-stamp mill on ore from their ledge. It is reported good.—Austin and Cadie continue mining in the Pliocene, from which for many months considerable gold has been taken.—Hickerson and Davis are getting a good prospect in gravel below the Pliocene mine.—The Savercool Bros., including themselves, have several men employed at Dutch Hill and it is understood that they are doing well.—H. Kelly is running a second tunnel in the San Jose drift mine.

At the King Solomon mine near Taylorsville work is progressing favorably. The wet ground has been passed and each of the three shifts succeed putting in a set of timbers. A 5000-foot tunnel is expected to cut the ledge at 2000 feet depth. There remain 400 feet of tunnel to be run.

San Bernardino.

Ingersoll & Esler at Virginia Dale are putting up a stamp mill, which will soon be ready to crush ore from their property.

A mortgage for \$25,000, given by the Randsburg Santa Fe Reduction Company to the Union Trust Company of Rochester, N. Y., was filed for record with the recorder of the county last week. Sec. 1, T. 9 N., R. 2 W., with all improvements, was given for security to float bonds for \$25,000.

J. M. Wolbrecht, Gen. Mgr. Golden Slope mine near Victor, has specimens of honey-combed quartz threaded with gold, taken from a ledge 4½ feet wide. There is a 5-stamp mill at the mine.

San Diego.

F. Ganahl has started up the Cincinnati Belle mine near Julian.

Shasta.

(Special Correspondence).—In the Muletown district and about Whiskeytown development work is in progress to a greater extent than has been the case in the history of the county, and, too, with notable success.

The amount of ore being hauled from Shasta and surrounding country to the smelter is reaching into large proportions. Men who a few years ago had their holdings mortgaged and were about to lose their little ranches have turned to quartz farming, with good results. On every road leading from the several mountain villages to the smelter one meets teams drawing ore to Keswick, for which they get not less than \$2 per ton, and oftentimes a much better price.

The ores about Shasta and Whiskeytown are mostly free milling, though among these are found properties that from careful study show that chlorinating and cyaniding must enter largely into the successful treatment of ores in this county. The reopening of the Butters cyanide works at Kennet will do much to advance the mining industry of this section and bring about a demonstration that Shasta's possibilities in the mining field will at last be brought into life and become productive.

Redding, July 26th, '98.

The Desmonds at Whiskeytown are taking out ore and will start up as soon as the rains come.—Brown & Son are at work on the Pompeii and meet with encouragement as they go down on their porphyry dyke.—Men who have made a thorough examination of the Davis copper mine report some of the ore bearing 40 per cent copper and from four to twenty ounces in silver and \$2 to \$30 in gold. Davis is negotiating with the Mountain Copper Co. to deliver his ore at Keswick in ten-ton lots.

Sierra.

English & Smith have bonded the William Tell mine near Sierra City for G. A. Price of Denver, Colo., who will build a 10-stamp mill upon it. There are two ledges—one 4 feet thick of fair grade ore and one from 10 to 20 feet of low grade.—Work at the Gold Bluff mine near Downville is progressing. The air compressor and receiver are set and the pipe nearly into the shaft. The pump will be started soon.

Siskiyou.

On the 18th inst. the sheriff put James McCaw of Oakland into possession of the Macauley & Fry quartz mines on Patterson creek, as a result of the decree in favor of the plaintiff McCaw in the case of James McCaw vs. Thomas Macauley and C. J. Fry. This cause has awakened a great deal of interest among miners and mining men. By the decree the Court obliges Macauley and Fry to specifically carry out the terms of a contract they entered into with the plaintiff some time in January or February of this year. The terms of the contract called upon McCaw to

pay \$35,000 for the mines, \$2500 of which was to be paid in April and the balance in two equal payments, one six months and the other a year later. McCaw tendered the \$2500 as per contract, which Macauley and Fry refused to receive, claiming the contract was void.

The main question decided by the Court in the action was as to the validity of the contract and the right of plaintiff to compel defendants to carry it out on their part, after plaintiff had tendered performance, the Court holding that plaintiff was entitled to force performance.

The judgment of the Court, says the Yreka Journal, meets with the general approval of all people interested in mines and mining sales. The prospector who finds a promising property is able by letting the intending purchaser into possession, upon a small sum paid down, to realize the value of what the future of the mine may develop, while on the other hand the purchaser is able and willing to take hold of such a property and develop it, if it proves what both think it will, to pay when such fact becomes apparent, a fair sum for the mine. It is really the only method by which the prospector can ever realize a good round sum for his prospect; and if such contracts cannot be enforced, then capital will not be employed to develop our prospects, as they would not dare depend upon the moral consideration which might weigh with the seller. If it is law that the seller can back out when he desires, most if not all undeveloped mines are sold on future contingent payments. If sales can only be made for cash down the prospector fully realizes that he can never receive pay for anything more than is in sight, as all fully realize the old saying, "You can't see an inch ahead of the pick." Consequently it is in the interest of the miner and those who have undeveloped mines that the legality of such contracts be upheld, as great inducement both to the mine owner and to capital.

Journal: The river miners on the Klamath have been troubled about getting heavy enough current under their wheels, and have been obliged to bank the stream or confine it in narrower limits where possible, on account of low water. All are hoisting pay gravel, and taking out considerable gold, with prospect of having the best paying season yet known. The low stage of water is advantageous from Oak Bar to Happy Camp. Above Oak Bar, when the river is very low, the wheels have to be dropped down to the lowest gauge, and the current of the river forced under them by means of breakwaters and bulkheads to turn the stream where needed.

Tuttle & Davis have a paying mine on Scott river, from which they realized \$3000 lately.—Morrison & Coburn have put in an engine and boiler to run their quartz mill.—The King Solomon quartz mine at Salmon river has been showing well lately, but water is scarce to run the mill, the water being pumped for use a second time.—The Greenhorn Blue Gravel mine near Yreka continues to yield well and more drifters have been put to work. The water is gradually diminishing, but by extra efforts in securing all the bed-rock drainage, and using it a second time by pumping back, enough is secured to keep the sluices supplied.—The Fry & Macauley quartz ledge on Patterson creek, bonded by J. McCaw, is being prospected by the latter with success.

News: The Shurtliff mill crushed thirty tons of ore from the Spencer dump. The Shurtliff mine is also a producer.—J. H. Smith is opening up the Knownothing mine, near the Forks of Salmon.—The Reader & Co. mine at Fools Paradise continues to yield high grade ore. They are developing the mine systematically and take out enough quartz to keep the mill running.

Trinity.

(Special Correspondence).—Authentic reports have reached here of a new strike in the Brown Bear mine at Deadwood. In driving a lower tunnel a ledge was found that is said to excel anything produced in the palmy days of this mine. The product of the Brown Bear was for several years almost abnormally rich, and little or no attention was paid to the lower grade ores. In latter years, however, when it was supposed the rich ore body had become exhausted, the company was content to work the lower values, and also sublet its work to tributaries and do custom milling. It is known that in the second stage of its history, having been taken up by the present company as an abandoned property and bought for a bagatelle, it made occasional monthly clean-ups from a 10-stamp mill that ran from \$28,000 to \$37,000 on the plates.

At New River, on Canyon creek, the Chloride & Bailey is producing good ore. The thorough and extensive development it is receiving from the new company will determine its worth. The property was recently secured by San Francisco and New York capitalists, who are opening the property, not on an extravagant surface plant, but upon a practical and broad gauge system of underground work.

Lewiston, July 25th, '98.

Tuolumne.

A. E. Davis of San Francisco has bonded the Mount Hood and Sunrise mines at Jamestown and will develop the property.

Democrat: The App mine, at Quartz Mountain, owned by Nevills, Ballard & Martin, is down over 1000 feet. Two thousand tons of ore per month are put through the 20-stamp mill.—The quartz mills of Tuolumne have 405 stamps dropping.—The crosscut tunnel on La Estrella is in 315 feet.—A good strike is reported in the Gray Eagle at American Camp.—The Golden Gate is down 700 feet, with several thousand feet of drifts. It has been operated for years.—Work on the Pennsylvania and Rhode Island, the Goldwin M. Co.'s two mines on the East belt, is being pushed. All the workings are reported looking well.—Owing to the lack of water, the Star is still closed.—The Eagle-Shawmut, Jacksonville, owned by Halsey, Rosenfield & Co., is extensively operated. It has a big pay-roll and a 20-stamp mill.—The Hope, a Bald

Mountain property, owned by S. Ralston, has a large vein and is producing good ore.—The Bonanza contemplates building a stamp mill. D. Oliver of Sonora is one of the owners.—The New Year mine has been bonded for \$50,000.—The 20-stamp mill on the Confidence is in constant operation.—The Kanaka, at Groveland, is said to be producing high grade ore.—In the Rappahannock work is progressing.—All the new machinery for the Mt. Jefferson in Groveland district is being placed and extensive underground operation going on.—The North Star and Black Warrior, at Moccasin creek, are extracting ore from an 18-foot pay-streak.—The old Soulsby, which sustained a whole town for years and produced \$5,500,000, is idle, despite the fact that those in position to know say there is still plenty of ore.—Water is being kept out of the Seminole group with a view to an early resumption of work.—A large body of ore was recently discovered in the Dreisam, at Arastroville.—The recently opened up Denmore, near Parrott's Ferry, is making a good showing.—The Sell mine is running steadily with good results.—The Tanzy pocket mine, near Sonora, is yielding a good product.

Yuba.

(Special Correspondence).—The soundings made in the Yuba river, under the supervision of a civil engineer in the employ of the U. S. Debris Commission, have been thoroughly prosecuted. The depth reached through the tailings to bedrock, as nearly as can be learned from unofficial, though reliable, sources, is 70 feet. Three different localities were examined. The report upon the work is now, no doubt, in the hands of the U. S. Debris Commission, who will determine which site shall be selected. The Narrows in which these soundings were made are about 1½ miles from Smartsville and are about 300 feet deep. Smartsville, July 27th, '98.

Marysville Democrat: Amador county men are trying to get the mine and mill of the Good Title Co. of Indiana Ranch, to resume sinking and further prospecting the property. This will be settled as soon as Mgr. Carson returns from Cincinnati, Ohio.

NEVADA.

The new camp of Searchlight is twelve miles from the Colorado river near Summit Springs, Lincoln county. The boundaries are: From the northern point of the Vanderbilt district in California where it touches the California-Nevada line, due east to the Colorado river, thence down the Colorado river to a point due east of Newberry Peak, thence due west through Newberry Peak to the California-Nevada line, thence along the California-Nevada line to starting point. G. F. Colton is district recorder.

McDermott Bros. of Los Angeles, Cal., and Butte, Mont., have bonded Murphy & Co., in Bull Run district, Elko county, five claims for \$150,000. There is some development work done on the property. The ore averages \$20 a ton and can be mined and milled, it is said, for \$1 a ton. The prospect tunnels, on ore, are 1200 feet above the creek in a mountain that rises to a height of 3000 feet with a 30° pitch. Under the provisions of the bond, men must be put at work immediately. Before a year a mill or reduction works, with a capacity of forty tons daily, must be under construction, to be completed by November 1st, '99.

A chalk deposit two miles long and 400 feet wide has been found near Lovelock.

The Union Con. M. Co., Virginia, has re-elected the old board of directors, with C. H. Fish, Pres.; A. P. Swain, Sec.; D. B. Lyman, Supt.

Last week thirty-five miners were laid off by the Supt. of the Nevada mines in lone, and several others quit. The draft was from the group of mines in Shamrock Canyon, the Cleveland being closed down. On the 15th over half the miners employed in Austin and a number of the top men were laid off. J. C. Fleming has been appointed Supt. of the Nevada Co.'s mill and mine at lone. The Eureka Sentinel hears that the present ceasing of work in Austin is due to the embezzlement of about \$300,000 of the Austin M. Co.'s funds.

The bullion yield from the Olinghouse Canyon, Washoe county, was \$2500 in the past thirty days.

The Eureka mine at Como is being opened on the 115-foot level. A recent test crushing of seven and one-half tons netted \$83. If the next mill test proves equally good, extensive development of the mine will follow.

Winnemucca Silver State: Deep mining, as contemplated by the managers of the various Comstock companies, means a revival of our wood, timber, farming and railroad industries. Every taxpayer in the State should be in favor of any reasonable project that would enable the resumption of work. The feasibility of opening the lower levels is acknowledged by competent engineers.

OREGON.

The Rogue River Courier says the Wimer Bros., operating a placer mine near Grants Pass, made a cleanup after an eight months' run and that it amounted to about fifty pounds in gold.—The Gold Bug group, comprising six claims on Mt. Reuben, upon which J. P. Jones and others have been exploiting for a year, has been bought by them, and the property will be further developed and equipped with machinery. The ore varies from five inches to 15 feet and much of it mills \$50 a ton.

At Baker City suit has begun in the Circuit Court by F. M. Bolles asking for an injunction prohibiting the new owners of the Virtue—Messrs. Labaree and Thompson—from operating the mine or in any way interfering with his rights.

BRITISH COLUMBIA.

The Giant mine at Trail made its first shipment to the Trail smelter. It sent down twenty tons and will make regular shipments.

The directors of the Le Roi Co. at Rossland

have concluded to reduce the daily ore shipments from 300 to 100 tons and to devote more force to development work.

At Rossland \$110,000 was disbursed last week to the shareholders of the old Josie G. M. Co., being part of the proceeds of the sale of the company's property to the B. A. Co. for \$265,500, and the division was on the basis of 30.57 cents per share. There were over 300,000 shares of Josie stock held in Rossland.

The Bosun group of mines near New Denver has been sold to the Sandiford corporation for \$7500 cash.

The Nelson Tribune says that in the Enterprise group, on Ten-mile, from the top showings to the tunnel on the Iron Horse, there is a vertical depth of ore of 1130 feet, with a width in No. 2 tunnel of 800 feet. In some places the ore is 2½ feet in width and of uniform richness. There is at present \$2,000,000 worth of ore blocked out. Eleven hundred tons of ore at the lake is being shipped in bulk that will realize \$200,000.

There are thirty men employed at the Porto Rico mine. A 10-stamp mill will be built. The number of men employed after the mill is erected, will be sixty or seventy-five. Work on the 2500-foot aerial tramway has begun.

Rossland Miner: The ore output for the first six months of '98 for the Trail Creek division was 39,365 tons, valued at \$1,277,079.11.

THE KLONDIKE.

Officers of the C. P. Ry. Co.'s steamer Tartar at Vancouver from Klondike outposts laugh at the statement that the Tartar had on board \$1,000,000 in gold. Far from having any gold on board the purser of the Tartar had not even heard of gold having come up the Yukon river from Dawson on the steamers Goddard and Ora.

G. A. Kinsley and W. L. McDonald of Stockton are two California miners back from the Copper river mining district. They left San Francisco last November in a party of seven. A company was formed and each took stock. When they left they were assured by a man who said that he had been in the country that he would put them on good paying ground. They landed at Orca Dec. 11. From then until a month ago they had not been anywhere near paying ground, and there is not the slightest probability of anyone ever getting on ground that pays or even ground that gives any color. For over forty miles the alleged trail is lined with provisions, left there by disappointed miners who have left and expect never to go back there again. If the mass of people in there do not get out soon the steamer lines or the Government will have to bring them out. There has not been enough gold taken out of that infernal country to fill a small cavity in a tooth. They are both miners and have spent many years in the mines and know what they are talking about when they say that the Copper river district is not a mining country. They traveled around and prospected wherever there was the slightest probability, but always with the same old chestnut, "no color." The hardships cannot be imagined by anyone who has not ventured on such a trip. At present the glacier is very dangerous to travel over, and it is unlikely that there will be many more prospective miners get from the interior to the coast until it gets colder.

IDAHO.

The Mammoth G. Q. mine near Idaho City has resumed work. The mine was for two years under development by an English company, which became involved and allowed it to be sold under liens; the time for redemption has expired. The property is owned by Poncia & Co.

At Burke a 4-foot ledge has been found in the Hecla mine, of good value.

A valuable strike has been made in the Daisy mine at Neal. From the 200-foot level a drift has encountered a ledge 6 to 8 feet in thickness that averages \$50 to the ton.

At Burke the shaft of the Con. Tiger & Poorman M. Co. is 1400 feet deep and sinking is continued. The hoisting machinery in use has a capacity of 2500 feet, and there has never been anything in the conditions discovered in the mine to raise any doubt that it will be used as long as it can be, and then larger and better machinery put in its place. When lead was lower and the ore not as good as now Supt. Culbertson estimated that under the conditions then existing the mine could be worked to a depth of 3000 feet, and it now looks probable that it will be sunk even deeper than that. It is not a question of raising the ore, there being practically no limit to the depth from which it would pay to raise that, but the amount of water increases with the depth and the cost of pumping increases. That may be partially overcome in time by cheaper power.—The first shipment of copper bullion from the Seven Devils district has arrived in Huntington. It consists of seven and one-half tons of copper from the New York & Idaho Smelting Co.'s plant near Cuprum.

Times: At Bailey the Tip Top mine has been sufficiently developed to permit the stopping of fifty tons of ore a day. A new tunnel will soon be begun that will tap the vein 10 feet lower than the present workings, and at that depth a sufficient supply of water for a 30 or 50-stamp mill will probably be secured. If this proves to be the case a mill will be built at the mine; otherwise it will be located on Rock creek, about a mile and a half away, where there is an ample supply of water. As it will take some months to drive the new tunnel and connect it with the upper works, it is likely that the proposed mill will not be erected until next spring. M. Packard is the owner of the property.—The ores of the DeLamar mine are said to carry an average of \$11 per ton, of which 85 per cent is recovered at a profit.

Boise Statesman: Work on the property of the Upper Boise Hydraulic Co. near Boise has been suspended. An injunction secured by the Twin Springs Placer Co. was served on the Upper Boise Co. The litigation involves the title to all the placer ground of the Upper Boise Co. It is understood, however, that the

desire on the part of the Anderson company is to secure possession of the waters of Sheep creek, which the Boise company had the use of.

Idaho City World: Six miles of the ditch and flume being constructed by the Basic Co. in the lower valley of Grimes creek are finished, leaving two miles to be done. The company expects to have the water at the power house by the end of July.—The dredge at Placerville is finished ready for running. It will be operated by the Bed Rock Dredging Co. Contracts have been let for a second dredge near Centerville to be completed Oct. 1. This will be operated by the Boise Dredging Co. The dredges have a capacity each of 3000 cubic yards per day.

UTAH.

The Utah mine in Tintic district made a shipment last week of high grade ore.—The Gold Belt and April Fool mines in the State Line district were sold to Butte, Montana, capitalists for \$20,000.—In the Annie Laurie mine near Richfield a 180-foot tunnel is all on ore. Nine men are taking out 1000 pounds of first-class ore per day, which is being piled on the dump pending shipment.—The Humburg and Uncle Sam mines, Tintic, owned by J. Knight, are taking out ten cars of ore a week, which gives high values in silver and lead and some gold. The payroll is \$10,000 a month.—The Ajax mine at Mammoth has opened an ore body of good value at 550 feet depth.

After tunneling a distance of 2100 feet and expending \$50,000 upon the undertaking, the Sterling Coal Co. has connected with its coal measure at Morrison on its dip, and will soon be producing large quantities of coal. It was two years ago that it was decided to abandon the incline from which water had to be continually pumped. Several seams were passed through in digging to the original point where there is a 14-foot seam.

At Park City the ore shipments last week were 1,781,000 pounds.—The Loring Bros.' mill will be ready for operation within two weeks.—Frame timbers for the large ore bins at the Silver King are in position and carpenters are rushing the work. The masonry walls on the bin grade are completed and work on the high wall for the new air compressor is being pushed.—Shipments for the week from Tintic were twelve cars concentrates, five bars bullion and ninety-five cars of ore.—From Silver City fifty-seven carloads of ore were shipped.

Bingham Bulletin: In the West Mountain district Mgr. Strickley of the Montezuma is sinking a new winze and station 250 feet from the surface. The old winze, 50 feet farther in, is showing a fine body of ore, but operations had to be suspended on account of water. A hoist and pump will be put in by Sept. 1.—The raise made from the drain tunnel of the Starlus to the surface for air is completed. The drain tunnel has reached gravel and terminates in a sump. Work in the incline will be resumed as soon as it is pumped out, and the drift of the 150 level is also to be extended.—The cyaniding mill being erected at the Star group in Pine canyon in Tooele county will be ready to make a trial run the 1st of August. The property is showing large bodies of cyaniding ore.—A raise is being made for air from the east drift of the Winnamuck 400. It will open a large amount of stoping ground. The east drift is pushing ahead and still in solid ore. From these points considerable ore is coming out, and there are twenty to thirty tons on the dump. It is galena, going well in silver.—The Badger Co. will soon start work with a considerable force.—Work has been resumed on the Levant, owned by Gov. Wells and E. Case, and considerable development work is to be done this summer.—Several of the Markham group claims are being worked under lease.—Results obtained by the Swan-Bemis mill on Niagara dump ore are very satisfactory. From twenty-five to thirty tons of concentrates are made daily.

Mercury: At Mercur the Geyser-Marion made its usual semi-monthly shipment of cyanides valued at \$7000.—At the Snowstorm the shaft reached the ore at a depth of 160 feet, and an incline has been run on the dip of the vein 140 feet.—At the South Daisy two shafts have been sunk 160 feet and a drift is being run to connect them, which will be 200 feet in length. The values are improving and there is no doubt as to the class of ore existing in the property. There will be no cessation to the work, and within a short time enough ore will be blocked out to justify the erection of a mill.—The owners of the Oakland have decided to continue operations on their property; they will put down a diamond drill to a depth of 1000 feet.—At the Daisy the mill is running steadily. Seven of the tanks have been filled and the eighth is ready to receive the ore. It is found that forty-eight hours' time is all that is necessary for leaching the ore.

The Joe Bowers mine, near Eureka, has a 25-ton shipment that assays 32 per cent copper and seventy-six ounces silver.

MONTANA.

S. F. King of Butte has bought the Calhoun mines near Phillipsburg. The ores of this property are of a uniform fine milling grade, and can be saved to a high per cent by the cyanide process. The pyritic ore exposed in the principal tunnel is the largest exposed body of this character of mineral known in the State. The latter is successfully treated by concentration and gives \$6 to \$32 per ton. The Mgr. is F. D. Brown.—The Keystone, at Sylvanite, is pushing work on its tunnel and is in good ore. Thirty men are at work on the Gold Flint mine, ten in the Keystone.—In the Gold Flint mine the tunnel is 600 feet and the ore is improving. The mine is producing 140 tons a day.

Work on the McCauley Milling Co.'s property at Crevasse has been resumed. Two 10-stamp mills are being operated night and day and a large force is employed in the mine. The ore encountered is free milling and of a

high grade.—The Butte and Boston Con. M. Co., in their annual report to the County Clerk, show a capital stock of \$2,000,000, all paid in. On July 1 last the assets were \$5,500,000; liabilities, \$1,600,504.42, and bonds amounting to \$1,500,000 were outstanding.—The Montana Ore Purchasing Co. is shipping low grade ore from the Nippur claim. It is understood that the bond has been taken up and the mine is now the property of A. Heinze and associates. Development work is also progressing satisfactorily on the Cora and Parnell, on both of which this company holds a bond.—In the East Pacific near Winston ninety men are engaged taking out high grade ore, and within the next sixty days the force will be increased to 125 men. Plans are being perfected for a fifty-ton concentrator to be erected in the near future.—The Big Bonanza near Walkerville, owned and operated by the Montana O. P. Co., is reported to have become a paying property. Shipments of silver ore are said to be giving returns of 100 ounces of silver to the ton.—Near Townsend, at the Diamond Hill, in a short time twenty stamps will be dropping.—Work has resumed in the Moulton mine near Nelhart. Over 100 men were formerly employed in this mine, and it is intended to put that large a force to work if the present price of lead is maintained. The other mines at Nelhart in operation are being worked extensively.

The Washoe Co. has acquired 4000 acres of land on Camp creek, near the Big Hole river, which is locally considered to verify the report some time ago that Messrs. Daly and Higgin, principal owners in the company, were about to build a big smelter there and start a new smelter town. Ores will be handled from the Butte mines of the company and properties on Moose and Camp creeks will be developed.

WYOMING.

The Charter Oak mine, near Grand Encampment, has a 225-foot shaft and three drifts of 100 feet all in ore. The vein is from 6 to 12 feet wide and the ore is low grade, running 8 per cent copper and \$4 gold per ton. The mine produces 150 tons of ore a month.

SOUTH DAKOTA.

The Durango mine near Lead made a thirty-ton shipment of ore to the smelter that yielded \$75 per ton.—The Wasp No. 2 mine near Deadwood is shipping 120 tons of ore a week that carries an average value of \$100 a ton.—The Burlington mine at Preston is shipping fifty tons of ore a week.

Because of the miners' strike in Blacktail the Cyanide Co. has been unable to work any property and the plant is shut down.

LAKE SUPERIOR.

W. F. Fitzgerald of some Lake copper properties says: "Osceola promises to be a large producer. The cost of treating copper at Lake Superior will be reduced during the next year. One of the mines is working on a scheme which, if successful, will greatly increase the capacity of a stamp, and likewise reduce the cost of stamping. Mining men are laying considerable stress on the way that the mines are increasing their production, holding that large production merely shortens the life of a mine, and that it will not be many years before the larger mines will have to open up new lodges or decrease their productions. The amount of ground used up by the larger mines in making their great productions is almost beyond comprehension. The asking price for copper by all of the large producers is 1½¢."

ONTARIO.

The Golden Star mine at Mine Center is down 292 feet and is producing free-milling ore that yields \$45 to the ton. The mill will be in operation Sept. 1st.—The Olive mine mill is running and the work of putting in the additional stamps is progressing. The Olive is said to be turning out with its two stamps an average of \$600 per week.

At the Golden Star mine, near Rat Portage, the shaft is down 292 feet, the quartz becoming better as the shaft deepens. There are ninety men employed.—Development on the Golden Crown property is being pushed. Two shafts are being sunk on good ore.

NEW MEXICO.

(Special Correspondence).—The St. Louis United Copper Co. has begun the erection of buildings on its property in the Jicarillas.

The Lillian tunnel, on upper Bitter creek, is being pushed night and day, and is in over 600 feet.

D. B. Gillette, Jr., superintendent of the Hearst properties in Grant county, has been seriously ill for some weeks past, and the business is now being attended to by B. B. Thayer, of San Francisco.

A lead smelter has recently been erected in the Caballo mountains for the purpose of treating the ores from several fine lead claims in that vicinity.

The old Terry gold mine in Water canyon, Socorro county, is being actively worked by the new company in control.

The work being done on the Miners' Union, at Bland, proves that property to be fully as rich as expected.

Hundreds of placer claims in the territory, upon which nothing can be done most of the time for want of water, are now being worked vigorously, the heavy rains of the last few weeks having given a good water supply.

All the heavy machinery for the big cyanide plant in Colla canyon, Cochiti district, is now in place, and it is announced that the mill will be ready to commence active operations in the early part of the coming month. It is the biggest establishment of the kind in the territory.

The new machinery for the Silver City reduction works is in place, and that institution has blown in its furnace again. The improvements consist of a Corliss engine, new boiler, and concentrate press. Two stacks with a capacity of sixty tons each per day are being operated. A very large amount of ore

has accumulated during the temporary suspension of the works.

Albuquerque, July 24th, '98.

The first run of the mill at Hematite on a 300-ton lot of ore resulted in a saving of 92 per cent of the assay values. The mill was erected at a cost of \$5000, and has a capacity of twenty-five tons per day. The ore is crushed and rolled to sixty-mesh fineness, then leached by a weak alkali solution. The extraction is made in from one to four hours and the cost of treatment is less than \$1 per ton.—A 6-foot vein of ore has been opened in the Albemarle mine, Cochiti district. Several thousand tons of ore are on the Albemarle dump at Bland awaiting the completion of the new mill.—A sixty-days option has been secured on the Hatch & McKay property in Mallette canyon at Red River by the Hematite Mill Co.—The Baca mine at Red River is producing \$30 ore.

On the Surprise mine near Hanover lessees are shipping a good grade of lead ore to the smelter.—A strike of copper-iron ore was recently made on a claim worked under lease by J. & P. Welsh, which runs high in copper and iron.—At Santa Rita the S. K. Copper and Iron Co. owns seventy-seven claims, covering nearly 1500 acres. The formation is an isolated peculiarity in geology. The copper ore intimately permeates every portion of the formation in an area of more than 1000 acres. There are 150 men employed in the mines, most of them working on the tribute system, paying a royalty to the company, the low grade ore thrown over the dump reverting to the company, to be utilized when proper appliances are at hand. Every one of the tributaries is making more than ordinary wages, besides paying a royalty. The production of ore from these mines last month was more than 600 tons, which averaged 21 per cent copper at smelting works.

Since the completion of the railroad from San Jose to Santa Rita last month there were shipped to the smelter 1200 tons of iron ore and 600 tons of copper.—Six hundred tons of ore shipped from Santa Rita ran 39 per cent copper.

Sinking has been resumed on the shaft of the Atlantic mine at Pinos Altos. It is down 480 feet and will be continued to 750 feet before ore is extracted in any quantity.—The Gillette shaft of the Pinos Altos G. M. Co., operating at Pinos Altos, is down 700 feet and will be continued to 1000 feet depth.

COLORADO.

(Special Cripple Creek Correspondence).—The Doctor mine, on Raven Hill, which was inactive for several months, has started up again and is taking out low grade ore.

The Jack Pot, under lease, made a new strike recently and has shipped some six-ounce ore. Its vein runs into that of the Work.

The Ingham is being worked in a small way. It is claimed the bad timbering in the mine has retarded the work.

Eclipse No. 1, being worked under lease, is shipping ore in small lots.

On Bull Hill the Gold Sovereign is shipping ore of fair grade.

The American Eagle has ore at 800 feet depth.

The Modoc has fifteen-ounce ore at 600 feet depth. This property has a new shafthouse and new machinery.

The Hill City Placers, at Independence, all under lease, are producing from \$60,000 to \$70,000 per month. This constitutes the most important new work in the district.

The Vindicator ships from 1500 to 1800 tons per month, one-third of which goes to the smelters and the rest to the mills. The product gives a net value of \$25 per ton of mill ore and \$100 per ton smelter ore.

The Lillie ships 1200 tons per month, which averages two and one-half ounces per ton.

The Pharmacist ships 75 to 100 tons per month, the values running from one and one-half ounces to forty ounces per ton.

The tonnage from the principal mines may be summarized in the following estimates:

BULL HILL MINES.

| | Tons per month. |
|------------------------|-----------------|
| Victor | 3,000 |
| Isabella | 1,300 |
| Los Angeles | 1,300 |
| Modoc | 750 |
| Last Dollar | 1,300 |
| Vindicator | 1,800 |
| Hill City Placers | 2,200 |
| Lillie | 1,700 |
| Union | 500 |
| Christmas | 2,500 |
| Longfellow | 3,500 |
| Pinto | 2,500 |
| Specimen | 2,500 |
| Free Coinage | 2,500 |
| Shurtloff | 2,500 |
| Garfield-Grouse | 2,500 |
| Favorite | 2,500 |
| Pharmacist | 2,500 |
| Burns | 2,500 |
| Mountain Beauty | 2,500 |
| Beacon Hill Properties | 600 |

BATTLE MOUNTAIN MINES.

| | |
|---------------------|-------|
| Portland | 3,600 |
| Strong | 1,000 |
| Independence | 1,000 |
| Gold Coin | 3,000 |
| Granite & Dead Pine | 1,500 |

BEAVER HILL MINES.

| | |
|------------------|-------|
| Elkton | 1,800 |
| Raven & Jack Pot | 1,500 |

GOLD HILL MINES.

| | |
|------------------|-------|
| Anchorage-Leland | 1,300 |
| Half Moon | 1,300 |
| Moon-Anchor | 1,500 |

Two years ago very few Cripple Creek properties were under lease. Now it is believed three-fourths of all the shipping properties are in the hands of lessees, who as a rule are experienced mine operators.

A great many of the mine dumps in Cripple Creek district are leased to miners who are saving the values therefrom by a washing and sorting process. A box the size of a wagon-bed is placed on the ground beside the dump and partially filled with water, within the box is a smaller screen-bottomed box

which is churned up and down in the water as the ore is shoveled into it. The slimes pass through the screen bottom into the main box, from which they are afterwards gathered and shipped to the smelters. The coarse ore in the small box is sorted and the better grade shipped with the slimes. Some of the "washers" are thus making about \$100 per week, though others make considerably less.

Victor, Colo., July 23rd, '98.

BOULDER COUNTY.

In the Red Cloud mine at Gold Hill, on the 90-foot level, J. Williams uncovered a vein of ore said to yield \$50 a pound. The vein is supposed to be the old ore body for which they have been looking for over twenty years.—The Village Bell mine at Eldora continues shipments of good ore. The monthly payroll amounts to \$3000.—The body of high-grade ore found in the San Blas, Ward district, has increased until it is 5 feet wide. The tunnel has been driven 1000 feet. The Enterprise mine, Eldora, makes a twenty-ton daily shipment. A ledge of black quartz has been found carrying tellurium and a test of eighty pounds yielded \$40 per ton.

CHAFFEE COUNTY.

Mabel Grace ore, Whitehorn district, gives a general average of \$34 per ton. The highest value is eight ounces in gold and \$2 in silver. Work is progressing at the rate of 18 inches per shift. The rock is soft and timbering is slow work.

CLEAR CREEK COUNTY.

J. Todt, on the Foyer mine, near Idaho Springs, has 6 inches of \$70 ore. He is driving into the hill with good results.

DOLORES COUNTY.

The concentrator at Rico is busy on the ores of the camp. It received fifty tons of ore from the Little Maggie, twenty from the Montezuma and forty from the Burns property.

EL PASO COUNTY.

The Copper Mountain mine lease on the Fluorine at Cripple Creek shipped last month 500 tons of ore of an average value of 2½ ounces to the ton, and it is admitted that this rate of production can be maintained until the termination of the lease next December.—Twenty tons of screenings were sent out from the Newell tunnel, taken from the dikecut at a distance of 1000 feet and a depth of 525 feet. The vein ranges from 25 to 40 feet in width. If this trial shipment comes up to the expectations of the management, it will be the developing of a hitherto unprofitable section of the camp. The property is equipped with air drills and machinery and is in shape to make heavy shipments at once if the returns warrant.—Two carloads of \$30 ore were shipped from the Carey and Rankins lease on the Little May.—The Portland production for the present month will run, according to the latest estimates, between 3500 and 4000 tons.—The June production of the Half Moon mine at Cripple Creek was 1919 ounces of gold, amounting to \$38,353 30 net.

GILPIN COUNTY.

The last shipments of ore from the Black Hawk depot of the U. P. R. R. were twenty-four cars, nearly 400 tons. Indications point to heavy shipments this month.

GUNNISON COUNTY.

The Tabor mine, on Whitehouse mountain, is throwing out lead carbonates in boulders that weigh nearly 500 pounds. One boulder of lead weighing about 6000 pounds was uncovered and a single piece weighing 1500 pounds was taken out. The ore carries 100 ounces silver, 70 per cent lead, steel galena, crystallized lead and carbonates.

LAKE COUNTY.

The Nisi-Prius mine, Leadville, has the credit of shipping the highest grade ore that leaves the camp. The new ore bodies on the lower level are growing into great producers. The company paid \$30,000 dividends during the first four months of the year.—In the Maid of Erin, above the 700-foot level, enough ore is taken out to make a daily shipping of 100 tons. The ore is lead carbonates, lead sulphides, copper-iron and iron oxide. The property is worked by a leasing company that has granted twenty-two sub-leases.

PARK COUNTY.

The Hill Top Co. has leased twenty-two claims in Horse Shoe from the Stormy Petrel Co. The Hill Top is building a mill and will develop the territory added by the lease to its producing ground. A good strike of gray carbonates was made a short time ago in the Hill Top.

SAN JUAN COUNTY.

A new ore chute has been found in the Ridgway mine, near Silverton. The ore body assays \$180 in gold and \$250 in silver. The old workings continue to output high-grade ore.

SAN MIGUEL COUNTY.

The Shoemaker mine at Telluride continues its output of high-grade gold ore and keeps five stamps of the Suffolk mill dropping on \$35 ore. About ten tons per day are packed to the mill and twelve men extract the product.

ARIZONA.

At Prescott a cave-in occurred at the United Verde copper mine this week, destroying the assay office and part of the foundry. E. W. Johnston, civil engineer, C. E. Beveridge, assayer, and T. E. Larson were killed. A mining expert from New York, whose name is not given, was seriously injured.

The West Oro Bonita mine, near Tucson, has a tunnel on the vein nearly 200 feet, with an ore streak of \$40 gold rock 2 feet in width. The Mohawk G. M. Co. is going down 400 feet. The thirty stamps are dropping on good grade gold ore.

Kent & Son, owners of the Lottie and Postmaster mines, have a tunnel 400 feet long; six men are at work on it.—The mining suit of Jordan vs. Duke, involving the copper property near Jerome, Yavapai county, has been appealed to the U. S. Supreme Court. The

case has been in litigation under one form or another for several years, and has been tried in three counties, resulting in judgments for the defendant. The Territorial Supreme Court at its last session affirmed the judgments. Eight carloads of ore have been shipped from Kingham since the first of the month. The erection of a 20-stamp mill is contemplated at the Yellow Dog mine near Yuma.—A cyanide plant has been put in operation at the King of Arizona mill at Mohawk and is giving satisfactory results.

Regular shipments of ore from the Silver Thread mine near Tombstone continue. Some of the ore from this property is said to be the richest ever produced in the Tombstone district.—The Carr Bros. are shipping ore from La Cruz mine, Cedar district, to the smelter at Barstow, Cal.

The plant at the Temple Bar Consolidated M. Co. is nearly finished and the pumps will be installed immediately. The Colorado river has begun to fall without having risen this season higher than 9 feet 10 inches above low water mark, and without having brought any driftwood of consequence. On the completion of the erection of the machinery the gravel washing will commence.—The Rosemont Copper Co. has about 1500 tons of ore on the dumps of its properties at Rosemont, Pima county. Its claims are being rapidly developed.

Phoenix Republican: At the Welles property in the Dragons, seven men are employed and the mine is looking well.—The long drought of the past year has dried up the springs and source of water supply at Chloride to such an extent that the big mill at the Elkhart mine is unable to run to its full capacity.—At Big Bug, M. S. Taft is rapidly developing the Sterling mine. This shaft is 100 feet deep, in the bottom of which is good ore.—In both drifts there is a ledge 1½ feet wide of good ore. About twenty tons of shipping ore are on the dump.—The Little Annie has stopped work until an air compressor and a drill can be obtained. The Providence M. Co. contemplates placing a smelter about a mile from their mine.

LOWER CALIFORNIA.

J. O. Brown and associates of Riverside, Cal., have secured 570 acres of placer ground near Escondido and will operate extensively. They will be known as the Piramide Mining Co.—A 10-stamp mill is en route to the Aurora mine at Santo Domingo. There are 3000 tons of ore on the dump of the mine ready for milling.

MEXICO.

At Las Planchas the Big Four M. Co. is building a tramway and an 80-stamp mill. Operations in that region will be carried on upon a magnitude never before known there. The roasters at Minas Prietas, Sonora, have started up on the tailings from the old mill, and cyaniding the roasted tailings will soon begin.—The new Wyman shaft in La Mina Colorado is below the 700-foot level and is expected to cut the vein in a short distance. Connection will then be made with the old workings of the mine.

The Montezuma M. Co. at Montezuma, Sonora, is about to erect a new smelter. The company employs 700 men.

Since the opening of the railroad between Saltillo and Concepcion del Oro, development of the old mining district of Mazapil and Concepcion has taken a fresh start, resulting in such increase of the movement of lead and copper ores that the English capitalists interested in that section are talking of establishing a large smelter. All branches of business are profiting by the recent large increase in the mines throughout Zacatecas.

Personal.

A. B. PAUL has returned to San Francisco from Shasta, Cal.

C. P. SULLIVAN becomes Supt. Carson Creek mine, Robinsons, Cal.

H. L. BENNER becomes Mgr. Sacramento mine, Mercur, Utah, Aug. 1.

S. B. MILNER has been appointed Gen. Mgr. Dexter mine, Tuscarora, Nev.

H. A. RAMSTETER will be Gen. Mgr. Grub Stake M. Co., Virginia, Mont.

EX-GOV. BLAISDELL is visiting his mining property in Mariposa Co., Cal.

C. K. BANNISTER of Ogden has been appointed State engineer of Utah.

F. W. WILMANS, Pres. Rose Creek M. Co., Sonora, Cal., is in San Francisco.

C. JENNENS has been appointed Gen. Mgr. Village Belle mine at Eldora, Colo.

J. C. BOYD has resigned his position with the Guston M. Co., at Guston, Colo.

CHAS. B. WORES is about to revive his sampling works at Tucson, Arizona.

J. SNYDER, Supt. Pop Gold Mines, Casa Grande, Ariz., is in Los Angeles, Cal.

WM. JOHNS, Supt. Whitlock mine, Mariposa, Cal., has returned from San Francisco.

COL. EWING of Diamond Hill, Montana, fame is operating at Kingman, Arizona.

D. EVANS of Ogden is at Fish Springs, Utah, examining the Utah and Galena mines.

F. X. LA BONTÉ of the Marino Mariscani mines at Ono, Cal., is in San Francisco.

R. S. SPENCE, chief owner Humming Bird, Paris, Idaho, is in Salt Lake City, Utah.

J. L. FLOOD of San Francisco is visiting his Allison Ranch mine at Grass Valley, Cal.

F. CORNHILL, Supt. Dead Horse mine, Jamestown, Cal., is at Candelaria, Nevada.

B. F. HARTLEY, Supt. Zantgraft mine, New Castle, Cal., has returned from San Francisco.

E. SALADIN, Supt. Cle Fse Hydraulic mine, Junction City, Cal., is en route to Paris.

J. J. SULLIVAN, Supt. Golden Valley M. Co., La Bura, Mexico, is visiting in Denver, Colo.

D. FRICOT, owner Independence mine, Grass

Valley, Cal., has reached that place from an inspection trip to his mines in Calaveras Co., Cal.

M. W. GIBBONS, of the Kasser G. M. Co., has returned to Globe, Arizona, from California.

G. Crimson of Salt Lake City, Utah, is visiting his Eagle mine at Baker City, Oregon.

C. T. DURNING, Supt. Gray Eagle mine, Forest Hill, Cal., has returned from San Francisco.

S. W. CHEYNEY, Supt. Jamieson mine, Johnsville, Cal., has returned to San Francisco.

A. VOSS, secretary-treasurer Phoenix G. M. Co., Nevada City, Cal., has returned to Covington, Ky.

G. P. HOLMAN, Salt Lake City, Utah, is visiting his Cope placer mines near Dillon, Montana.

W. J. BATCHELOR, Supt. Crown Point mine, Grass Valley, Cal., has returned from San Francisco.

H. A. COHEN, Capt. De Lamar's Mercur, Utah, manager, is on a wedding tour in British Columbia.

F. R. BIELEN, Baltimore, Md., is in Prescott, Ariz., looking after the interest of the Virginia G. M. Co.

J. P. EVANS, auditor Colorado Iron Works Co., Denver, Colo., accompanied by his wife, is in San Francisco.

C. A. HAMILTON has returned to San Francisco from an inspection trip to the San Justo mine, at Angels, Cal.

P. KERWIN of the Comstock at Virginia, Nevada, is at Grass Valley, Cal., examining the Allison Ranch mine.

Geo. CROCKER of the S. P. Co. is putting \$100,000 into the development of the Alice mine, Idaho Springs, Colo.

J. W. FRANK is Gen. Mgr. and part owner in the new company operating the Mountain Boomer mine, Denny, Cal.

R. NICHOLS, formerly Supt. Sutro tunnel and now a mine manager at Coolgardie, West Australia, is in Virginia City, Nev.

J. H. HUTCHINSON of the Trade Dollar mine, Halley, Idaho, is examining the mining industries in the Seven Devils country.

E. J. MURRAY of San Francisco, old-time Mgr. Trinidad mine, Sonora, Mexico, is the new Supt. of the Santa Rosalia mine.

D. H. JACKSON of Placerville, Cal., becomes Supt. Holmes mines at Candelaria, Nevada, upon which work will shortly be resumed.

CHAS. H. KARLSRUH, Pres. Phoenix M. Co., Nevada City, Cal., has returned to Cincinnati, Ohio, after an inspection of the mine.

J. SONNAG, Sec. Cal. State Miners' Association, has returned from a trip to Grass Valley, Cal., in the interest of the organization.

M. FLYNN has resigned as manager of the Sacramento at Mercur, Utah, to accept the superintendency of a gold mine in New South Wales.

F. RICHMOND, Supt. Golden Gate mill, Mercur, Utah, has resigned to accept a position with a machinery company in the City of Mexico.

O. S. BUCKBEE, who went to Fort Mohave, Ariz., a few weeks ago to become Supt. Sheep Trail Mine, is at his home in San Francisco in ill health.

J. J. CRAWFORD becomes secretary of the Eureka Con. Drift M. Co. of Forest Hill, Cal., with office at 1209 Claus Spreckels Bldg., San Francisco.

DR. A. OPPEL of Bremen, Procs. Geographical Society of Germany, who has been studying the mining resources of California, has returned home.

J. C. BOYD of the Guston M. Co., at Guston, Colo., is on his way to Tasmania via San Francisco, whither he goes on mining business for his company.

C. N. STEWART, Mgr. Scottish Joint Trust Co., London, England, having examined mining properties in Mexico and California, has returned home.

J. D. GILLETTE Jr., Gen. Mgr. Hearst copper mines, Silver City, N. M., is reported seriously ill. His place is temporarily filled by B. B. Thayer.

W. J. SUTHERLAND, Gen. Mgr. Holmes M. Co., Candelaria, Nevada, is in San Francisco gathering estimates for machinery, preparatory to resuming work.

R. PRET, Gen. Mgr. French Swiss Mines, La Plata, Colo., has gone to Paris and Berne to confer with his company about erecting reduction works at La Plata.

MAJOR MYERS, a prominent miner of Siskiyou county, Cal., has recruited 200 mounted riflemen, "Siskiyou rough riders," but so far has been unable to get them accepted.

J. F. ALLAN, Gen. Mgr. Mexican G. & S. Co., with headquarters in the City of Mexico, has been inspecting his company's mines at Hermosillo and Matape in Sonora, Mexico.

JOAQUIN MILLER has got back from the Klondike, where the aged poet spent a year. He is at Byron Springs, Cal. He says there are 40,000 men up there, 5000 of whom have secured some gold.

T. M. IRWIN has been made Mgr. of the King of Arizona M. & M. Co. at Chrystal, Arizona. Mr. Irwin was recently connected with the Canadian Pacific Exploration Co., Ltd., as their local Mgr. in the Province of Ontario.

M. B. KERR, M. E., has returned from two months' professional visit to Santiago de Costa Rica, via Kingston, Jamaica, and the Bahama Islands. At the former place he got first news of the destruction of Cervera's fleet off Santiago de Cuba, twelve hours in advance of the receipt of the news in this country.

Coast Industrial Notes.

—Southern Oregon hay is \$9 per ton on the cars.

—Redlands, Cal., proposes to have an electric street railway system.

—The San Francisco Mechanics' Institute will hold no exposition this year.

—Douglas county, Oregon, has 100 carloads of dried prunes ready for shipment.

—The pumps at Coronado Springs, Cal., are raising 850,000 gallons of water daily.

—P. L. Orcutt of Boston has bought 45,000 lbs. wool in eastern Oregon at 15½ cents.

—Never before was the Pacific ocean so full of vessels as now. The war and the Klondike did it.

—Flagstaff, Arizona, has contracted with G. W. Sturtevant, Jr., for water works to cost \$85,000.

—Last Sunday and Monday ninety-nine carloads of fruit were shipped East from Sacramento, Cal.

—The new freight rate on rough pine or redwood lumber from San Francisco to New York is 60 cents.

—From Astoria, Or., were shipped last week twelve carloads of Columbia river salmon to London, England.

—The walnut crop of Orange county, Cal., for this season amounts to 475 carloads and is valued at \$500,000.

—Fresno, Cal., is shipping forty carloads of melons daily to the trade centers of California and the Northwest.

—Twenty-five carloads of combined harvesters were recently shipped from Stockton, Cal., to Oregon and Washington.

—The Warren Live Stock Co. of Cheyenne, Wyo., sold to I. N. Humphrey of Cedar City, S. D., 2500 head of cattle for \$90,000.

—The business of the Los Angeles, Cal., clearing house banks for the three months ended June 30th, '98, was \$36,821,785.54.

—Up to July 17 the orange shipments from southern California were 14,209 carloads. Shipments for the season will be over 15,000 carloads.

—The Northern Pacific land department during the year ending June 30 sold 616,679 acres of land, of which 500,000 were in Washington.

—One hundred and fifty horse power will be furnished by the Big Creek Company, Santa Cruz, Cal., to operate the machinery at the powder works.

—Domestic and foreign shipments of redwood lumber from Humboldt, Del Norte and Mendocino counties, Cal., last month were 10,553,855 feet.

—Fresno, Cal., papers say "meadows that have been boggy for years have dried up and are dusty. The streams and springs are nearly all dry."

—The gross earnings of the Mexican National Railway for the second week of July were \$113,374.97, against \$96,411.53 for the same week last year.

—Estimates in California of the per cent of different timber sawed are as follows: Redwood 50, yellow pine 20, sugar pine 15, Douglas spruce 10 and fir 5.

—Our Alaskan possessions, which we acquired in 1867, extend 1500 miles farther westward than the Hawaiian Islands, which we have just acquired.

—At Santa Cruz, Cal., W. P. Peyton this week discovered a process for the condensation of ether that effects a saving of \$400 a day at the powder works.

—The S. F. & S. J. Valley road, Cal., has let contracts for grading two miles of road on the extension west of Stockton, between Stockton and the San Joaquin river.

—The North Pacific Coast railroad, operated in Marin and Sonoma counties, Cal., for the year ending December 31, 1897, earned \$356,993.60; expenses, \$245,888.73.

—Salt Lake City, Utah, proposes to at once float a \$500,000 issue of straight twenty-year gold refunding 4 per cent bonds with which to take up the 1888 issue of 5 per cent bonds Sept. 1.

—The whaling crews at Point Barrow, Alaska, to whose relief an expedition was sent from San Francisco on the revenue cutter Bear last fall, are in good condition and were at no time in danger of famine.

—The season's surplus wheat crop in the Columbia river basin and Willamette valley is estimated at 1,050,000 tons. It is thought that at least 25,000,000 bushels of grain will be exported through Portland this year.

—In Los Angeles, Cal., placing the electric, telegraph and telephone wires underground has cost \$600,000, and it is estimated that before the work is completed the outlay will reach three-quarters of a million dollars.

—A default decree against the city of Spokane, Wash., for \$152,000 in favor of the Rhode Island Mortgage and Trust Co. has been set aside by the Supreme Court of the State. The judgment was for street grading.

—In the Sacramento, Cal., railroad shops 2350 men are employed. Recently the shops have turned out 100 cars for hauling crude petroleum in southern California. Each car carries a cylindrical iron tank which will hold 5000 gallons of oil.

—A farmer at Peatlands, Orange county, Cal., has harvested sixteen tons of good barley hay from three and one-half acres of land, and is now planting the same ground with celery. And still, says the Los Angeles Times, this is a dry year.

—The Rock Creek dam of the Electric Light and Power Co., Nevada City, Cal., is completed to a height of 35 feet. It is to be raised 15 feet more. The ditch, flume and pipe line

leading to the works on the South Yuba river, two miles below, are in process of construction. Under this new arrangement the company will have a fall of over 800 feet.

—A new oil field has been discovered in southern California. The new discovery was made by Jonathan Begg, the mining locator, and lies between the Santa Ana range of mountains on their eastern slopes and Elsinore lake, Riverside county.

—A. A. Robinson, re-elected president of the Mexican Central Railway Co. at the annual meeting, says that the exports of Mexico for '97 were valued at \$112,000,000, of which the exports of metals were worth \$80,000,000, and all products of orchard, farm and forest \$32,000,000.

—Charles Denby, Jr., former secretary of the American legation at Peking, China, says that "within twenty years there will be 20,000 miles of railroad in operation in China. The internal development of the Orient has just begun. America's footing in Oriental trade will be broadened and our prestige in the affairs of the Far East greatly increased."

—The State of California has already furnished over 6000 soldiers to the war with Spain. This is more than 20 per cent of all the troops that have been assembled in and about San Francisco during the past three months. Of California's 6000, practically 3000 have already embarked for Manila. No other State in the Union is believed to have furnished so large a proportional representation in the volunteer army.

—The Carson & Colorado Railway Co. has petitioned the California State Board of Equalization that the assessed valuation of that portion of the company's road operated in California be reduced from \$230,000 to \$70,000. The superintendent states that the business which the railroad was built to handle has ceased to exist. The road runs from Mound House, State of Nevada, to Keeler, on Owens lake, in California, a distance of 300 miles, 107 of which is in California, the remainder in Nevada.

—At the meeting of the Los Angeles, Cal., Oil Producers' trustees on the 25th the price of their crude petroleum was advanced to \$1.15 a barrel. The chief reason for this advance, as explained by Secretary Stasburg, is that the present supply above ground is decreasing, instead of increasing, and that the trustees have been obliged to call upon their reserve to fill their contracts, and that the quantity in the tanks in the field and also in their own tanks is steadily growing smaller.

—C. Van Orden of Sacramento, Cal., proposes to trolley the Sierras. The South Yuba Ditch Co., of which he is secretary, owns twelve square miles of watershed in Summit valley in the high Sierras. He proposes to operate the Central Pacific R. R. by electricity between Sacramento and Verdi, Nev., 144 miles, the power being generated from the water stored in the shed at Summit valley. It is impossible at present to run more than fifteen trains over the divide in one day. Mr. Van Orden claims that his scheme will permit the operation of sixty.

—The gunboat Iroquois, formerly the tug Fearless, will make the longest tow ever undertaken. She is to haul the ship Tacoma from San Francisco to Manila by way of Honolulu, a distance of about 6600 miles. The Tacoma is to carry 100 horses and 120 mules and a coal supply. The Iroquois will steam to Honolulu, a distance of 2100 miles, on her own coal. At Honolulu she will recoil from the bunkers at that port and then proceed to the Ladrões and there getting into smooth water, will take on sufficient coal from the Tacoma to carry her through to Manila.

—At the new Salinas, Cal., beet sugar factory are several artesian wells 4 feet in diameter. A 10-inch centrifugal pump has been worked on one of these wells, drawing 1200 gallons of water a minute without lowering the water level. Another accessory is a 3,000,000-gallon reservoir, in the construction of which 10,000 barrels of cement were used. The factory, when completed, will cost \$2,500,000, will use 13,000,000 gallons of water per day, will consume 1200 barrels of oil daily for fuel, will crush 3000 tons of beets and will produce 450 tons of sugar. The operating expenses per day will be \$12,000 for beets and \$5000 for labor.

—The following shows the decrease in the import of prunes for seven years:

| Year. | Quantity, lbs. | Value. |
|-----------|----------------|--------------|
| 1891..... | 4,012,571 | \$2,130,070 |
| 1892..... | 10,374,874 | 490,078 72 |
| 1893..... | 23,255,821 | 1,049,896 48 |
| 1894..... | 8,749,349½ | 413,769 51 |
| 1895..... | 15,311,695 | 533,748 21 |
| 1896..... | 832,941 | 71,512 54 |
| 1897..... | 736,987 | 74,165 46 |

The trade appearing here as lost to Europe has all been gained by the Pacific coast, where the production of prunes last year amounted to quite 100,000,000 pounds. The growers of the coast have received the money which formerly went to those of France and Hungary.

—The biennial report of the bureau of highways has the following in regard to roads in Stanislaus county, Cal.: "It is the custom to cover the roads in the summer season with refuse straw, which is abundant. This is the most temporary makeshift. The cost of the straw varies from \$30 to \$45 per mile, and in many instances must be repeated two or three times a season. Nor is this all. It frequently happens that a lighted match or cigar is dropped on a freshly strawed road, and the whole roadway vanishes in smoke. It is a well-authenticated fact that, on one occasion, on the day after the road had been strawed, a band of hungry cattle came along and actually ate the road up."

—President McKinley has set aside a number of new tracts recently for forest purposes. The latest enlarges the Pine Mountain and Zaca Lake forest reservation in the southern part of California. The reservation before being enlarged comprised 1,159,000 acres, and

the addition increases it by 507,000 acres. The bulk of the addition is on the eastern end of the original, and it now forms the connecting link with the San Gabriel forest reservation. This makes a complete chain of reservations, extending along the Coast Range mountains from the southern part of San Luis Obispo county to the middle of San Diego county. These reservations, in their order, are: Pine Mountain and Zaca Lake, San Gabriel, San Bernardino and San Jacinto. It is learned that the President will soon set aside several more timber tracts in the eastern and north-eastern parts of California.

—The development of electric power at the two big plants in the vicinity of Redlands, Cal., has been likened to the opening of inexhaustible coal mines. It is stated that it requires 34,560 pounds of coal to generate 1 H. P. for one year by means of steam. The Redlands Electric Light and Power Company has a plant producing 1000 H. P. in electricity and the new plant will produce 2000 H. P. additional. The plant of the Southern California Power Company will produce 4000 H. P., making 7000 H. P. in electricity produced by the two companies in Mill Creek and Santa Ana canyons. This is equivalent to the consumption of 120,960 tons of coal per year in the making of power by steam. With coal at \$4 per ton, this means \$483,840. Dividing this by 300, as the number of working days, gives an average of 403, which may be said to be and is the equivalent of this number of tons of coal mined per day, and as the water flow is continuous, these plants, says the Times, may be likened to inexhaustible mines producing this enormous output.

—The Northern Pacific railway has restored the wages of the engineers, firemen and passenger train conductors in its employ to the standard that prevailed on the road prior to the general cut made in 1893. This means an advance of from 10 to 15 per cent. Some have contended that the raise may have been prompted by a likelihood that the men might go to war if an extra inducement were not held out to them to remain at work. The wages that have been paid engineers on the Northern Pacific since 1893 have ranged from \$3.75 to \$4 a day, the difference being in accordance with the size of the engine. Ten hours or less or a run of 100 miles or less is counted as a day, and all overtime is paid for at from 3½ to 4 cents a mile or 35 or 40 cents an hour. The new wages are from 10 to 15 per cent increase for the regular ten-hour day and provides for 40 cents an hour for overtime. The basis of ten miles to an hour is most commonly used, and oftentimes the wages of the men are considerably in excess of the so-called day's wages. Engineers of the heavy mountain engines get as high as 47 cents for overtime. The wages of the firemen have been paid on the same plan as that of the engineers, and they average \$2.15 a day. The new wage is \$2.35. The old rate of overtime was 20 cents; the new rate is 35 cents. The wages for passenger conductors have been \$112.50 a month. The new wages are \$125.

—Says the Boston Financial News: "E. E. Jones & Co. and W. Stanton & Co. saw a good thing in Hawaiian bonds and hustled. The hustle was fruitless, only because the walking is not good between San Francisco and Honolulu. The idea was all right, and it is the enterprise of these firms that makes bond houses smile. Apparently, W. Stanton and H. H. Pearson, Jr., representing the two firms named, had made a special business of keeping themselves informed as to the probable action of our Government on the annexation of Hawaii. When the "straight tip" was given, they rushed across to San Francisco to take passage for Honolulu, where they meant to buy the Hawaiian 5% bonds, amounting to \$4,000,000 (and they would probably have got them at about 112), before the annexation resolutions passed the Senate. But our Government had chartered all available steamers to carry troops to Manila. The would-be bond buyers obtained permission to go on one of the transports as assistant pursers, but instead of getting off June 1st they did not sail until June 15th. Upon arriving at Honolulu they found that both Houses had passed the refunding bill, authorizing the issuance of fifty-year bonds amounting to \$4,000,000, with the option of calling them at any time on six months' notice. In other respects the form of bond was not satisfactory. The enterprising New Yorkers immediately took steps to have the bill amended, but before the necessary legislation could be put through, news arrived from Washington announcing the passage of the annexation resolutions. Negotiations were at an end and Messrs. Stanton and Pearson leisurely returned to the United States. Had it not been for those two weeks lost at San Francisco their peculiar enterprise would doubtless have been richly rewarded."

—The advance of the United States into the markets of the world is presented in a Government publication just issued. Although no reference is made to recent geographical and political changes resulting from the appearance of the United States army in the Philippines, Cuba, Porto Rico and elsewhere, yet the review deals with the important part which American enterprise and capital are taking in the development of the Far East. The United States is no longer the "granary of the world" merely. While its exports of agricultural products have increased to a remarkable extent during the past year, its sales abroad of manufactured goods have continued to extend with a facility and promptitude which have excited the serious concern of countries that for generations had not only controlled their home markets, but had practically monopolized certain lines of trade in other lands. China has for some years been one of the most promising fields for American enterprise, industry and capital, and the entrance of the vast empire upon the path of Western development under conditions which would secure equality of opportunity to the United

States would doubtless result in immense gain to our manufacturers in the demand, sure to follow, for lines of supplies and goods of various descriptions that we are fitted to provide. The solution of the problem of the future commercial conditions of the Chinese empire has, therefore, an immediate and most important relation to the expansion of our export trade, especially that of our Pacific slope. The "internationalization" of the United States, so far as industrial and commercial interests are concerned, has, in fact, been made a thing of the past by the logic of the change in our economic requirements, and we can no longer afford to disregard international rivalries, now that we ourselves have become a competitor in the world-wide struggle for trade. Nor is it with the relation of the different nations toward one another that we are alone concerned. The industrial changes current within the territory of each obtain a new and much graver importance in their possible effect upon our nascent development as an exporter of manufactured goods. The conditions contributing to the rapid growth of manufactures in recent years; the fiscal changes in Russia, India and Japan, as well as in some of the Latin American countries; the extraordinary impulse given to the industrial and commercial growth of the German empire as a factor of international trade; the advance of Russia on similar lines and the rapid progress of the Siberian Railroad toward an open port on the Yellow sea; the efforts of Great Britain to meet the encroachments of other nations; the decline of the sugar industry in the West Indies as a result of the beet sugar competition; the troubles of Spain with her colonies; the discovery of gold in Alaska and the adjacent territory in British Columbia; the tariff legislation of the United States, Canada and other countries—all the phases of economic changes during the past year have and interest and importance for the individual operative in the United States which are greatly enhanced by the transformation now going on in our industrial life, converting us slowly but surely from a people absorbed with the internal development of a virgin continent into one of the great commercial powers of the world, with the international interests and responsibilities which such a position naturally implies.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING JULY 17, 1898.

607,727.—BICYCLE HUB—J. Baker, Pasadena, Cal.
607,730.—POLISHING MACHINE—H. Breckenridge, Lynden, Wash.
607,733.—CURRYCOMB—J. Carden, Carpinteria, Cal.
607,656.—COOKING APPARATUS—F. A. Dixon, San Jose, Cal.
607,658.—BICYCLE GEAR—D. W. Guile, Portland, Ogn.
607,619.—WASHING MACHINE—F. L. Johnson, Valley Springs, Cal.
607,515.—DISH CLEANER—Leonard & Hescoc, Tacoma, Wash.
607,661.—BEER BARREL—R. Piotrowski, S. F.
607,557.—FRICTION CLUTCH—E. Turney, Portland, Ogn.
29,053.—FLAG DESIGN—J. M. Kennedy, Los Angeles, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

BEER BARREL.—R. Piotrowski, San Francisco, Cal. No. 607,661. Dated July 19, 1898. This invention relates to improvements in barrels and kegs such as are employed to contain beer and other effervescent liquids under pressure. It consists essentially of composite heads made of disks of steel and wood placed together, fitting into the grooves of the keg and having a bolt and nut whereby the two parts are drawn together at the center with an elastic tension, so as to make the meeting edges hermetically tight. Through one side of the head thus made is introduced a bushing of any suitable character for the reception of the faucet by which the contents are withdrawn.

AUTOMATIC COOKING APPARATUS FOR CANNERIES.—F. A. Dixon, San Jose, Cal. No. 307,656. Dated July 19, 1898. The object of this invention is to provide a means for mechanically transferring the prepared cans, automatically submerging them first into a tank known as the "exhauster," in which the air is expelled, removing them from this tank until the vents are sealed, then submerging them by continuous operation into the final cooking tank, and regulating the time during which the cans are submerged in the first and in the second tank without changing the speed of the carrier, and in providing a rapid and convenient means for removing and discharging the cans after the operation is completed. The tanks are arranged in line with each other, and the pans in which the cans are contained are suspended from tracks above by trolley wheels adapted to travel on these tracks. The tracks are disposed one above the other, the upper ones serving to suspend the pans above the tanks and a switch track connection is so arranged that the trolleys are transferred to the lower tracks so as to submerge the pans in the tanks for the desired length of time, and then to again raise them out of the tank.

To Measure Flowing Water.

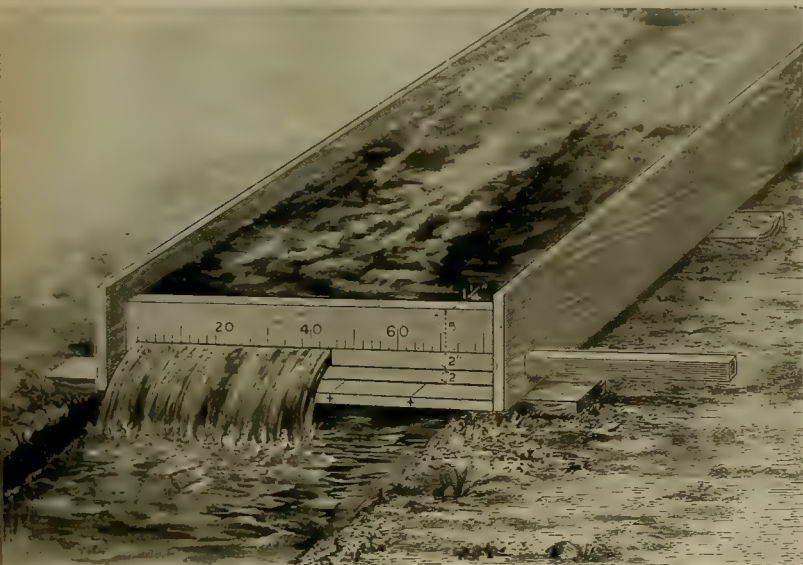
ase answer through the columns of next's issue how a gauge may be made for measuring water pumped from an irrigating pump!

ase advise me what a miner's inch of water irrigation purposes is. I had understood it was quantity of water which will pass through opening 1 inch square under a pressure of 4 a." Enclosed cutting from a late issue of a paper gives a different definition. Which is it?

the courtesy of the Pelton Water el Co., 121 Main St., San Francisco, we with reproduce from the 6th edition of

The lower edge of the aperture should be 2 inches above the bottom of the measuring box and the plank 5 inches high above the aperture, thus making a 6-inch head above the center of the stream. Each square inch of this opening represents a miner's inch, which is equal to a flow of 1½ cubic feet per minute.

Place a board or plank in the stream, as shown in the drawing, at some point where a pond will form above. The length of the notch in the dam should be from two to four times its depth for small quantities and longer for large quantities. The edges of the notch should be bevelled toward the



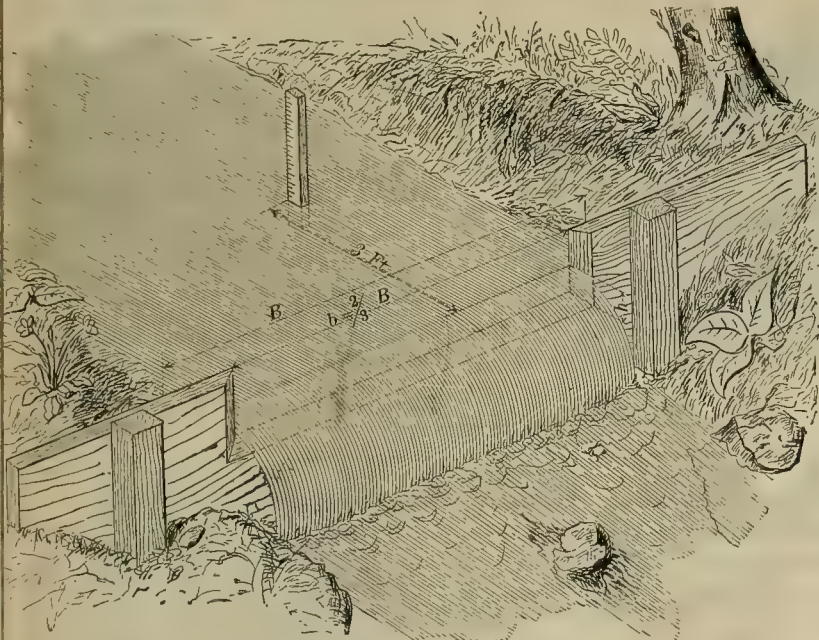
EXPLANATION OF MINERS' INCH MEASUREMENT.

catalogue cuts and description of rs' inch measurement, for measuring water of a stream by a weir dam and table by which the flow can be inter- d into cubic feet per minute. There so given a table for measurement of r flowing from a tank at varying pres- . These, it is believed, will answer uestions asked.

e term miners' inch is a method of urement adopted by the various ditch

intake side as shown. The overfall below the notch should not be less than twice its depth—that is, 12 inches if the notch is 6 inches deep, and so on.

In the pond about 6 feet above the dam drive a stake, and then obstruct the water until it rises precisely to the bottom of the notch and mark the stake at this level. Then complete the dam so as to cause all the water to flow through the notch, and, after time for the water to settle, mark the



EXPLANATION OF WEIR DAM MEASUREMENT.

panies in disposing of water to their omers. The term is more or less indefi- for the reason that the water compa- do not all use the same head above the er of the aperture, and the inch varies 1.36 to 1.73 cubic feet per minute ; but the most common measurement through an aperture 2 inches high and ever length is required and through a k 1½ inches thick, as shown in cut.

stake again for this new level. If prefer- ed, the stake can be driven with its top precisely level with the bottom of the notch and the depth of the water be measured with a rule after the water is flowing freely, but the marks are preferable in most cases. The stake can then be with- drawn and the distance between the marks is the theoretical depth of flow correspond- ing to the quantities in the table.

TABLE FOR WEIR MEASUREMENT.

Giving Cubic Feet of Water per minute, that will flow over a Weir one inch wide and from ⅛ to 20⅞ inches deep.

| INCHES. | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 |
|---------|-------|-------|-------|-------|-------|-------|-------|
| 0 | .00 | .01 | .05 | .09 | .14 | .19 | .26 |
| 1 | .40 | .47 | .55 | .64 | .73 | .82 | 1.02 |
| 2 | 1.13 | 1.23 | 1.35 | 1.46 | 1.58 | 1.70 | 1.95 |
| 3 | 2.07 | 2.21 | 2.34 | 2.48 | 2.61 | 2.76 | 3.05 |
| 4 | 3.20 | 3.35 | 3.50 | 3.66 | 3.81 | 3.97 | 4.30 |
| 5 | 4.47 | 4.64 | 4.81 | 4.98 | 5.15 | 5.33 | 5.69 |
| 6 | 5.87 | 6.06 | 6.25 | 6.44 | 6.62 | 6.82 | 7.21 |
| 7 | 7.40 | 7.60 | 7.80 | 8.01 | 8.21 | 8.42 | 8.83 |
| 8 | 9.05 | 9.26 | 9.47 | 9.69 | 9.91 | 10.13 | 10.57 |
| 9 | 10.80 | 11.02 | 11.25 | 11.48 | 11.71 | 11.94 | 12.41 |
| 10 | 12.64 | 12.88 | 13.12 | 13.36 | 13.60 | 13.85 | 14.34 |
| 11 | 14.59 | 14.84 | 15.09 | 15.34 | 15.59 | 15.85 | 16.36 |
| 12 | 16.62 | 16.88 | 17.15 | 17.41 | 17.67 | 17.94 | 18.47 |
| 13 | 18.74 | 19.01 | 19.29 | 19.56 | 19.84 | 20.11 | 20.67 |
| 14 | 20.95 | 21.23 | 21.51 | 21.80 | 22.08 | 22.37 | 22.94 |
| 15 | 23.23 | 23.52 | 23.82 | 24.11 | 24.40 | 24.70 | 25.30 |
| 16 | 25.60 | 25.90 | 26.20 | 26.50 | 26.80 | 27.11 | 27.72 |
| 17 | 28.03 | 28.34 | 28.65 | 28.97 | 29.28 | 29.59 | 30.22 |
| 18 | 30.54 | 30.86 | 31.18 | 31.50 | 31.82 | 32.15 | 32.80 |
| 19 | 33.12 | 33.45 | 33.78 | 34.11 | 34.44 | 34.77 | 35.44 |
| 20 | 35.77 | 36.11 | 36.45 | 36.78 | 37.12 | 37.46 | 38.15 |

Example Showing the Application of the above Table.

Suppose the Weir to be 66 inches long, and the depth of water on it to be 11⅝ inches. Follow down the left left hand column of the figures in the table until you come to 11 inches. Then run across the table on a line with the 11, until under ⅝ on top line and you will find 15.85. This multiplied by 66, the length of Weir, gives 1046.10, the number of cubic feet of water passing per minute.

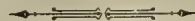
TABLE FOR TANK MEASUREMENT.

Giving the number of Cubic Feet of water discharged per minute, through an orifice one inch square, under any Head of Water from 3 to 72 inches.

| HEADS IN INCHES. | Cubic Feet Disch'd per minute. | HEADS IN INCHES. | Cubic feet Discharged per minute. | HEADS IN INCHES. | Cubic feet Disch'd per minute | HEADS IN INCHES. | Cubic feet Discharged per minute. | HEADS IN INCHES. | Cubic feet Disch'd per minute. |
|------------------|--------------------------------|------------------|-----------------------------------|------------------|-------------------------------|------------------|-----------------------------------|------------------|--------------------------------|
| 3 | 1.12 | 17 | 2.51 | 31 | 3.36 | 45 | 4.05 | 59 | 4.63 |
| 4 | 1.27 | 18 | 2.58 | 32 | 3.41 | 46 | 4.09 | 60 | 4.65 |
| 5 | 1.40 | 19 | 2.64 | 33 | 3.47 | 47 | 4.12 | 61 | 4.72 |
| 6 | 1.52 | 20 | 2.71 | 34 | 3.52 | 48 | 4.18 | 62 | 4.74 |
| 7 | 1.64 | 21 | 2.78 | 35 | 3.57 | 49 | 4.21 | 63 | 4.78 |
| 8 | 1.75 | 22 | 2.84 | 36 | 3.62 | 50 | 4.27 | 64 | 4.81 |
| 9 | 1.84 | 23 | 2.90 | 37 | 3.67 | 51 | 4.30 | 65 | 4.85 |
| 10 | 1.94 | 24 | 2.97 | 38 | 3.72 | 52 | 4.34 | 66 | 4.89 |
| 11 | 2.03 | 25 | 3.03 | 39 | 3.77 | 53 | 4.39 | 67 | 4.92 |
| 12 | 2.12 | 26 | 3.08 | 40 | 3.81 | 54 | 4.42 | 68 | 4.97 |
| 13 | 2.20 | 27 | 3.14 | 41 | 3.86 | 55 | 4.46 | 69 | 5.00 |
| 14 | 2.28 | 28 | 3.20 | 42 | 3.91 | 56 | 4.52 | 70 | 5.03 |
| 15 | 2.36 | 29 | 3.25 | 43 | 3.95 | 57 | 4.55 | 71 | 5.07 |
| 16 | 2.43 | 30 | 3.31 | 44 | 4.00 | 58 | 4.58 | 72 | 5.09 |

Example Showing the Application of the above Table.

Suppose the opening to be 36 inches long and two inches high, and the head of water above the opening 25 inches. Multiply the length 36 by 2, the height of the opening, and it gives 72. Referring to the above table opposite 25 inch head will be found 3.03. This multiplied by 72 gives 218.16 the number of cubic feet of water passing through the opening per minute.



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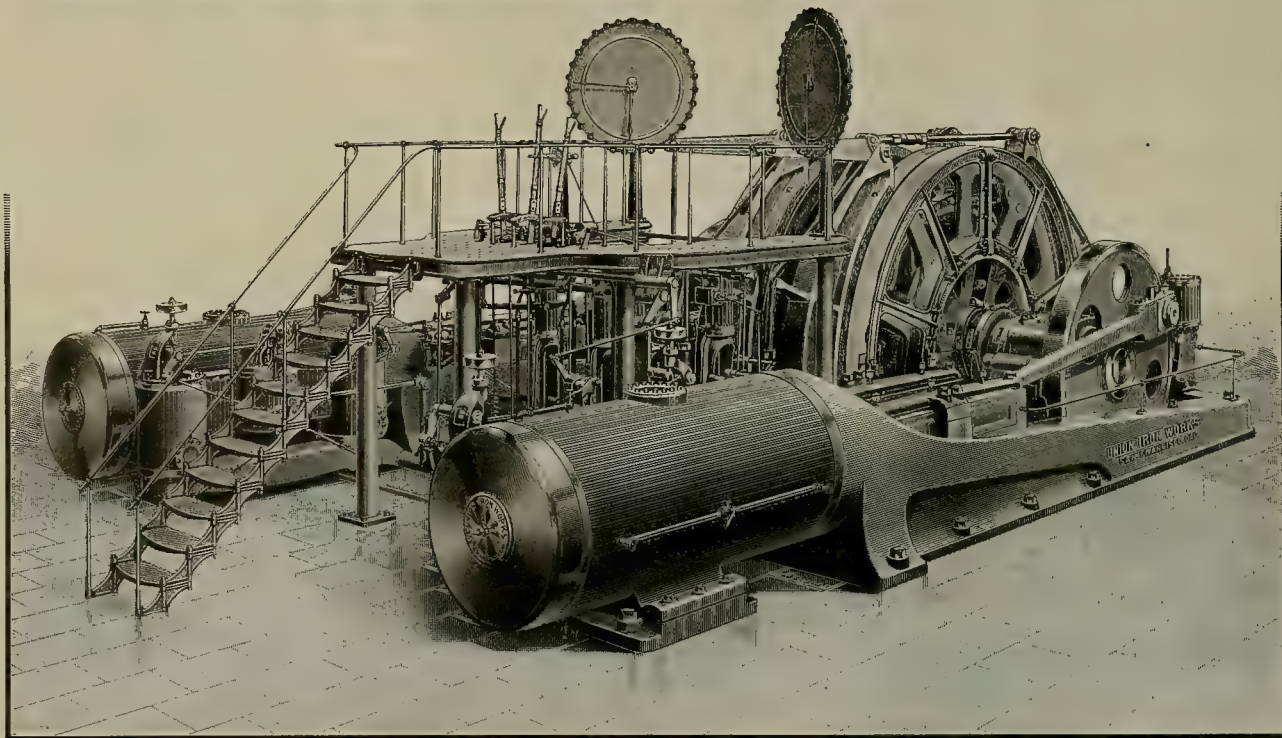
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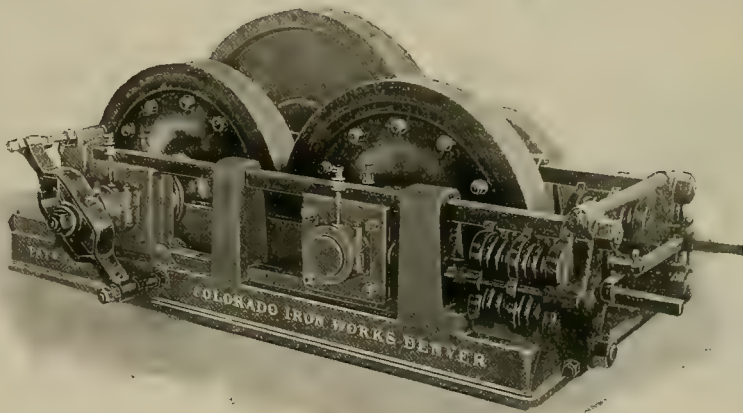
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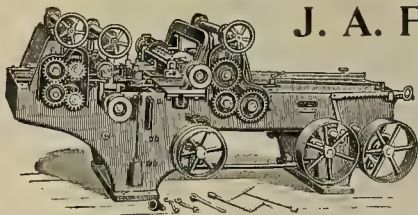
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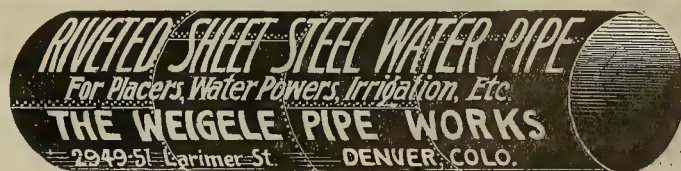
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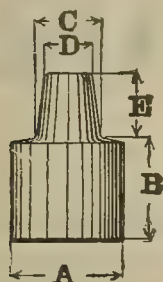


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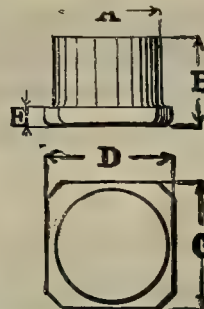
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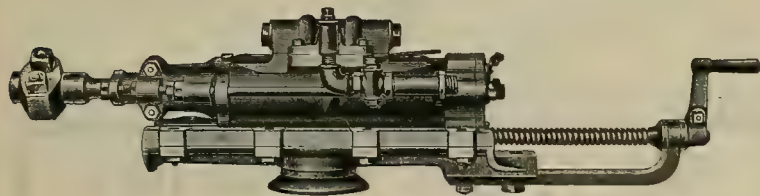
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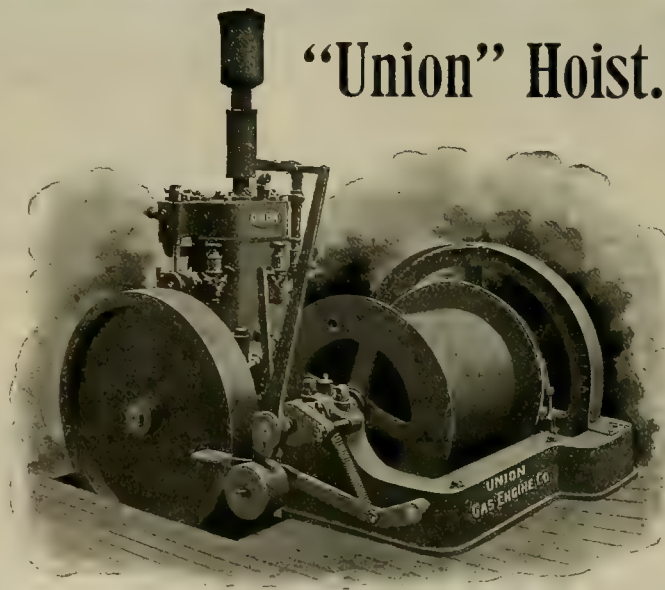
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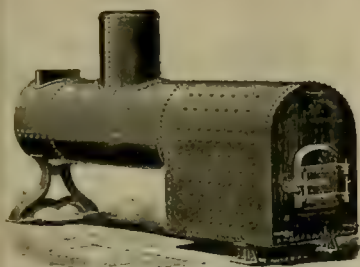
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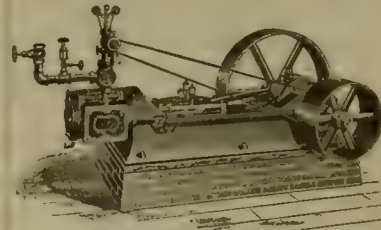
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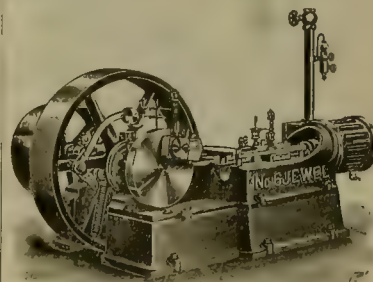
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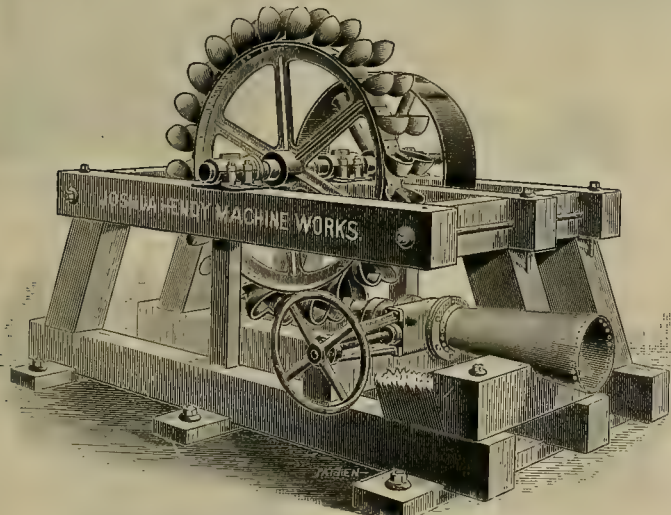
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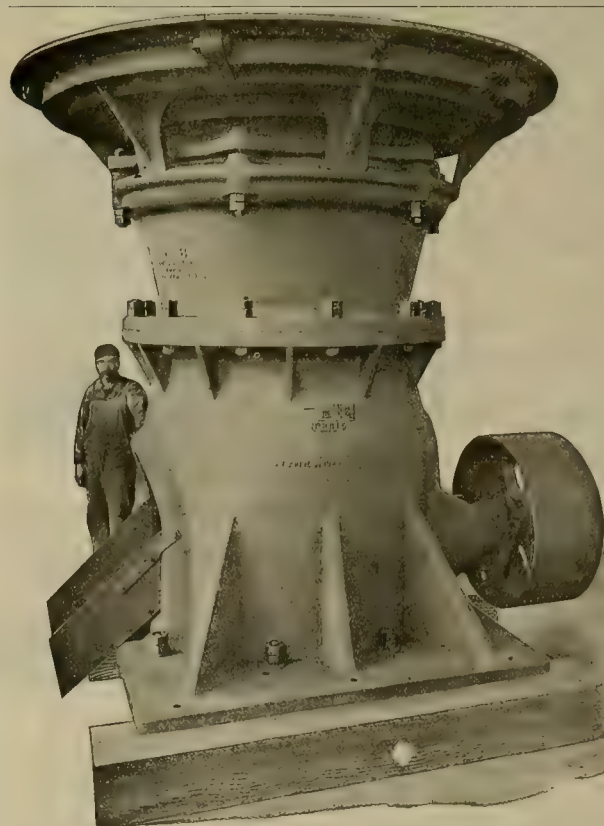
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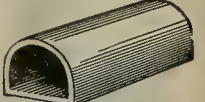
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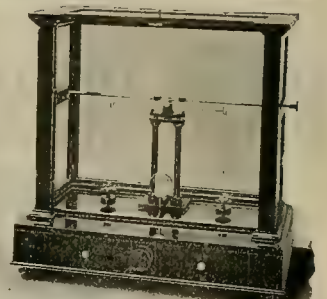
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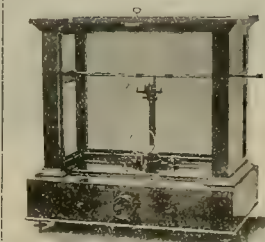
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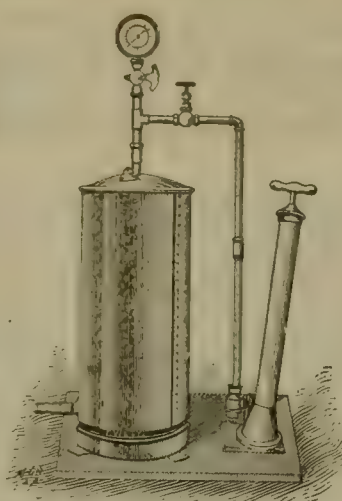
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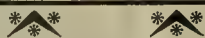
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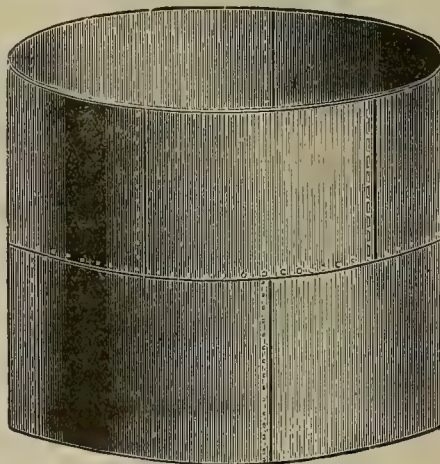
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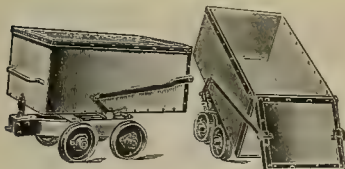
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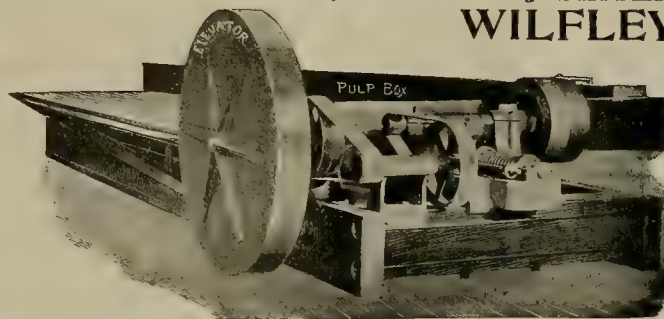
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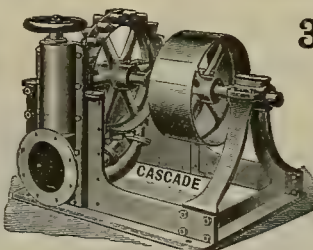
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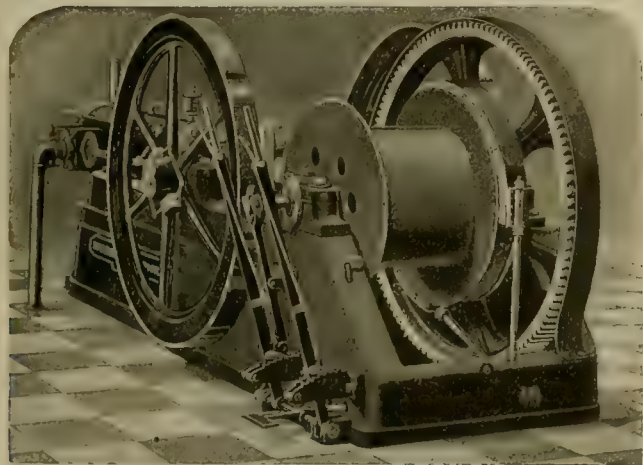
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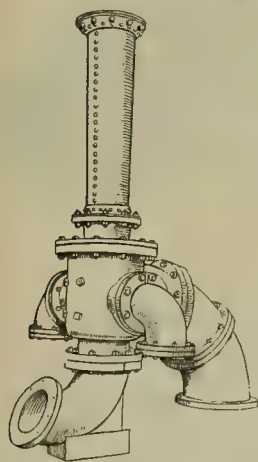
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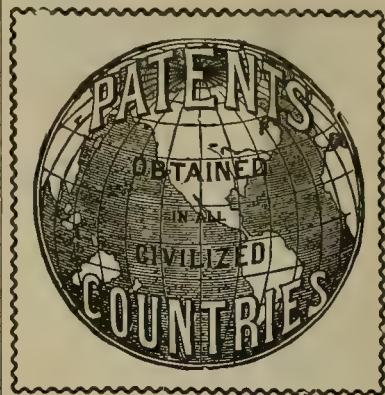
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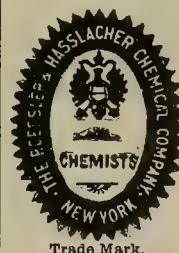


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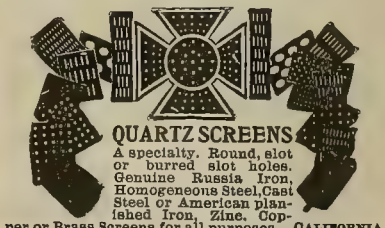


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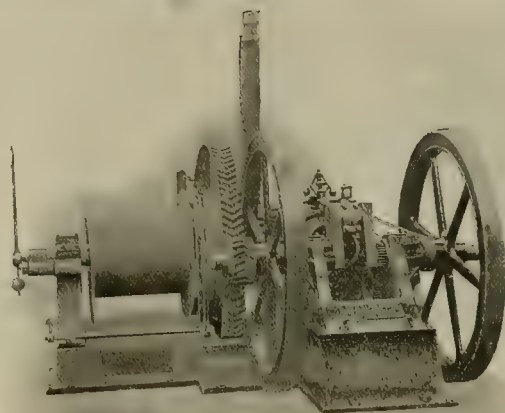
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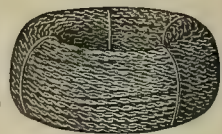


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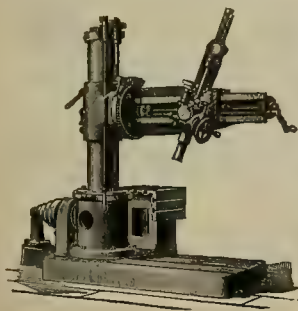
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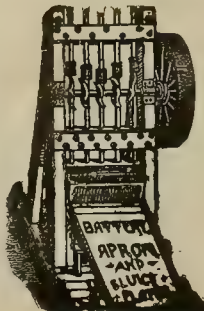
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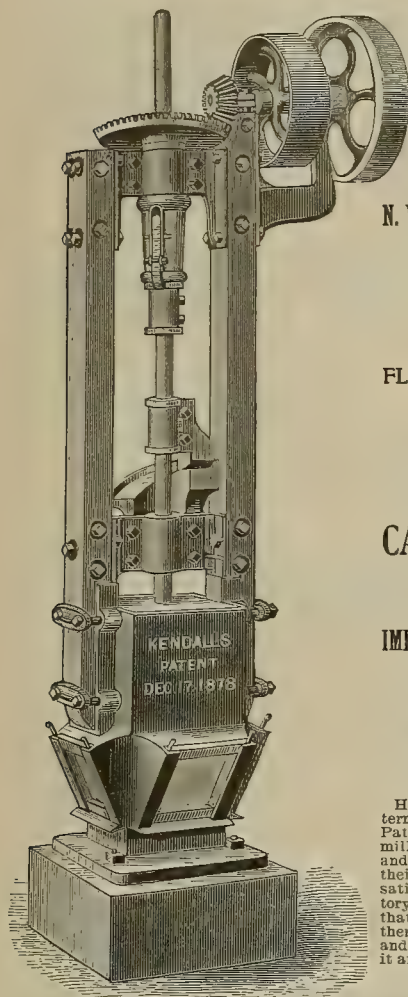
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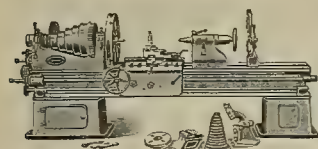
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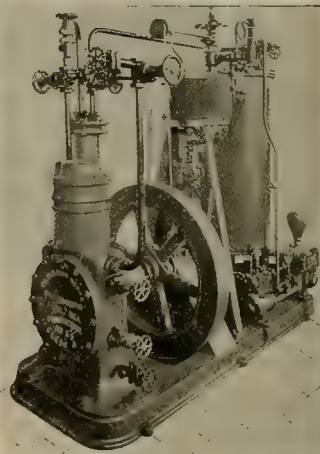
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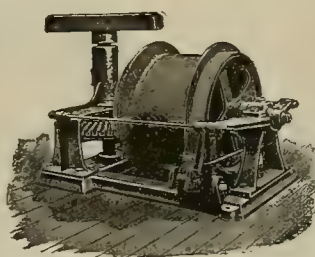
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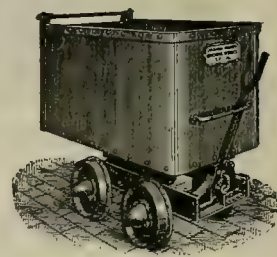
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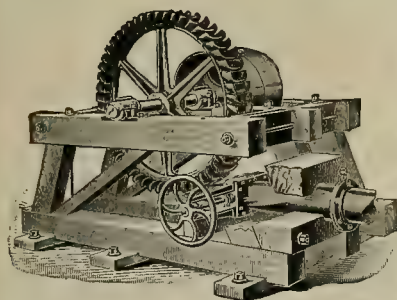
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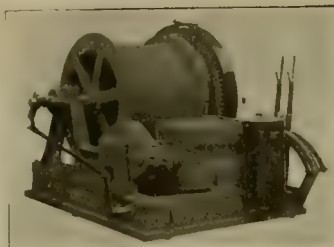
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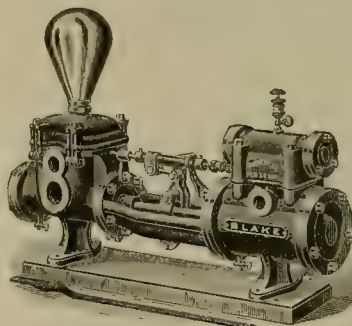
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Assaying.—Part I—Gold and Silver Ores.

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Market Reports.

The Markets.

SAN FRANCISCO, July 28, 1898.

SILVER.—London, 27½d; New York, 58¾; San Francisco, 58¾, nominal. Bradstreet's reports: "The only feature of the London silver market was the renewal toward the end of the week of Spanish purchases. They are, however, cautiously conducted, with an evident purpose of avoiding any decided marking up of quotations. The figures for bars were, however, fractionally higher under this influence." Mexican dollars, 45½. New York exchange, telegraphic, 17½.

COPPER.—Lake, unchanged, 11.50. New York advices are that the market is firm at 11½c for Lake, with sales this week of several hundred thousand pounds thereat for delivery in August and September. Outside of the Calumet business reported, there are aggregate sales of fully 1,500,000 pounds at 11½c to domestic manufacturers. The market closes firm at this price, at which copper has been readily taken by large consumers.

LEAD.—New York, 3.90 asked; smelters quote 3.85; local, pipe, 6@6¼; sheet, 6¼@7c; pig, 5½c.

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—5 and 5½.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c.

ANTIMONY.—9½, 10.

BABBITT METAL.—16c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.25; cut, \$2.00; 10 to 20d, wire, \$2.30; cut, \$2.05; 8d, wire, \$2.35; cut, \$2.10; 6 and 7d, wire, \$2.45; cut, \$2.20; 4 and 5d, wire, \$2.55; cut, \$2.30; 3d, wire, \$2.70; cut, \$2.45; 2d, wire, \$2.95; cut, \$2.70. In carload lots, 10c per keg less.

QUICKSILVER.—Domestic, \$42.50@43; export and carload lots, special rates.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1** 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8 @ Coos Bay, \$5.00; Seattle, 6.00; Southfield, 7.50.

Cargo lots, Eastern and foreign:
Wailend, \$7.50 @ Cannel, \$10.25
Brymbo, \$7.50 @ Cannel, \$10.00
Pennsylvania, 14.00 @ Welsh Anthracite, 12.50
Scotch, 8.00 @ Rock Springs, 7.60

COKE.—Foreign, \$13; domestic, \$11 per ton.

CHEMICALS.—Cyanide of potassium, jobbing, 31 @ 32c per lb.; carloads, 25½c; sulphuric acid, 2½c per lb. for 60%; nitric acid, 12½c; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½c per lb.; blue vitriol, 4½c per lb.; borax, refined, 5@6c per lb.; chlorate of potash, 9¼@10c; roll sulphur, 2½c; blue vitriol, 4c.

LUMBER.—Retail: Pine, ordinary sizes, \$17@18.50; redwood, No. 1, \$18@20; No. 2, \$16@18.

The following list of Washington Government decisions relative to the new stamp tax law was given out by Collector Lynch to-day:

A 2-cent stamp is required on an order for cash drawn on a merchant by one of his customers. Certificates of deposits drawing interest, if left a certain time, are taxable the same as promissory notes.

If papers in the nature of receipts are given in lieu of checks and are used as commercial negotiable instruments, they are checks, and not receipts, and are subject to tax.

Where certificates of stock are delivered as collateral, the stock to be forfeited on condition of failure to pay the debt for which it is pledged, a stamp is required as a pledge and not as a sale.

Real estate mortgage notes require to be stamped in addition to the stamps placed on the mortgage.

Where there is a pledge of property accompanying any promissory note, which pledge is subject to stamp tax under schedule A, this stamp tax must be paid, notwithstanding the fact that a stamp is also required on the note connected with it.

In cases of loans on real estate where promissory notes are given, which are not paid at maturity, but on which an extension of time of payment is granted without the taking of a new note, it is held that every such extension is a renewal of the note within the meaning of the statute, and that the requisite stamp must be affixed for every such renewal or extension. This also applies to notes discounted before July 1, falling due on or after that date.

The person who signs and issues a bank check without affixing the proper stamp becomes involved in liability to penalties under section 10 of the act, unless it is shown that he had no design to evade the payment of the stamp tax, and that the requisite stamp was affixed and canceled by the bank or person upon whom it was drawn before payment.

When certificate of stock is sold and stamp tax is paid on memorandum thereof, upon transfer of this certificate to purchaser's name, no additional tax for such transfer is required. Where one certificate represents several shares of stock (however large the number of shares) on the transfer of this certificate the stamp tax is to be reckoned on its face value and not on the face value of each separate share of stock which it represents.

Immense amounts in the aggregate are now being received by the Government by the operation of the stamp tax. Conquest, expansion, "imperialism," annexation, etc., come high, but

we advance and must pay the first cost. The nation moves on. First, we crossed the Alleghenies, then subdued the plains, then crossed the Rockies, then the Sierras. Now even the Pacific ocean does not stop the steps of manifest destiny.

Mining Share Market.

SAN FRANCISCO, July 28, 1898.

Little in the way of business has been done during the week. On Monday all stock dealing began on the plan of certificates, calling for future delivery of shares at the par value to which stockholder's meetings will reduce them next September, which gave a little life, though, of course, nothing like activity could be expected under present conditions at the mines.

The Governing Committee of the Colorado Springs Mining Stock Association held a meeting Friday and passed a measure which will do away with the 25-cent stamp tax for power of attorney, says the Denver News. The measure has received the favorable opinion of a number of leading law firms. The manner in which they propose to do away with this tax is by the adoption by each company as a by-law to this effect:

"All transfers of the stock of the company shall be made by assignment of the certificate representing the same duly signed by the person in whose name such certificate was issued, and all such transfers shall be entered and registered by the secretary in a book kept for that purpose, but only upon the surrender of such certificate duly assigned as aforesaid. No transfers shall be complete until such assignment, surrender, entry and registration, and all surrendered certificates shall be canceled and placed on file by the secretary."

The Con. Cal. & Va. and Andes proposes in September to reduce share values to \$2.50, Chollar, Occidental, Mexican, Crown Point, Yellow Jacket, Belcher, Confidence, Challenge Con. and Caledonia, \$3, Julia and Con. Imperial \$1.

Recent California Mining Incorporations.

Pacific E. Co., San Francisco; capital stock \$15,000; subscribed \$25; G. F. Davidson, I. J. Truman, B. F. Hand, R. Garvey, T. K. Code.

Pacific Slope D. Co., San Francisco; capital stock \$1,000,000; subscribed \$125; W. Butterfield, E. A. Emmons, F. Homer, A. M. Goss, E. C. Kemble.

Thorpe G. M. Co., San Francisco; capital stock \$80,000; subscribed \$28,000; A. Poniatowski, T. S. Bullock, H. McAllister, W. Angus, W. Gregg.

Horse Shoe Bend & Tuolumne Co. M. & D. Co., Sonora; capital stock \$150,000; subscribed \$125; J. W. Dunlap, M. E. Sanford, H. E. Pratt, M. J. Gastman, G. Morrice.

Overman M. Co., San Francisco; capital stock \$230,400; subscribed \$70; W. G. Morrow, M. Schmitt, J. P. Martin, A. S. Groth, W. E. Sharon.

Mammoth S. & R. Co., Randsburg; capital stock \$100,000; subscribed \$51,000; H. A. Bacon, J. C. Creusshaw, J. Goldsmith, E. Johnson, I. N. Cohen.

Plymouth Rock M. & M. Co.; capital stock \$100,000; subscribed \$50,000; J. A. Parsons, J. A. Sanborn, C. E. Brown, W. H. Murphy, C. D. Bailey.

Recently Declared Mining Dividends.

Lower Mammoth, Utah, 25 cents per share; payable immediately.

Pioneer G. M. Co., California, 12½ cents per share, \$12,500; payable Aug. 12.

Standard Con., California, 10 cents per share; payable Aug. 15.

Homestake, South Dakota, 25 cents per share; July 25.

Elkton, Colorado, 2 cents per share; July 20.

Mammoth, Utah, 5 cents per share, \$20,000; payable Aug. 1.

Lillie, Colorado, 1 cent regular and 2 cents extra per share, \$27,000; payable Aug. 25.

Moon Anchor, Colorado, 7½ cents per share, \$45,000; payable Aug. 1.

Quincy Copper M. Co., Michigan, \$3.50 per share, \$350,000; payable Aug. 10.

Montana O. P. Co., Montana, \$1 per share, \$40,000; July 20.

Tamarack Copper M. Co., Michigan, \$3 per share, \$300,000; July 30.

San Francisco Stock Board Sales.

SAN FRANCISCO, July 28, 1898.

9:30 A. M. SESSION.

50 Best & Belcher... 20 50 Union... 20
500 Chollar... 20

2:30 P. M. SESSION.

200 Ophir... 22 100 H. & N... 60
100 Best & Belcher... 20 100 Belcher... 19
200 Con Cal & Va... 41 100 Utah... 02
200 Savage... 14 200 Bullion... 05
500 Chollar... 20 100 Caledonia... 20
200 Potosi... 21 200 Andes... 06

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Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

Commercial Paragraphs.

At Houghton, Mich., the E. P. Allis Co. of Milwaukee has secured the contract for the machinery of the new Franklin mill, to include five stamps and a 15,000,000-gallon pump. Mill building will be of steel and is to be ready July 1, 1899. The Allis Co. has taken orders for over \$100,000 worth of machinery in Houghton county in ten days.

The Union Gas Engine Co. of this city has just completed a 50-H. P. oil marine engine to be placed in the schooner Queen of the Isles this week. Also a 4-H. P. motor of the same type for a landing launch to accompany the schooner. These engines will be operated by kerosene oil of 150 degrees fire test, being the first engines built to work on oil of this high grade. The Queen of the Isles will trade among the Caroline Islands, and is regarded as the pioneer of a large fleet of the same class that will soon ply among the islands of the South Pacific.

One of the largest and best equipped power buildings in the United States in the Manufacturers' building, Providence, R. I. This building has accommodations for upwards of sixty manufacturing concerns, being particularly equipped with conveniences for the production of jewelry, specialties, etc. The Manufacturers Building Company has purchased a 250 K. W., 500-volt Westinghouse Electric & Mfg. Co.'s engine type generator, 100 r. p. m., to be driven by a Corliss engine. This generator will supply power for the operation of motors in the various manufacturing departments of the building.

Mr. W. J. MILLER, General Manager of the Denver Engineering Works, has lately returned from a trip to Europe, where he went to examine some improved electrical mining machinery not being used in this country, but used very extensively in the mines in Hungary. The Denver Engineering Works aim to keep up with the times, if not a little in advance, and considered it would be better to go and see this machinery working rather than get their information by mail, and possibly discover that, if the machinery is capable of producing good work in Europe, it would not work so well in this country. Mr. Miller made arrangements for his company for the introduction of these improvements in this country, which, if successful, will reduce the cost of mining very materially.

Catalogues Received.

Denver Engineering Works Co., Denver, Colo., Catalogue No. 6, electric and steam hoisting plants; elaborately illustrated; dimensions, descriptions and prices, with tables and required information in detail.

Thomson Electric Welding Co., Lynn, Mass.; illustrated description of apparatus for forging, brazing, welding, tempering, etc., by electricity.

The American Stoker Co., New York; handsome pamphlet of their underfeed stoker, with results of tests, testimonials, etc.

Baldwin Locomotive Works, Philadelphia; illustrations and specifications of work recently turned out for foreign use, with records of construction, etc.

Dearborn Drug and Chemical Works, Chicago; an excellent treatise on lubricating oils for engines and machinery, and the proper treatment of boiler feed water to prevent the formation of scale, with explicit directions as to how to send samples of feed water for analysis, and practical points about the selection of lubricants.

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WANTED.—Position as Manager of Gold Mine or Mill. Have had ten years' experience in mining and milling free and base gold ores and thoroughly understand all departments. References. Address Z, Mining and Scientific Press.

WANTED.

Partner in Extensive Placer and Quartz Mines. Free wood and water. JAMES ARTHUR, Cornucopia, Union Co., Oregon.

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B. F. WILSON, Battle Mountain, Nevada.

NOTICE OF DIVIDEND.

Jamison Mining Company, rooms 50 and 54, No. 120 Sutter street, San Francisco, California. June 20th, 1898. Semi-Annual Dividend No. 2.

At their meeting of June 20th, 1898, it was resolved by the Board of Directors of the Jamison Mining Company to pay to the stockholders of the company from the surplus funds in the treasury a dividend of Nineteen Thousand Five Hundred Dollars (\$19,500.00), being five (5) cents per share on the capital stock of the company.

The dividend will be payable at the office of the company on the 15th day of August, 1898, to all stockholders of record on the 5th of August, 1898. Transfer books will be closed at the close of business on the 5th of August and reopened on the morning of the 16th of August, 1898.

SAM. W. CHEYNEY, Secretary.

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage.

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Assessment Notices.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of June, 1898, an assessment (No. 10) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 237 13th street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 4th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 4th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

Office—237 13th street, San Francisco, California. The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of June, 1898, an assessment (No. 4) of Two Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 14, Nevada block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 20th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

WILLIAM McPHERSON, Secretary. Office—Room 14, Nevada block, No. 309 Montgomery street, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of July, 1898, an assessment (No. 84) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 49, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of August, 1898, shall be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 20th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

A. L. ELLIOT, Secretary. Office—Room 49, Nevada block, No. 309 Montgomery street, San Francisco, California.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 10th day of May, 1898, an assessment (No. 1) of 1 1/2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 7, 5th floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 30th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

R. L. CHENEY, Secretary. Office—Room 7, 5th floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 8th, 1898.

R. L. CHENEY, Secretary. Office—Room 7, 5th floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to August 6th, 1898, and the day of sale to MONDAY, September 5th, 1898.

R. L. CHENEY, Secretary. Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

THORPE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Fourth Crossing, Calaveras County, California.

Notice is hereby given that, at a meeting of the Board of Directors, held on the 10th day of June, 1898, an assessment (No. 10) of 2 1/2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 44, Phelan building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of July, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 8th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

A. F. FREY, Secretary. Office—Room 44, Phelan building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Thorpe Mining Co., the day of delinquency of the above assessment has been postponed to August 16th, 1898, and the day of sale to WEDNESDAY, September 7th, 1898.

A. F. FREY, Secretary. Office—Room 44, Phelan building, San Francisco, California.

MARINA MARICANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 9th day of July, 1898, an assessment (No. 14) of 2 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary at the office of the company, 217 Sacramento street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 18th day of August, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 7th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

CHARLES BOVONE, Secretary. Office—217 Sacramento street, San Francisco, California.

ROSE CREEK MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1898, an assessment (No. 2) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 3rd day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

J. M. WILMANS, Secretary. Office—Room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

BOULDER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, El Dorado County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1898, an assessment (No. 1) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 2d day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

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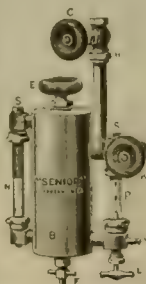
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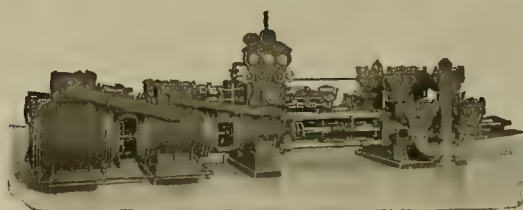


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as well as almost every other make of steel.

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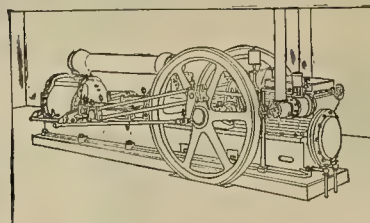
Yours very truly,

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Hardware and General Mining Supplies.

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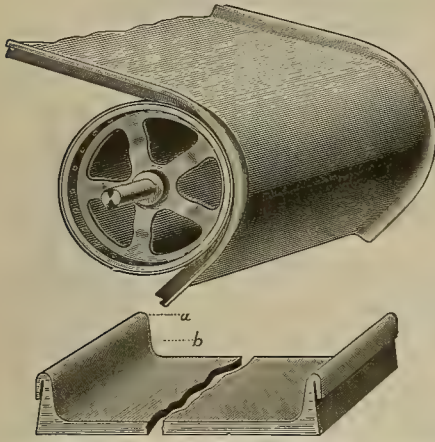
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J. S. BROWNELL, ESQ.—DEAR SIR: Replying to your query of Feb. 15th, will say that I have used your Patent Lip flange belt more than one year, and judging from their appearance after more than one year of hard service, I do not hesitate to say that they are the best belt I have ever used and I take great pleasure in testifying to the fact.

MR. J. S. BROWNELL—DEAR SIR: I take pleasure in saying that I have used your Patent Lipped flange belt for several years while connected with this company, and I consider them the best that we have used. The quality of rubber in the flange seems to be the best, and we are not bothered with the flange cracking and thereby destroying the life of the belt. At present we are using 14 concentrators, and have in use several kinds of belts. We consider your Patent Lipped flange the best.

For any information regarding Frue Vanner or Belts, call on or address

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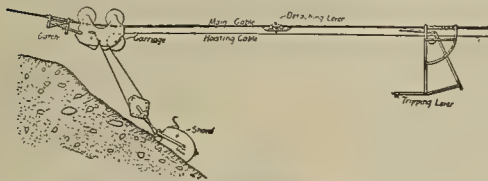


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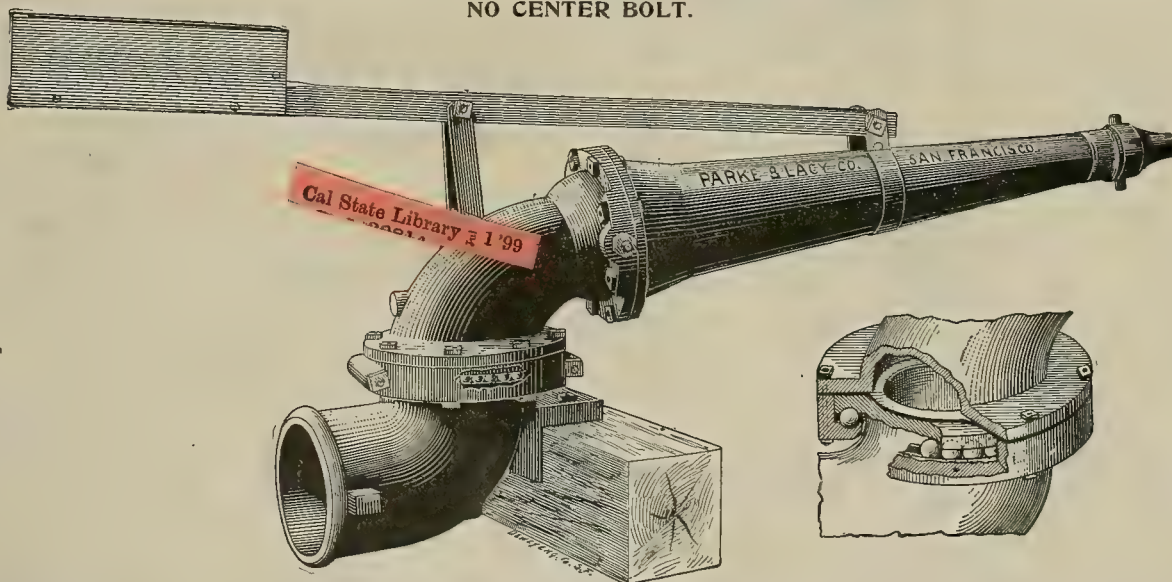
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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1987.—VOLUME LXXVII.
Number 6.

SAN FRANCISCO, SATURDAY, AUGUST 6, 1898.

THREE DOLLARS PER ANNUM.
Single Copies, Ten Cents.

Vertical Duplex Gas Engine.

In England is now built a gas engine which departs from the normal design. Two pairs of these gas engines, manufactured by the Griffin Engineering Co., were recently installed in a warehouse in London for driving dynamos to light the warehouse. Each engine drives one generator through a countershaft, the plant being so arranged that either engine can be coupled to either machine. The most striking peculiarity of the engine is that it is vertical and that the cylinders are supported on four massive steel pillars. This is not the first vertical gas engine built, but previous ones have been much smaller. These engines at 180 revolutions each give 46 I. H. P. and 40 brake H. P. The vertical design seems well adapted to this engine, as the heavy and sudden

upper end of a vertical shaft operates both sets of valves. Inlet and exhaust valves open direct into each cylinder, being operated by ordinary levers from the cam. The ignition of the charge is effected by two incandescent tubes arranged side by side in one chimney and heated by a single Bunsen flame, a single gas valve supplying both cylinders. It is controlled by a hit-and-miss device operated by a centrifugal governor. It will be noted that the combustion chamber and passages are entirely water-jacketed. The dimensions of the cylinder are: Diameter, 10½"; stroke, 15". The consumption of

respecting value, but that when they appear in the English market, through a "prospectus" and an incorporated Co., Limited, with earls, lords, etc., directors, with figures for shares \$40 to \$1 to be paid for the property, and all so grandly gilded, that the poor mining proprietor becomes convinced that he has been foolish in letting go so cheaply a property estimated by others to have so enormous a value. Of course, most of us understand how it is, but lately it has become clear that the English public is waking up to the existence of an evil: the selling of position and influence for coin.

The Hooley expose makes clear the causes and requirements for all the loading-up of mining and other properties when put on the London market. Ordinarily, so many have to be cared for in any English operation, that to cover all a figure is put on

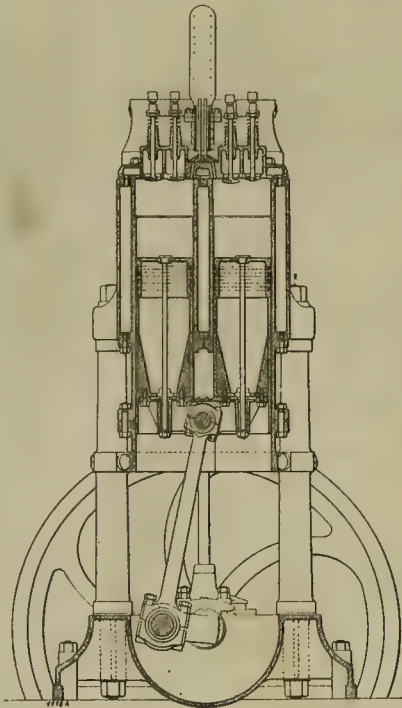


FIG. 2.

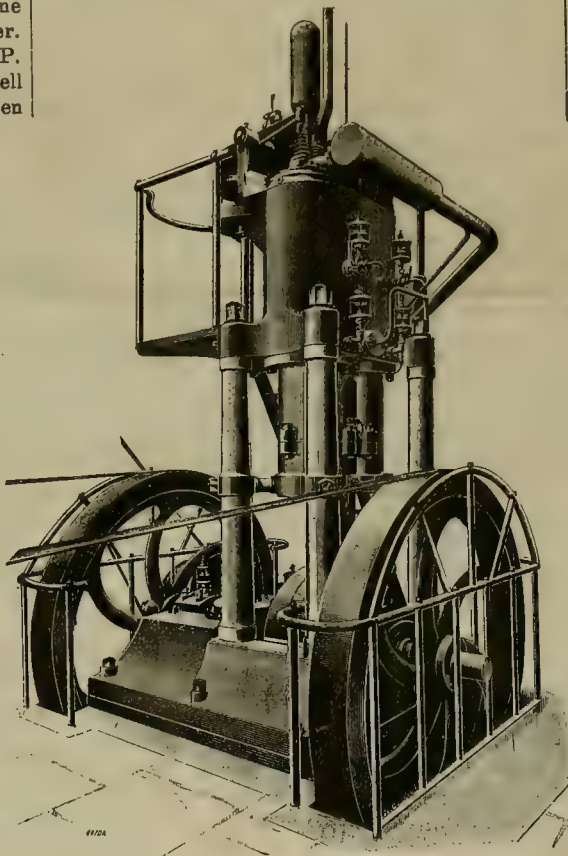


FIG. 1.

NEW VERTICAL DUPLEX GAS ENGINE.

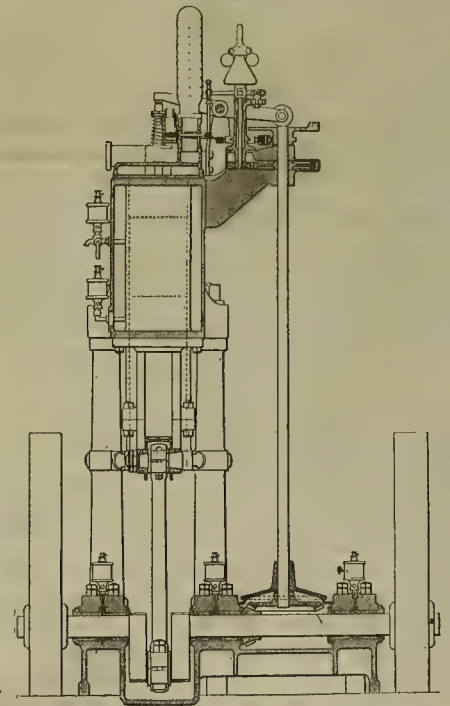


FIG. 3.

strains to which it is subjected are met by placing the cylinders on the pillars. There is a noticeable absence of vibration, and it is not so easy to distinguish between explosion strokes and non-explosion strokes, as is usually the case with horizontal engines. The saving of space was in this instance also an important matter.

Fig. 2 shows a second feature of novelty—the duplex arrangement of the cylinders—there being two cylinders, but only one connecting rod. It will be noticed that the two cylinders are combined in a single water jacket and that the two pistons are coupled together by a steel cross-head. The trunk pistons are very long and work each in its own cylinder for its entire length. The inner sides of the cylinders, where they form guides, are cut away to allow the cross-head to pass. Each piston is bolted to the cross-head by four bolts, and in addition there is a central bolt passing through the entire length of the piston. The engine works on the four-stroke cycle, there being an explosion at each stroke in one or the other of the cylinders. A single cam on the

gas is said to be 18½ cubic feet per I. H. P. and 21½ cubic feet per brake H. P. Since the engines have to make long runs without stoppage, special pains were taken to render the lubrication continuous and reliable, and the engines run steady, satisfactory lighting by incandescent lamps down to quarter load.

London Stock Jobbing Sharps.

Some months ago a great deal was said in London journals about the way the English people were "swindled" by California mining sharps; in one instance it was stated that all Englishmen should think twice before they invested a shilling in any American mining property. At the time the matter was noted herein, one communication on the subject saying "if the English would look very closely they would find, no doubt, several Englishmen 'under the fence' somewhere," and that they were the fellows who loaded the mines upon their countrymen. It is well known by everyone handling mines on the English market that properties leave California under bond, at fair, profitable and honest figures,

mining property that makes a sale too often a failure, which otherwise should have been a success. This latest expose should make a radical change in all this business of English promotion. Everyone is willing to accord a legitimate profit for the trouble of finding good mines, and preparing them for sale, and to the English agent for his business efforts; but it is a curse to American mining interests to demand in London \$1,000,000, or possibly \$2,500,000, for a property negotiated in California or elsewhere for from \$50,000 to \$300,000. There is neither sense, honesty or business in such work, and the sooner it is ruled out the better. An owner who desires to make success of a sale should determine upon his price, allow the promoter a reasonable advance to pay him for his trouble and business service, then demand in writing that no additional loading, under any circumstances, shall be put upon that price. This would enhance the likelihood of a sale. The English buyer would thus have value received for his money and the American mine owner and promoter would be credited with fair dealing.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....Publisher

San Francisco, August 6, 1898.

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A PAPER recently read before the Colorado Miners' Bureau on "Gold Yield of Placer Mines" brings out some noticeable statistics coinciding with some former statements in this paper regarding the large percentage of the world's gold yield produced from placer mines. The paper referred to goes further and claims that more than eighty per cent of the world's supply of gold has been taken from placer ground. Some definite statistics were furnished, compiled from official reports, which tended to corroborate the claim. In those reports Russia is credited with an annual placer production of gold amounting to \$20,000,000. Some of the figures seem to be exaggerated: for instance, Africa appears as having yielded a total of \$553,000,000 in placer gold; Japan, \$500,000,000; Australia, \$1,250,000,000; New Granada, \$847,113,750; Peru, \$124,000,000; Bolivia, \$205,000,000; Brazil, \$500,000; California, \$1,200,000. The present Klondike gold yield will tend to further augment the percentage of the world's gold yield from placer mines. And yet the enormous aggregate is but an index of the possibilities in that direction.

THE one unanswerable argument in favor of the profitable nature of gold mining as a business is the increased value of the product, the only product of any industry that shows such increase. True, it is not called an increase, but the fact is manifest. Everything connected with its production has increased in convenience and utility, but decreased in price. Mining supplies of all kinds are furnished cheaper and better: \$25 to-day will buy what cost \$100 twenty-five years ago; cost of reduction has been reduced; labor is obtainable at lower rate; yet, contrary to the rigid rule in every other business instance, the product sells for the same price it did when the attendant cost of production was three or four times what it is now—\$20.67 per ounce. It would be interesting to give tabulated statements of cost—now, and say twenty-five years ago; giant powder then \$1 per pound, now of vastly better quality, 15 cents; candles, \$20 per case, now \$5; fuse \$30 per 1000 feet, now \$4.50; iron 20 cents, now 5 cents; steel 40 cents, now 8 cents; tools of all kinds in like proportion. Nor is this all. In all other products the producer seeks the customer, the buyer, the consumer. In all other products "overproduction," "want of consumption," business rivalry, competition, ruinous cutting of prices and other attendant annoyances embarrass the producer. In the case of the gold miner, he is saved all these troubles. In nearly every other line of human industry the question of freights enters largely into the problem; upon the ability of the producer to get the product to market often depends success or failure of the entire enterprise. In the case of the gold miner freight charges are reduced to the minimum. These are a few of the unusual circumstances attendant upon the business of gold mining and sufficiently illustrate the point.

The Usual Result.

Most instructive in "financial methods" is the publicity now accorded "the Electrolytic Marine Salts Co." in Eastern prints. This concern some time ago announced its ability to profitably extract gold from salt water at its "works" at North Lubec, Maine. At the time reference was made herein to recent scientific investigation, tending to further confirm that which is generally understood, viz.: that while gold undoubtedly exists in sea water, it has hitherto been unprofitable to attempt its separation therefrom, the amount being less than $\frac{1}{4}$ of 1 grain to the ton of water. The opinion was also expressed that the first part of the coupled fact might be successfully used in inducing ignorant people to invest in a proposition to form an extraction company, which to investors would prove as fruitless as a similar one to extract sunbeams from cucumbers. The result is in accordance with our belief.

Boston financial papers (of course, wholly uninfluenced financially; purely in the interest of science), during June and July contained most glowing accounts of the enormous resultant profits on the stock of this company: the likelihood of a sudden rise in the price of the stock, intimation that by proper effort a few shares could still be secured, and further innocent statement that some knowing ones who applied for blocks of the stock had to be content with a "pro rata," and were congratulating themselves on getting even a very small slice of this very valuable stock.

Indeed, had such editorial articles appeared in London financial journals it would be uncharitably assumed that they were paid for at so much, so very much, per line to induce foolish people believing such absurdities to buy stock.

That those articles had such effect is evident. In the issue of July 29th of one of the Boston papers, most fulsome in its former editorial statements, is expressed serious concern regarding the present whereabouts of the "reverend" inventor and custodian of the secret, who, it says, "has this year realized from confiding New England investors more than \$1,000,000, of which \$338,378 was paid to him personally." It appears that this gentleman has suddenly and silently withdrawn, and it is feared in Boston editorial offices that much of the money paid him has accompanied him in his departure. The fact that some of his remaining associates declare in this same issue of the Boston paper of July 29th their willingness to "stake their lives on the success of the business" does not tend to remove painful apprehension among people who, according to this Boston paper, have "mortgaged their houses and reduced their living to put money into this company." Just how much influence the former meretricious editorial announcements had to do with inducing those misguided people to put their money into the scheme is something that is indeterminate. It is a pity that the lashing now being administered the "reverend" projector by the astute Boston press was not forthcoming when he first induced those immaculate publications to print the statements that lured the victims into his cleverly constructed net.

HITHERTO, amid the fraud, falsehood and trickery so prominent in nearly everything connected with the Klondike, the Canadian officials have enjoyed honorable place. But if half what is charged by recent arrivals be so, they, also, deserve condemnation. With considerable show of truth, it is asserted by men from the Klondike that, by illegality and injustice, Canadian officials have created a monopoly, and that they are devoid of honesty and integrity. One honorable exception is made—Capt. Constantine. The extortionate taxes and duties may be borne, natural friction and difference may be overlooked, but malfeasance and abuse of position are charged to so great an extent that the officials under so grave an imputation should have an investigation. As between mining claimants in that region the Gold Commissioner's decision is final. This is asserted to be a temptation not wholly withstood by the incumbent. By collusion, it is also claimed, those "on the inside" become possessed of the best claims. This is given as a sample case:

"A man reports the discovery of gold on a new creek; he tells what he has found, gives its location and description, and asks for papers. He is told that the 'inspector' will go out and examine the prop-

erty to see if he has really found gold—if he has not he is not entitled, under the law, to locate. Several days elapse before the inspector can go out, insiders are told to go and locate above and below the discovery hole, 'and you needn't see any other stakes that may be there!' It usually happens that there were several men with the real discoverer on the prospecting tour, and, as soon as a find is made, they all locate above and below. By the time the inspector gets to the spot there are two sets of stakes above and below 'discovery,' one set belonging to the companions of the real discoverer, and one set placed there by those to whom the 'tip' is given. The inspector does his work and reports, and the discoverer is given his papers. As the discovery must be officially recognized before any other papers can be had on the creek, of course applications for the adjoining claims cannot be recognized until after the discovery is allowed. So when the friends and fellow-prospectors of the real discoverer make their application they are too late; 'papers were applied for and granted to that property an hour ago.' There is no appeal, what is there to be done about it? Then it naturally follows that if the inspector's report is a very good one, and it usually is, there is a stampede, and the property becomes saleable at once. The insiders sell—if they are told to do so—the proper settlement is made, and the insiders wait for another 'tip.'"

Recalcitrant Ownership.

From Los Angeles, Cal., Telluride, Colo., and Burke, Idaho, come practically the same question. The inquiry from Los Angeles is most briefly stated, and is as follows:

A. B. and C. are equally interested in a mining claim. After assessment work is performed, A. and B. desire to continue operations and do so. Is C. liable for his share of expenses incurred—wages, mining supplies, etc.? Can C. cancel this obligation by notifying A. and B. that he will not be responsible for further expenses, and how will he proceed in the matter?

C. is not liable unless working under a mining partnership or by agreement. As stated above, C. can quit whenever he wants to and cannot be made to pay any part of the expenses or stand any share of the loss, though, under the law, if the prospect turns out well and becomes valuable he can claim a share in the profit. Numerous decisions are to the effect that "a co-tenant in possession of a mining claim, whether his interest be large or small, cannot bind those who do not voluntarily participate in the venture. He cannot force direct contribution for improvements made, nor for the costs and expense of development or working." While each co-tenant has the privilege of entering upon the property and making such use of it as its nature will permit without committing destructive waste, he will not be entitled to retain for his exclusive use any more than his proportionate share of the net product. The working co-tenant may deduct from the gross product all legitimate expense of working, but in case of loss he cannot compel his co-owners to contribute.

Section 2324 Revised Statutes contains a method of ordinary forfeiture to co-owners that applies to a portion of the Burke, Idaho, letter. The section referred to, after providing for the performance of annual labor, or the making of improvements to the value of \$100 during each calendar year, contains the following additional provision:

"Upon the failure of any one of several co-owners to contribute his proportion of the expenditures required hereby, the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent co-owner personal notice in writing or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days; and if at the expiration of ninety days after such notice in writing, or by publication, such delinquent should fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners, who have made required expenditures."

With approval is noted the fact that all applications for patents now pending that were filed by employes of the Washington, D. C., patent office, during the period of their service, have been ordered stricken from the files and fees returned. This applies in every case, even when the patent was completed after the former government employe had ceased to be in that capacity. The Commissioner of Patents is to be commended for this ruling, the justice and necessity of which are manifest.

Concentrates.

PITTSBURGH, Pa., capitalists will build a pyritic smelter in Carson, Colo.

MINING company's assessment notices, etc., are legally published in weekly journals.

THE 1894 quicksilver production of the Almaden, Spain, quicksilver mine was 44,521 flasks.

THE Victoria, Australia, gold yield for the six months ending June 30th, '98, was 382,716 ounces.

THE Sierra City, N. M., reduction works refuse to establish an eight-hour system for employees.

THE total dividend disbursements of the Boston & Montana Copper Co. to date aggregate \$3,375,000.

IT is locally claimed that the Barstow, Cal., Reduction Co. pay only \$16 per ounce for "desert gold."

DENVER AND PUEBLO, COLO., smelters have made contracts for iron from the Hartsville, Wyo., mines.

AT Quesnelle Forks, B. C., the Cariboo hydraulic mine's first run of the season amounted to \$62,500.

THAT gold does exist in sea water is a fact; that, so far, it cannot be extracted with profit is also a fact.

THIRTY-FIVE railroad cars of iron and mineral are daily routed from Leadville, Colo., to the smelters.

THERE are over 12,000 tons of ore at the Trail, B. C., smelter, awaiting the starting of the works.

THE Pinos Altos G. M. Co. will build a reduction plant at Pinos Altos, N. M., of 200 tons daily capacity.

IN 1894 the ore shipments from Rossland, B. C., amounted to \$75,000; they increased last year to \$2,100,000.

THE best time to go to the Klondike is in summer; the best time to mine or travel there is in the winter.

IN twenty-one years the market price of 99% cyanide of potassium has fallen from \$1.50 per lb. to 25 cents.

TWENTY THOUSAND maps of Mercur and Tintic, Utah, are being distributed at the Omaha, Neb., exposition.

THE "lost Pegleg mine" is again found—in eastern Riverside Co., Cal., and ought to stay discovered this time.

WHILE descending a shaft in the Gloriana mine at Cripple Creek, Colo., R. E. Melvin was killed by foul air last week.

SURVEYS are being made for a line of railroad from Bingham, Utah, to the Highland Boy mine, a distance of seven miles.

AFTER a respite of eleven months, 30 of the 120 stamps on the Diamond Hill mine at Winston, Mont., have been put in operation.

THE Champion M. Co., at Nevada City, Cal., are rebuilding their reservoir again which will enable them to run their 40-stamp mill.

THE American Express mine at Blacktail, S. D., is the only one in that district paying union wages. The other mines are worked by contract.

THE Tiger-Poorman mine near Burke, Idaho, has introduced electric power and is said to be the only property using it in the Coeur d'Alenes.

AN example of a large mining claim held by one patent is the Golden Butterfly in Butte Co., Cal., consisting of 1200 acres patented land.

THE cyanide plant of the Midas M. Co., at Harrison Gulch, Cal., was destroyed by fire last week. The loss is \$1500. The plant will be rebuilt.

"CONCENTRATES" is unable to tell "when and where the first copper plate was introduced?" referring to the California quartz stamp mill.

SINCE Aug. 22, '97—less than one year—there has arrived in San Francisco from Australia \$24,187,349 in gold, all of which has been recouped here.

NEAR Whitehall, Montana, last week, J. Shea was killed by the accidental discharge of two sticks of giant powder to which caps were attached.

COMMUNICATIONS concerning public lands in southern California can receive speediest reply by being addressed to Col. B. F. Allen, Los Angeles, Cal.

THE Mount Morgan, Australia, dividend for June was 7d per share, £29,166 13s 4d—the first dividend above 6d that has been declared since June, 1891.

THE sale of the Snowshoe mine, near Libby, Mont., which has been under bond for four months to an English corporation, has been closed for \$150,000.

PLYMALE BROS. & Co., who have been experimenting with a dredger near Gold Hill, Or., have taken out their machinery, the enterprise not proving successful.

INCREASED use in the arts, and a strong demand in connection with the cyanide process, are among the causes of the advance in zinc ore from \$22 per ton to \$28.

THE Oroville, Cal., Water Co., has bought the Miocene ditch system and the Thermalito pipe line, and has under consideration the erection of an electric power plant.

THE force of the Livingston, Mont., Coal & Coke Co.'s plant at Cokedale has been increased to sixty men. The company will resume the burning of coke at an early date.

A KLONDIKE report states that J. Ladue has at last secured from the Canadian Government a crown grant for the 160 acres of land upon which the townsite of Dawson is located.

NEAR Choteau, Montana, the Mitchell Co. is building an irrigating reservoir that will cover 2100 acres. At the mouth of the reservoir a dam will be built 40 feet high.

MONTANA placer miners have been favored with plenty of water this year; the industry has received new impetus, and a large output of gold from that source is expected.

THE Congressional bill referred to last week, affecting California mineral lands already patented to the railroad, was endorsed by the California Miners' Association last January.

EVERY application for a U. S. patent to a mining claim filed since the 1st of last month must show that \$500 worth of work has been done on that claim, or for each claim if locations are grouped.

THE Dillon, Montana, Tribune, noting the revival of mining in Beaverhead county, says there will soon be more men employed in the mines there than there were in the '70's and '80's.

THERE are not more than thirty mines in California over 1000 feet in depth, and but three over 2000 feet. The Union Co., on the Comstock is 3350 feet deep; the Calumet-Hecla in Michigan is 4900 feet.

THE Josephine M. Co., operating in Josephine county, Oregon, has made an assignment. The liabilities are \$8000. The

cause of the assignment is the death of one of the company and the scarcity of water.

THE Miners' Union at Leadville, Colo., has arranged for a drilling contest Aug. 14, at which \$700 will be given in prizes, the largest being \$400.

THE Deadwood-Terry shafthouse of the Homestake M. Co., at Lead, S. D., was destroyed by fire last week; loss, \$50,000. It will be rebuilt. Three hundred men are temporarily thrown out of employment.

WORK of sinking for foundations for the proposed debris dam is reported to have been recently resumed under the auspices of the California Debris Commission at "the Narrows" near Smartsville, Yuba Co., Cal.

THE U. S. Mint never makes assays for any one. While assaying is constantly done there to determine the fineness and value of gold dust or bullion, it is only for the institution itself that such work is done.

THE fact that at present there are but forty men on the Comstock payroll as miners, would seem to unsatisfactorily solve the old problem of wages in that famous camp, which for thirty years paid \$4 per day.

THE central point of the North American continent (exclusive of islands) is at Elko, Nevada. The central geographical point in the U. S. is thirty-four miles west of the mouth of the Columbia river.

THE Kootenay country mines, B. C., from the Rocky mountains to the Yale district, produced ten years ago \$26,000; five years later the product increased to \$100,000; last year the output reached \$7,000,000.

T. S. LIPPY, who got about \$100,000 in the Yukon region this season, asserts that the American side or lower 1500 miles of the Yukon river is richer than that part of the Northwest Territory located about Dawson City.

IN 1894 the Boston & Montana Copper Co.'s dividend was \$2 per share; in 1895 it was \$7; in 1896 it rose to \$10, and in 1897 the company declared four dividends of \$3 each. The dividends declared thus far this year amount to \$11 per share.

FROM Arabia district, Humboldt county, Nevada, were recently shipped 500 pounds of phyllite, a silicate of alumina, to Cleveland and New York, to be tested by the electro-cyanide process. The result was 37 cents per ton silver and from \$3 to \$6 gold.

A VERY good coating for iron pipe, and one that will stand 250°, is a good asphalt lacquer laid on thinly. If desired to be "ornamental," zinc oxide mixed in will give a gray shade, red lead a brown. Where oil paint is used the surface should be thoroughly cleansed.

OF the \$2,000,000 gold recently received in San Francisco from the Klondike, that from different localities varied in value, the gold from El Dorado creek going about \$14 to the ounce, and from other localities of higher value, the Bonanza Creek gold going \$16.50.

THE Supreme Court of British Columbia has decided that portion of the Coal Mines Regulation Act relating to the employment of Chinese underground in mines is constitutional and that they are barred from competition with miners in the province of British Columbia.

AT present the Con. Cal. & Va. Co. of Nevada has the largest capitalization of any mining corporation in the country—\$21,600,000. When its proposed reorganization comes to pass the Minnesota Iron Co. will have that distinction, with its 160,000 shares, par value \$100.

FIGURING a Klondike output of \$15,000,000, the product of 8000 men, would give an average of \$1875 per man for the year on the invested capital of outfit and labor. There, as everywhere, every dollar taken out represents at least an equivalent of effort and expenditure.

J. OLIVER in the Silver King mine, near Nelson, B. C., entering the tunnel too soon after a shot had been fired, finding the gas too strong attempted to retrace his steps but fell, overcome with the fume; the candle in his hand set fire to his clothes and he died in a few hours.

A LATE reported ruling of the General Land Office in regard to compromising where claims conflict, is to the effect that, if a claimant has a right to a portion of the ground, he has a right to the whole of it, and has no right to compromise the case pending a decision of the Land Office.

THE Vancouver Smelter Co., of London, England, with a capital of \$750,000, has formed a combination with the Treat Smelter Co., at Vancouver, B. C. The latter has a plant of 100 tons capacity which is to be enlarged by the new company and be in operation before the end of the year.

THE "mother lode" in California is popularly supposed to extend west of north from about what was formerly Bridgeport in Mariposa Co. into El Dorado Co. The "east lode" is supposed to almost parallel it but with a more westerly trend, from six to fifteen miles eastward of the "mother lode."

ARIZONA mining interests show encouraging progress, and the gold and copper of that rich Territory are becoming factors in the world's output. Territorial augmentation is exhibited in the result of the recent annual adjustment of Presidential postmasters' salaries. Every office in Arizona except one, changed, was increased.

ON page 80 of the issue of the 23rd ult., in the article "Development of the Cyanide Process," the words "arsenic sulphides, regular and orpiment," should read "arsenic sulphides, realgar and orpiment." In the sentence beginning, "Therefore before the cyanide solution thus found," the last word should read "fouled."

THE ironclad pool of the Le Roi, B. C. Co., in which four-fifths of the stock was held, has been dissolved; the Peyton faction has sold its holdings to the British American Corporation on the basis of \$6 per share, and involves 284,000 shares; and, as the capitalization of the Le Roi is 500,000 shares, the B. A. C. now has a majority in the company.

THE MY yield of the Witwatersrand, S. A., was from the mills 221,570 ounces, from concentrates 9051 ounces, from tailings 106,797 ounces, slimes 5515 ounces, banks 927 ounces, a total of 344,160 ounces, worth \$6,058,825. The aggregate amount of profits declared by the mines of the Rand for the half year ending June 30th, '98, exceeds \$3,750,000.

WEST AUSTRALIA justly fears the probable danger to life and property occasioned by the increasing number of unskilled miners. In no pursuit is each worker more dependent upon his fellow laborers for safety than in mining, and self-interest requires as small a proportion of "green hands" as possible where any considerable number of men are employed.

"GABBERO" may be technically defined as "a granular intrusive rock, consisting, principally, of diallage or allied mono-

clinic pyroxene, or a rhombic pyroxene, together with soda lime and lime feldspars. "Gabbro-diorite" is a term indicating areas of gabbro containing primary and secondary hornblende and areas containing intimate mixtures of gabbro and diorite.

TANTALITE is composed of oxide of tantalum, iron and manganese with occasional tin and tungsten. Tantalite and columbite are not identical, though columbite is similar to tantalite, the main difference being that it contains niobium, another rare element instead of tantalum. There is not supposed to be any commercial value to these minerals except as mineralogical specimens.

GEN. MGR. CULBERTSON reports a profit of \$64,604.46 during the year ending June 30th, '98, in working the Tiger-Poorman property at Burke, Idaho. He thinks that with the new machinery now being placed, and the consequent increased output, the company can soon begin paying dividends. During the year there were mined 113,607 tons crude ore, producing 16,628 tons shipping ore.

PLATINUM in usual connection with iridosmine is found in several counties in northern and central California, likewise on the Similkameen river, B. C. So far as known, platinum in place has not been found on this continent. It is found, incidentally, in gold mining but not in matrix, only from debris of serpentine or peridotite. In the Ural mountains, Russia, it is mined for itself alone.

THE Nevada Co. has sued its agent and manager, P. T. Farnsworth, alleging that it gave him \$20,000 to buy mines, and that, in purchasing, the difference between the prices he represented as having paid and the actual disbursements was \$110,757, which they want returned. The suit is brought in Salt Lake City, Utah. Most of the purchased mining property is in Lander Co., Nevada.

THE latest alleged "salting" of a mine is reported in the Denver, Colorado, Times, wherein the purchaser was permitted to "blast out several feet" in the breast of a drift, finding good pay ore, discovering when too late, that the giant powder had been "salted." The story is a good newspaper one, and is about as truthful as the usual diaphanous one about "salting" California gold mines.

INTERIOR papers are advertising an unusually large number of applications for patent. A U. S. patent is a good thing for many reasons. It obviates all necessity for further assessment work, eliminates all likelihood of annoyance from "jumpers," almost wholly does away with possibility of litigation and, in case of desire to sell nothing, next to known value, will insure the sale of a mining property more readily than the fact of its being covered by a U. S. patent.

THE Copper Queen M. Co. at Bisbee, Ariz., has put in machinery for the annihilation of the microbe infesting the water used by the employees. The water is put through a process of distillation, then pumped into tanks to cool. The water is also placed at the disposal of the public free of charge. The Copper Queen Co. has put in a blower for blast to the converters that gives 10 H. P. to the square inch.

F. D. POWER, in reviewing an article on the Australian gold fields, says: "The various kinds of rocks in which gold-bearing reefs occur will astonish those whose knowledge in these matters is limited. Examples are given of deposits occurring in diorite, diabase, felsite, quartz porphyry, granite, syenite, andesite, porphyrite, rhyolite, mica, chloritic, seritic, talcose, and amphibolite schists, serpentine, slate, sandstone, and conglomerate."

THE old way of buying a 20-stamp mill as soon as a mine was bought or bonded is no longer generally observed. Men more modestly now start with a hand windlass for hoisting, then put in a small engine—steam or gas—for hoisting and pumping; afterwards, if justifiable, come the mill, concentrators, etc. While not so much mining machinery is at first called for as under the old way, yet to the mining machinery manufacturer it is often more profitable, as when he does get the order payment is more certain than before.

THE Hooley disclosures in London are fresh evidence that the evil practices unjustly ascribed to American mining men are of actual existence across the sea. The latest expose calls to mind the Londonderry mine, Coolgardie, West Australia, the original English purchasers of which cutely succeeded in unloading onto another English concern for \$2,000,000. The new directors discovered they were swindled, but secured the publication of statement that "within sixty days five tons of gold would be won." Then they had a meeting, at which glowing reports were read, while the directors, sitting soberly around the board, had telegrams in their pockets that "the reef is barren of gold." The published accounts enabled them to unload, and, just after, the facts came out.

THE Sulphide Reduction New Process Company is building a plant at Llanelli, South Wales, where the Ellershausen process for reducing zinc-lead sulphides will be used. The sulphides of zinc and lead are roasted at a white heat in a reverberatory furnace, with oxide of iron, lime and coal. The lead and zinc come off as fumes and the sulphurous acid comes off as well. These mixed gases and fumes are inducted through water by a fan. The lead is condensed as oxide and sulphate; the zinc as sulphate passes into solution. Some of the silver goes over with the lead, but most of it stays in the slag. The lead compounds are put back into the furnace, and the resulting mixture of slag and lead compounds is run off, afterwards to be treated as ordinary lead ore. The zinc solution may be treated in any desired way, but Ellershausen prefers to treat it with sulphide of soda, thus forming a white sulphide of zinc, which can be treated for the metal in the usual way.

THE Selby Smelting and Lead Co. of San Francisco are prepared to purchase osmium-iridium (a natural alloy of osmium and iridium) in quantities of one ounce and upwards. This metal, or alloy, has been found in various placer mines in California, particularly in the northern part. Owing to its high specific gravity, approximating closely to that of gold, in washing sand and gravel it concentrates with the gold. It can be easily distinguished by its bright metallic color and flat, scaly appearance, is insoluble in acid, and cannot be melted by ordinary furnace heat. The shape of grain is irregular, has a ragged edge, and varies in size from that of fine to coarse sand, and often larger. As the market for osmium-iridium has been limited, little attention has been paid to it on this coast, but it is believed considerable quantities may be found if miners will turn their attention in that direction. Should anyone find any of this metal, the Selby Smelting and Lead Works, 416 Montgomery street, San Francisco, will be pleased to quote rates on receipt of sample.

Recent Advances in Silver-Lead Smelting.

Read by R. H. TERHUNE of Utah at the Salt Lake session of the International Mining Congress, July, '98, and specially reported for the MINING AND SCIENTIFIC PRESS.

While many of you have suffered greatly by the fiscal policy of the world in the demonetization of silver, there is much left that gives you hope; old processes are being improved and new ones arising, until it goes without saying that values and quantity having been established, some method of extraction can be depended upon.

There are "cyaniding," "chlorination," "amalgamation," the so-called "combination process" of plates, vanners and pans, and, latest of all, "bromine extraction," offering much promise for treating coppery ores if free from lime and yet too base for amalgamation. Then we have, which is the topic of this paper, the time-honored shaft furnace process for silver-lead smelting, which takes ores which all other methods give up, asks few questions, and paid the miners of Utah in 1897 62.6 per cent of the New York value of the entire contents of each metal.

| 1897. | | | | |
|--|-------------|-----------|-----------|----------------|
| Net Ore. | Pounds, Pb. | Ozs., Ag. | Ozs., Au. | Total Cost. |
| 25,048 | 12,676,669 | 785,317.2 | 6,380.037 | \$858,204.74 |
| 59.8 cts. per oz. Ag. | | | | |
| \$3.58 per hundred Pb. | | | | |
| \$20 per oz. Au. | | | | |
| 12,676,669 pounds Pb at \$71.60 per ton..... | | | | |
| 785,317.2 ozs. Ag at 59.8 cts. per oz..... | | | | |
| 6,380.037 ozs. Au at \$20 per oz..... | | | | |
| | | | | \$1,051,045.17 |

\$1051 \$858,204.74 (62.6 per cent of N. Y. value.
\$41.96 N. Y. value of contents one ton ore 1897.

In 1886 but 58 per cent of the New York value of entire contents of one ton of ore was paid the Utah miner.

| | N. Y. Value of Contents. | Price Paid in Utah. | Margin. |
|-----------------|-----------------------------|------------------------|---------|
| 1886..... | \$85.84 | \$38.57 | \$27.27 |
| 1897..... | 41.96 | 26.27 | 15.69 |
| Difference..... | \$23.88 | \$12.30 | \$11.58 |

| 1886. | | | | |
|---|-------------|-----------|-----------|----------------|
| Net Ore. | Pounds, Pb. | Ozs., Ag. | Ozs., Au. | Total Cost. |
| 52,081,575 | 14,836,935 | 990,576.3 | 2,319.6 | \$1,003,330.27 |
| Average cost, \$38.57 a ton net ore. | | | | |
| \$4.63 per hundred Pb. | | | | |
| 99 cts. per oz. Ag. | | | | |
| 14,836,935 pounds Pb at \$4.63 per hundred..... | | | | |
| 990,576.3 ozs. Ag at 99 cts. per oz..... | | | | |
| 2,319.6 ozs. Au at \$20 per oz..... | | | | |
| | | | | \$1,714,012.62 |

\$1714 \$1,003,330.27 (58 per cent of value paid.
\$65.85 N. Y. value of contents one ton ore 1886.

| DECLINE IN VALUES—FUELS AND FLUXES, 18 YEARS. | | | | | |
|---|----------------------|---------------------|------------------------|-----------------------------|---------------------|
| Year. | Price of Coal. | PerCent Decline. | Year. | Price of Iron ore. | PerCent Decline. |
| 1880..... | \$23.50 | | 1880..... | \$6.75 | |
| 1898.... | 9.75 | | 1898.... | 4.35 | |
| | \$13.75 | 58.5 | | \$2.40 | 35.5 |
| | | | | \$ 75 | 42.8 |
| PERCENTAGE ELEMENTS OF COST. | | | | | |
| Year. | Coal. | | PerCent of Decline. | | |
| 1880..... | .87 | | 40 | | |
| 1898.... | 3.75 | | | | |
| | \$3.85 | | 40.9 | | |

| PERCENTAGE ELEMENTS OF COST. | | | |
|------------------------------|-------|-------|--|
| | 1880. | 1898. | |
| Coke..... | 69.3 | 66.3 | |
| Limestone..... | 6.2 | 9.8 | |
| Iron ore..... | 27.3 | 23.8 | |

Decline in cost of coke, iron and limestone, 18 years,
62.70 per cent.

From the above it is shown that coke is the expensive factor of our business; but far as we are from attaining the theoretical effect of fuel in the blast furnace, we are nearer to it than the old Sheffield pot-melting furnace for steel, which required two and one-half tons coke to the ton of steel melted, equaling $\frac{1}{7}$ the theoretic or calorific value of the fuel, or the coal-fired, iron-heating furnace which used $\frac{1}{3}$ tons of coal to the ton of metal heated to 2900 degrees Fahrenheit, equaling $\frac{1}{5}$ the theoretic effect of the fuel. In lead practice we exceed $\frac{1}{3}$ the true calorific effect of the fuel, for we heat 2000 pounds of slag to 2000 degrees Fahrenheit with 517 pounds of coke, besides requiring of this fuel other functions.

The value of hot blast would be great to us were it not for the necessity of solid carbon in the charge. This could not easily be reduced in quantity and as it now affords the necessary heat and reducing power, the gain from the custom mills is so rare and usually so unsuccessful that smelting has proven a blessing to small miners, and the world over it has afforded them a certain and good market for one ton or ten tons of ore.

No other process than smelting extracts 100 per cent of your gold, and few extract as much silver. Under proper conditions it can take any part of the earthy crust of our planet, turn it into a liquid slag and remove its values. Follow in your imagination the complex charges of a lead blast furnace, often containing ore from twenty-five mines and perhaps half as many districts, from its entry at the feed door to the discharge below, of four well-defined new products—matte, speiss, bullion and slag—and you must concede it a wonderful even if it is a commonplace process.

The improvements in silver-lead smelting in recent years have been along the following lines: The judicious location of plants; the introduction of steel

buildings; the increased size of plants; the increased sizes of blast furnaces; the improved means of slag disposal and separation; better sanitary conditions about works; dispensing with heat roasting; improved system of flue dust condensation; the use of automatic roasting furnaces; improved crushing machinery; the briquetting of fine ores and flue dust; internal system of tramways; better power plants; improved rotary blowing machines; better railway service; chemical basis of ore purchase; tendency to uniform systems of assaying; improvement of men and service under eight-hour system; piston blowers.

The first move was in the judicious location of plants, with reference to proper mixture and supply of ores and cheap and ample sources of good fuel and fluxes, due regard being had to the market for bullion. Unwise and often fraudulent boom plants with their pernicious effects upon capital, communities and legitimate enterprise, are becoming more and more rare, thanks to a vigilant and generally honest technical press as well as to experience.

The growing use of steel for building purposes is economical in insurance of premises, the stability of a business and offers special freedom from anxiety which must attend wooden structures for roasting and smelting purposes. The large plant, the outgrowth of competition, as in all other lines, has lowered fixed charges and made large contracts with their attendant advantages possible.

The large blast furnace has called forth better structural work, in which arches with tension bolt chords have given place to the old type of cast iron deck plate, to sustain the brick superstructure, and stronger caissons to enclose the lead well or crucible. The best practice is to not attempt to resist a pressure that is almost infinite, but to provide releasing bolts to let out these plates at the beginning of a run; solid steel plates under the lead enable are now replacing riveted ones, thus preventing any possible leak of bullion; often twenty tons of bullion have been found under riveted plates.

The cross section of blast furnaces at tuyeres doubled and feed floor trebled in twenty years, while the height has in some instances been increased 50 per cent; the long rectangular form has almost entirely displaced the square or circular cross section. Twenty years ago a tuyere area of 42 by 72 was almost general. Now 44 by 144 is employed. In that early day 36 square feet at feed floor was used; now 108 square feet are common. Heights have risen from 12 to 18 and 20 feet, but the practice now shows a downward tendency in this regard. As a compact column does not admit the blast, walls of blast furnace have reached a thickness of 31 inches at the mantel, giving greater durability as they better resist expansion, and retard radiation of heat.

The return to the withdrawal of furnace gases overhead, instead of the innovation of under the feed floor, may be regarded as an advance, reducing flue dust production and admitting of more correct feeding of the charges. Better and stronger water jackets, with simplicity of tuyere fittings, may be regarded as an advance.

Large settlers for the separation of matte are coming into general use. These are made rectangular, and of sectional side and end plates and lined with brick to reduce loss of heat.

Improved means of slag disposal rank as a great advance. One system employs a bowl, or bowls, mounted upon a railway truck, the clean settler overflow slag being dumped hot. The other system, which is certainly the most advantageous, but only possible with an adequate water supply, is that of granulation: where the stream of slag is struck by a jet of water and reduced to granular form that will all pass a one-quarter mesh sieve. It is conveyed by water to an elevator and is thence handled automatically to the point of delivery upon tram or railway cars. The employment of conveyors to carry this material to a dump is about to be adopted.

I find that a jet of water from a slightly flattened 2-inch pipe under a 13-foot head is ample for the purpose of granulation; the region of the trough where the stream or slags falls is of necessity water-jacketed to prevent adhesion of slag to iron, of pieces that may pass the jet of water. The granulated slag is conveyed by the jet and jacket water down short troughs leading from each furnace into a longitudinal main, 2 feet wide, with cast iron bottom, and sloping one-quarter inch to the foot. Water for carrying 100 tons slag per day to an elevator pit over 100 feet distant is supplied from a 10-inch square box under 13-foot head. Heavy rubber belts and malleable cast iron buckets render good service. This system of slag disposal is growing in favor, and is certainly to be preferred to all others when practicable. It is the only system from which a perfect sample of slag can be obtained.

Artificially ventilated buildings, with paved tapping floor, constitute a great advance as a sanitary and economic measure. These are gradually giving way to the cramped structures of the past. Better service is secured, and ore and rich products, instead of being trodden in adobe floors, can be easily and regularly recovered.

As the blast furnace operation depends almost wholly for its success upon the reducing gases passing upward through the charge, it is clear how im-

portant it is that these gases have clear and well distributed passage. This necessitates a certain degree of porosity of the column of material in the furnace. Along with these gases much fine material is carried, constituting what is known as flue dust. Its successful condensation is very important. American progress in this direction consists in making flues aggregating one mile in length in which the gradually cooling gases deposit fine particles held in suspension, and such particles, all carrying values, are found at the base of the very tall chimneys employed for artificial draft.

Europe, earlier active in all industrial economics, had long ago led us in the employment of very long flues.

The other system for accomplishing the same results in a quicker manner consists in aspirating the furnace through an iron flue, and, thus being sufficiently cool, they are forced with the same fan through inclined planes, nearly vertical, of cotton cloth. When the accumulation of deposits upon the huge filters is indicated by an increase in pressure, as shown by a gauge, rocking shafts with arms shake off the solid matter, which is precipitated to the bottom of the large brick buildings.

As mines have deepened and the percentage of sulphurets in ore has increased, the problem of roasting has become one of increasing importance. In early days heap roasting of mattes and coarse ores was universal in this valley. Then came the short hand reverberatory, then the long one, and now in Utah automatic roasting furnaces have almost wholly displaced the hand-worked variety. Whole batteries of hand furnaces have been discarded at a cost of \$3000 each. There are various types of the automatic, all having certain merits and all their champions among metallurgists.

The Bruckner cylinder is in much favor in Salt Lake valley; the repairs are light, labor and fuel low, the time for oxidation not limited, as in rabble furnaces, and since the economical briquetting of flue dust was introduced, its production of that material is not the great objection that it once was. Ores containing 32% lead are now successfully roasted in them, and ores containing 30% zinc and 10% lead offer no difficulty, but require careful firing. The present and latest practice is to employ very large cylinders 26½ feet by 8½ feet and run them very slowly—one turn in forty minutes—the charge being seventeen to twenty-two tons and time thirty-six to forty-eight hours. I understand cylinders 28 feet long are in contemplation.

The first Ropp roasting furnace in this State was erected in the summer of 1896. Two years of use have proven it to be an excellent type of rabble furnace, requiring little labor and, compared with hand furnaces, little fuel, not costly to maintain and capable of treating a wide range of ores, with a very small make of flue dust. With structural changes, developed as necessary by experience, this furnace certainly will occupy an important place and a permanent one among straight-line rabble furnaces. The furnace built at the Hanauer Works in 1896 had the following dimensions: Width of hearth, 14 feet; total length of hearth exposed to head, 129 feet 6 inches; number of fire boxes, 4; area of each, 20 square feet; number of rabbles, 6; speed of rabbles, per minute, 80 feet; capacity in twenty-four hours, 25 to 40 tons.

There were roasted in ten months in this furnace 10,830 tons of 2000 pounds each of Bingham ore of the following composition, as shown by a partial analysis: Silica, 10; sulphur, 39.42; iron, 31.52; lead, 9.20; zinc, 4.23. The following were the results: Average sulphur in roasted ore, treating 39.18 tons per twenty-four hours, 6.37; average sulphur in 33.78 tons, 5.75; average sulphur in 30 tons, 5.10. Ore of the following composition is successfully roasted without slagging to 5.4% sulphur: 26.10 lead; 18 silica; 14.50 iron; 11.80 zinc; 26.90 sulphur. A 400-ton lot of ore of the following composition was treated at the rate of twenty-five tons per day to 6.7% sulphur, showing an oxidation of 66.1% of the zinc, which existed as blende in the ore: Silica, 9.20; zinc, 16.70; iron, 16.60; lead, 17.40; sulphur, 29; copper, 4.20. All the ore was crushed to pass one-quarter inch mesh screen, and yet but 11,000 pounds of flue dust were caught in 107 feet of flue.

It is found that the travel of the rabbles of this furnace exterior to the furnace, for a greater distance than they travel through the hot region, contributes to their endurance. The set remotest from the fire has roasted 16,569 tons of ore and matte and was still good; that nearest the box required renewal after roasting 14,419 tons of material.

One multiple hearth Kellar roasting furnace has been erected in Utah. It is beautiful in its mechanism, low in fuel consumption, but not capable of treating so wide a range of ores as might be desired, as it depends upon the burning sulphur in the ore more for a source of heat than other furnaces.

Improved crushing machinery has exerted some influence in lowering the cost of preparing ores for roasting. I have had better success with chilled iron roll shells than with soft steel ones. The "briquetting" of flue dust and fine ores, such as the roast furnace product and concentrates in general, has proven a most economical substitute for fusion as a means of rendering this class of material coarse.

The latest development of the briquetting machine produces sixty to seventy tons per day of small, hardened, flat, rounded discs, under great pressure, with caustic lime as a bond. They quicken the blast-furnace operation, and greatly contribute to general cleanliness about the works.

The rotary blowing machine is now made of great strength with heavy shafts, cut steel gear, large pulleys, long and improved journals, all resulting in a machine suited to high pressure and steady service. Compared, however, with the piston blower, it is an imperfect one, as the latter is the only positive machine that can deliver all the air which enters its cylinders. One western works is installing such a plant, although at a cost of 50 per cent greater than the rotary.

The eight-hour law for mining, smelting and other unhealthy pursuits which has been in force in Utah since June 1, 1896, though at first working a hardship upon employers (as it resulted in a slight advance of wages) has proven less of a bugbear than it at first appeared. The quality of the service in smelting has improved; and, as an economic measure, the general eight-hour system must have far-reaching value and is of national importance. A tending to employ 50 per cent more men in pursuits operated twenty-four hours per day improves their moral and physical condition, promotes human happiness and the coveted harmony between capital and labor.

Slag Elevator.

The handling of granulated slag and water is a problem which has received much attention at the hands of smelting people in the past. Owing to its fineness and gritty nature, it rapidly wears out any machinery with which it comes in contact. To design machinery for handling this material so as to reduce the wear to a minimum is of importance. This, the Jeffrey Manufacturing Company claim to have accomplished in the plant illustrated herewith.



SLAG ELEVATOR OF THE SILVERTON SMELTING CO., SILVERTON, COLO.

The elevator is 60 feet in height and in operation receives the slag and water below and elevates it into the sluice box overhead in connection with the head of the elevator. It is provided with double chains and steel buckets which operate over two sets of wheels at the head, being knuckle wheel construction. This discharges the slag and water into the hopper connected with the sluice box without the usual spilling common to elevators which depend upon centrifugal force to discharge their load. The chain used is one of the Jeffrey steel bushed type. Its wearing parts are of case hardened steel, which, when they become worn are easily replaced at small expense. The elevator is driven by a manila rope drive from the engine on the ground below. This outfit has been used for two years, having been installed at the plant of the Silverton Smelting Company, Silverton, Colorado. The elevator was designed by the Jeffrey Manufacturing Company, and all requisite details may be obtained by addressing their western branch, Frank R. Field, representative, Denver, Colorado.

The Geology of the White Pass.

AMONG THE LAKES ON THE
HEADWATERS OF THE YUKON.
June 15, 1898.

No one can travel over the deep blue waters of the Lynn canal, with its environment of mountain, glacier and snow, nor scale the White pass and view from its summit the wilderness of snowy peaks, nor descend through the chain of lakes on his way to the gold fields, without feeling a more than passing interest in the geology of the country. Even though his eyes are more or less dazzled by the golden halo encircling the Klondike, still the surrounding beauty and sublimity inspire him with a desire to decipher the inscriptions engraved upon the monument of Nature standing before him.

Commencing at Skaguay the prevailing formation is a massive granite which has been more or less disturbed, as has been evidenced by numerous dikes of aphanite, quartzite, etc., as well as various ledges and stringers of quartz. The information concerning the value of the quartz in the drainage basin of the Skaguay is decidedly meager; beyond that, so far as discovered, it is very base and has the appearance of being low grade as well. In the present stage of development the indications are unfavorable for the existence of commercially valuable bodies of ore, although, of course, there is a possibility that further prospecting may reveal the existence of richer mineral districts.

While there are numerous benches and flats favorable for gravel deposits still, as far as examined by the writer, the gravels deposited thereon are lamentably deficient in both quartz and gold. Regarding the alleged auriferous gravels underlying the town of Skaguay, it is sufficient to state that on account of their loose character and the water to contend with, they would have to be phenomenally rich to pay.

About five miles above Skaguay the formation changes to a belt of comparatively thin-bedded gneiss several miles in width, containing various dikes and stringers of hungry quartz. Next come the hard, massive granites composing the backbone of the range, and which, like the preceding formations, are chiefly valuable for scenic purposes.

When the summit is reached one can look from the sharp peaks of the mountains beyond the Lynn canal on the south and west to the rounded crests by and beyond the larger lakes to the north and east, and gain a fuller and more comprehensive idea of the magnitude and significance of the various changes marking the geological history of this section.

In broad lines, to the southward, the ranges are sharp and rugged, with steep and often precipitous sides, showing not only their more recent origin but their escape from the glaciation which planed and rounded off the ranges of the interior. This difference is noticeable from the very summit. Extensive as has been the glaciation of the interior, it evidently occurred a long time ago, as subsequent erosion has not only destroyed the polish and scoring, excepting in protected places, but has altered the surface of the country to a marked extent, although the general contours characteristic of glaciation are still retained.

The most marked evidences of glacial action are found in the basin containing the lake system forming the headwaters of the Yukon in this section. The long-continued glacial action formed the basin and hollowed out the beds of the present lakes. At one time the entire basin was filled by one immense glacier, formed by the union of a large number of lateral glaciers which descended from the surrounding heights. As that glacial age drew towards a close and the diminishing of the main glacier uncovered portions of the basin, the tributary glaciers again began an independent existence and furrowed the basin with their courses. As the ages passed they, too, gradually receded until to-day only their remnants are found at the heads of their former courses. Some of these relics of a former age are good-sized masses of glacial ice; others are simply banks of crystalline snow which, although it remains from season to season, is thawed by the unfrozen ground beneath with sufficient rapidity to prevent it from becoming firm ice.

Not only did the glaciers carve out the present lake system, but they also took the first step in the formation of a series of mountain meadows. From the recession of the glaciers, the lakes and shallows have been slowly filling with the sediments from the surrounding country until now some of the lake beds have become entirely filled and are meadows, while all stages of formation, diminishing with the progress downstream, are found in the others. Incidentally, the soil of these meadows, formed primarily from the sediments of feldspathic rocks, is exceedingly rich and is not only excellently adapted for the various grasses, but for the growth of any crops allowed by the shortness of the season.

The ice age, to which all of this glaciation belongs, is still passing away, for the rudiments of the former glaciers are receding as is indisputably proven by their terminal moraines. This fact is simply one of the many indications that the climate of the extreme northwest is undergoing important changes.

In connection with the evidences of past glacial

action, Crater peak, which stands on the eastern side of the meadows, is one of the natural curiosities of this section. It rises some 7350 feet above sea level and at an elevation of 6200 feet is what appears to be the lip of a crater whose outer wall is built up by an accumulation of tufa. In fact, so perfect is the resemblance, with the precipitous walls of light-colored feldspathic rock rising up behind the lip like the fire-scorched inner walls of a crater, that any one is to be pardoned for considering it an extinct volcano at first sight. However, examination shows that this crater lip is simply the terminal moraine of the rudiment of a former glacier. The fact that the loose rock rolled down the steep mountain side until the front of the moraine assumed the angle and appearance of a crater rim formed by loose volcanic rock and sand, aided of course by the color of the formation, is what completes the illusion.

While there is a greater variety of formations on the inland side of the summit, the mineral outlook is but little better than on the other side, although there is more quartz and some fine magnetite of iron float. The ore thus far discovered is too base and low grade to be available, although there are some good-sized bodies of it.

Among the formations is a belt of overlying feldspathic rock which commences at an elevation of some 5800 feet, and this belt is so broken up and seamed by dikes of all descriptions that its structural strength has been lost, consequently it fissures easily and rapidly breaks down and disintegrates. So rapidly has it given away before the forces of erosion that many of the mountains which were rounded by glaciers are now as sharp and rugged as though they had never been touched by them.

A. THURSTON HEYDON, M. E.

Under date of July 12 Mr. Heydon writes: Since writing the preceding article I have found a mineral district of some importance in a basin west of Middle lake. While the oxidized portions of the ledges would furnish free-milling rock that would pay a dividend in California, still, although the ore bodies give evidence of being large, it is doubtful if they become available at an early date. Beyond the reach of surface action the ore is decidedly base and shows a strong resemblance to that of the Big Canyon mine in El Dorado county, but on account of the altitude above timber line and the shortness of the season, the expense of working would eat up the profits from ore carrying 5 per cent sulphurets, worth \$100 per ton of concentrates. The most interesting feature about this mineral district is that placer gold occurs below it and that some of the bars contain fairly good streaks, although they are narrow and the gold is inconveniently fine. However, a more thorough prospecting might reveal the existence of coarser gold in better paying quantities.

Electrical Furnace as Used by Moissan.

Rudolph Mewes gives an account of the employment of the electric furnace and of the efforts made, before its introduction, to attain very high temperatures. It is pointed out that Moissan claimed for his furnace that it was an appliance strictly for scientific research, and not for technical uses. According to the nature of the work to be undertaken, there were five varieties of furnaces, and the strength of the currents employed varied between somewhat wide limits. Diagrams are given of the furnace, and an outline follows of the various researches undertaken by Moissan on the volatilization of certain refractory substances. These served as the basis of experiments upon the crystallization of the oxides of calcium, strontium, barium, magnesium and aluminum, and the oxides of the iron series. Subsequently he investigated the reactions in the electric arc of the metalloids—silicon, boron and carbon—and the distillation of silicic acid. His later experiments upon the production of carbides and double carbides have led to discoveries which, in the case of calcium carbide, are capable of practical industrial application. He has recently succeeded in producing artificial diamonds by causing molten iron to take up large quantities of carbon; the crucible containing the glowing mass is then rapidly withdrawn from the furnace and plunged into cold water. The result of this is that an outer solid coating is formed which occupies a less volume than the heated mass within, and exerts great pressure on the interior during the cooling process, in the course of which the diamonds crystallize out.

A PLAN has been introduced to some extent in engineering practice of winding steam pipes over 8 inches in diameter with $\frac{3}{16}$ -inch copper wire doubling the bursting pressure, and is one of the most important of recent changes. That the thickness of sheet copper forming the pipe may be reduced to the minimum, and at the same time insure the full advantage of wire winding, the system of manufacturing steam pipes has come into vogue of simply using copper of the thinnest possible gauge to form the interior or core of the pipe, while the body proper is composed of steel wire wound closely around the core, the interstices being filled in solid with copper by electro-deposition.

Alder Gulch, Montana, Tailings.

Tailings from the former rich placer gold mines of Virginia City, Montana, carry considerable value, and are being worked with profit. The German Bar Placer Mining Company has a novel plant on the old German Bar workings, three miles below Virginia City, where a small area of bedrock that had been uncovered by recent hand working gave them an excellent location in which to commence work. It is thus described in an interview in the Spokane, Wash., *Review*:

The problem required a three-fold resolution. 1. The excavation and handling of large quantities of material at a low yardage cost. 2. The delivery of this material at such an elevation that a gold-saving flume could be used, of sufficient length and grade to thoroughly save the finer gold which had escaped the original miners. 3. The delivery of the tailings at such an elevation that their disposition would take care of itself.

To solve the problem a novel application of the well-known cableway principle was adopted, with the addition of a drag or scoop bucket, self-loading and self-pumping in action. This combination adds to the hoisting and conveying capacity of the cableway the elevating function of a steam shovel. The cableway is self-portable, with the tall tower arranged so that it may be moved in a circle about the head, or hopper tower, the excavation being made along radical lines, and a semi-circular pit being thus worked out around the hopper.

The hopper tower was placed on bedrock in the pit previously worked out, and close to the face of the gravel to be excavated. This tower is built solidly of 8x8 timbers and extends up through the hopper, which it carries, and which surrounds the tower on three sides to a height of 67 feet. It has a square top about 9½ feet on each side, strongly tied together with 8x8 timbers, but open in the center and covered with an angular iron plate upon which a smaller pyramid tower, or bonnet, 8 feet in height is placed. This bonnet carries the saddle for the main cable support and the sheaves for the operating ropes. It rests upon the angular plate, and also is encircled at the bottom by an iron guard band attached to the top of the fixed tower. The bonnet is thus adopted to turn about the main axis of the tower and at the same time is open in its center so that the operating ropes may come up through the tower below.

The engine, both for convenience of location and to enable the operating ropes to pass over and clear of the hopper, was placed on higher ground at one side, and about 100 feet away from the tower. The motions of the carriage on the cable and the bucket in the pit are controlled by an endless or traction rope and a hoist rope. These ropes pass from the engine under fixed sheaves in the main tower, just above the hopper, from which they are guided around two sets of deflecting and swiveling sheaves, one set in the main tower and the other in the bonnet, to another series of fixed sheaves in the bonnet, and thence to their work. The purpose of the open center of the top of the tower is thus apparent. These banks of deflecting and fixed sheaves are ingeniously arranged so that the bonnet may turn through more than a half circle in its revolution, and the ropes will lead fair, never crossing or fouling each other.

Making Water Lift Itself.

Where it is desired to lift water from a rapidly flowing stream to high land adjacent, a method just introduced on Table mountain, in Lake county, Cal., may be serviceable. It is on the place of Granville Libby; the plans, calculations and construction were the work of D. Libby, Jr., of San Francisco.

The foundation of the works is built in an excavation of solid rock, a few feet above the level of Putah creek. The foundation and walls are built of concrete and should last for centuries. The walls are about 3½ feet high and 15 inches thick. The bearings for the wheel's axle are firmly bolted to the top of the wall. The wheel is an overshot water wheel, 6 feet in diameter, with 30-inch face. This furnishes power to run two 3-inch vertical plunger pumps, which force the water through 1350 feet of 1½-inch pipe to an elevation of 335 feet.

A flume 125 feet long, 30 inches wide and 8 inches deep, conducts water to the wheel. In the rainy season the wheel can be lifted high and dry out of its place, and when desired can be replaced again in a few minutes. The apparatus is supplied with self-acting lubricators, which need refilling about once in a week or ten days.

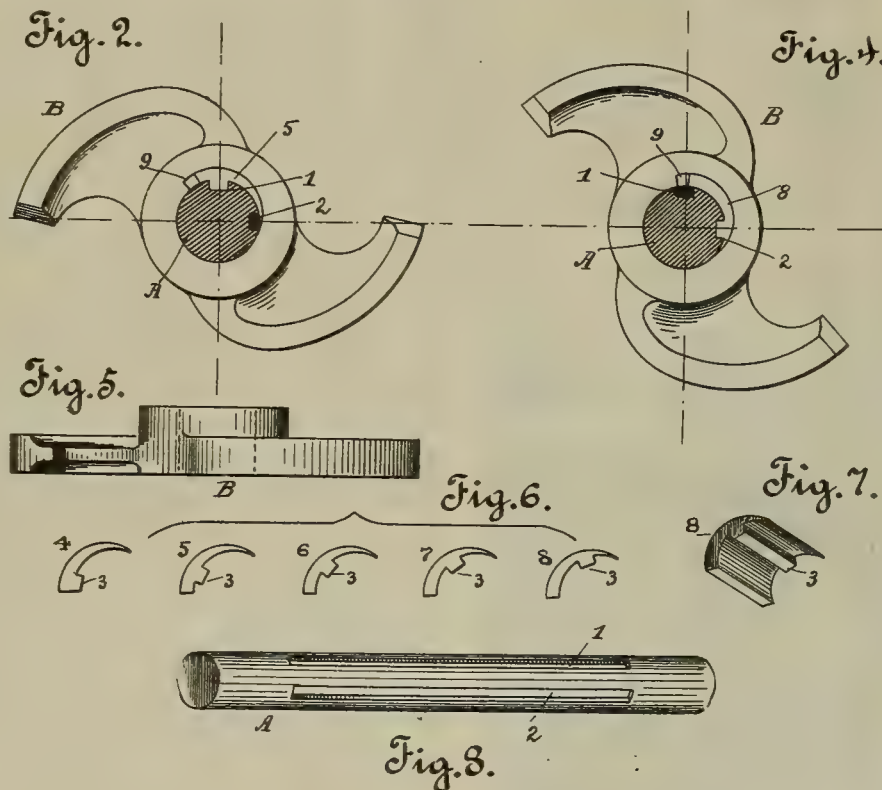
Near the building there are five or six garden valves for house, barn, garden, etc., to any of which a hose can be attached if desired. Mr. Libby filled a tank of 1200 gallons last week in one hour and forty minutes, or just twelve gallons per minute, which makes 17,280 gallons per day of twenty-four hours. This vast amount of water seems incredible by such a simple method.

ACCORDING to the *American Manufacturer*, M. Savreux finds that boiler deposits are fairly easy to remove under particular conditions. Rake out the fire, and let out the water only in small quantities,

replacing each such quantity by cold water, so as to keep the boiler filled. When quite cold, let all the water suddenly out. A great deal of the deposit will come away with it, and the remainder can be rather readily removed by scraping and brushing. But the cleaners have to be quick about it, for the deposit soon hardens and again sticks to the iron. At a works in Amiens the fire was let out on Saturday night; during two hours on Sunday the boiler was filled with cold water; Wednesday the boiler was polished; Thursday the water was again changed; and the same on Saturday. Sunday the water was let out, and the boiler promptly cleaned. The *Boiler Union's Journal* speaks well of this method, which is, of course, only applicable where there is a reserve boiler to fall back upon.

New Coupling for Cams.

Herewith is illustrated a new cam invented by Thos. J. Barbour of San Francisco, and by him assigned to the Risdon Iron and Locomotive Works of San Francisco, which is now manufacturing them in considerable numbers. The claim for the invention is the combination with a series of tappet cams of a series of interchangeable cam wedges for locking the tappet cams to the drive shaft of a stamp battery in relatively different positions so as to control the drop of the stamps, each cam wedge being



NEW COUPLING FOR CAMS.

provided on its under face with a feather, and the feather of each cam wedge being differently located relative to the butt of the other cam wedges. 2. The combination in a stamp battery of the drive shaft provided with a feather way, of a series of cams mounted thereon, and of a series of interchangeable cam wedges for locking the cams to the drive shaft, each cam wedge being provided with a feather which fits in the feather way of the drive shaft, the feather of each cam wedge being differently located relative to the butt of the other cam wedges, whereby the position of the cams is altered as to the drop of the stamp with a change of the cam wedges. 3. The combination with the drive shaft of the parallel feather ways cut therein, the tappet cams mounted upon the drive shaft, and the cam wedges for locking the cams to the drive shaft, each cam wedge being provided with a feather which fits each of the feather ways of the drive shaft, the feather of each cam wedge being differently located relative to the butt of the other cam wedges, whereby the position of the cams depends upon the feather way in which the feather of the cam wedge is fitted. 4. The combination with the drive shaft of the tappet cams mounted thereon, and the interchangeable cam wedges for locking the tappet cams to the drive shaft of a stamp battery, each cam wedge being capable of adjustment upon the drive shaft and having its fastening device differently located relative to the butt of the other cam wedges, whereby each cam wedge permits of a different position to be given the tappet cams to vary the drop of the stamps.

The distinctive feature of the cam is that in interchanging the keys one can alter the drop without having to drill any holes in the shaft, obviating other ordinarily attendant delay or annoyance in connection therewith.

The Mechanical Action of the Divining Rod.

The review in *Nature* of a publication relating to the "divining rod" recalls to my mind a purely mechanical theory of that rod, which was given me years ago by a friend.

This theory has been repeatedly tested by me and shown to be correct in the presence of my class. The process is exceedingly simple. Take any forked twig of reasonably tough fiber in the clenched hands with the palms upward. The ends of the limbs forming the twig fork should enter the closed fist on the exterior side of each fist, i. e., on the two sides of the clenched hands farthest from each other.

When a twig is grasped in this position it will remain stationary if held loosely, or with only a moderately firm grasp, but the moment the grasp is tightened the pressure on the branches will force the end of the twig to bend downward. The harder the grip the more it must curve.

The curvature of the twig is mechanically caused by the pressure of the hands forcing the limbs to assume a bent and twisted position; or the force that caused the forked limb to turn downwards is furnished by the muscles of the hands, and not by any other cause.

The whole secret of the divining rod seems to reside in its position in the hands of the operator,

and in his voluntarily or involuntarily increasing the closeness of his grasp on the two ends of the branches forming the fork.

If the above conditions are fulfilled the twig will always bend downward—water or no water, mineral or no mineral. Any one can be an operator, and any material can be used for the instrument, provided the limbs forming the fork are sufficiently tough and flexible.

It can be easily understood how an ignorant operator may deceive himself and be perfectly honest in supposing that some occult force, and not his hands, causes the fork to curve downwards.—M. E. Wadsworth, President Michigan College of Mines, Houghton, Michigan, in *American Geologist*.

Coal Output for '97.

The Geological Survey has partially completed its report on the coal output of the United States for the calendar year 1897. It shows that the total production of this article reached a higher figure than ever before.

The total output was 200,221,665 short tons, equivalent to 178,769,344 long tons of 2240 pounds, with an aggregate value at the mines of \$198,869,178.

The total output in the State of Utah was 521,560 short tons, valued at \$618,230, an average of \$1.90 per ton. The average number of employes in the Utah mines during the year was 704, and the average number of days there were employed was 204.

In the State of Wyoming the total product was 2,597,886 tons, valued at \$3,136,694, an average of \$1.21 per ton. The number of employes was 3137, and the average number of working days 219.

Coast Industrial Notes.

The B. C. Iron Works, Vancouver, B. C., has failed.

An Astoria, Or., factory made 7,500,000 salmon cans this year.

The Oregon Short Line will pay 3% on its income bonds Oct. 1st.

The Los Angeles, Cal., assessment for '98 is more than \$61,000,000.

A street railway is to be built at Patzcuaro, Michoacan, Mexico.

The wool sales in Lake county, Oregon, from July 1st to 14th amounted to \$50,000.

Nearly every commercial organization on the Pacific coast favors the retention of the Philippines.

Sheep and wool sales in Lake county, Or., from July 1st to September 1st will aggregate \$250,000.

From Pendleton, Or., were shipped to Nebraska last week 380 head of cattle; they sold for 3½ cents a pound.

In the Kincon asphalt mines in Santa Barbara Co., Cal., belonging to the Alcatraz Co., work has been resumed.

During the week the thermometer indicated 110° Fabr. in the interior Cal. valleys, and 54° at San Francisco.

The first locomotive that ever moved a wheel in Alaska pulled out of Skaguay July 21st with a string of flat cars.

A line of steamers is projected between Port Arthur and Puget sound, to run in connection with the Siberian railroad.

Mexico has twenty-one completed blast furnaces and two building, seven rolling mills, and two partly completed open hearth steel plants.

Pennsylvania capitalists have taken the 100 bonds of local improvement district issued at Tacoma, Wash. They draw 8 per cent and run ten years.

Work has begun on the 24-mile piece of railway to connect the Visalia branch of the Valley R. R. with the main line running to Bakersfield, Cal.

The Mexican railroad reports gross receipts for the 29th week of the year of \$78,389.88, against \$77,378.62, for the corresponding week of 1897.

The Santa Fe R. R. Co. is building at San Bernardino, Cal., of sheet steel, a tank 96 feet in diameter and 30 feet high, that will hold 36,700 barrels of oil.

There are 200,000 sheep feeding in the mountains of Alpine Co., Cal. The sheep license tax collected this season by that county amounts to \$6000.

In the Philippine Islands there are 750 miles of telegraph, but Manila is the only town that has a telephone system. It is owned by English capitalists.

The California Board of Public Works is to begin the work of building the jetty at Newton Shoals, in accordance with the suggestion of the Secretary of War.

The earnings of the whole Mexican Central Railway system for the third week of July were \$239,434, an increase for the corresponding period of 1897 of \$44,181.

In Astoria, Oregon, at a depth of 20 feet large pieces of coal were discovered when on being thrown upon a fire burned freely. The deposit is being investigated.

A cable is projected from San Francisco to Hawaii, the Ladrone, the Philippines and Hongkong, to cost \$10,000,000. The Pacific Cable Co. is capitalized for \$100,000,000.

During June there were exported from Progreso, Mexico, 39,514 bales of henequen, weighing 6,454,434 pounds. The bulk of it went to the United States and England.

McLean Bros., who have secured the contract to run the 3100-foot tunnel on the C. & N. railway, in British Columbia, estimate that it will take 130 men one year to do the work.

The Central Pacific road, between Ogden, Utah, and Truckee, Cal., uses coal mined at Evanston, Wyoming, which costs \$3 per ton at the mine, and annually consumes 300,000 tons.

The Mexican government has made a contract with Rossi & Chesio to exploit the deposits of guano on the desert islands in the Gulf of Mexico, near the coast of Yucatan and Campeche.

Orange shipments at Redlands, Cal., for the season approximate 487,640 boxes—more than double those of last year. The average f. o. b. price was \$1.75 per box, making a total of \$850,000.

The California Cotton Mills Co. of East Oakland, Cal., will increase their capital stock from \$600,000 to \$800,000 to enable them to increase their plant. Over 300 people are employed at the mills.

The Mexican General Electric Co., the Mexican branch of the General Electric Co. of Schenectady, N. Y., has been awarded the contract for the electrical installation equipment of the tramways of Mexico City.

Honolulu is to be fortified and made one of the strongest military posts in the Pacific. Major Langfitt, commanding a battalion of United States volunteers and engineers, goes there, followed by 400 expert engineers.

It is estimated that the salmon pack for the season of '98 on the Columbia river will be 100,000 cases below the average. Figures compiled by the *Astorian* show that 282,000 cases had been canned up to the 1st inst.

W. A. Bissell, freight manager of the Santa Fe system, says of the proposed steamer line from San Diego, Cal., to Japan: "The contract for the line is signed, and the steamers will begin their trips about Dec. 1st."

Oregon capital interested in the fisheries of Columbia river and on the sound reports

the season late, due largely to the cold weather. Fish are slack in the Columbia, and the run of sockeyes on the sound is not what it usually is at this time of year.

The clipper lines which carry freight from San Francisco to Atlantic ports have made another cut in their rates. Their new tariff ranges from 15 to 20 cents below that of the Southern Pacific, and from 6 to 11 cents under the rates recently made by the Panama railroad.

Men who have made a thorough study of the supply of green fruits in all parts of California estimate that about 4000 carloads will be shipped East this year, against 5300 in '97. The shortage is chiefly in pears, peaches and apricots. There will be an increase, however, in the shipments of prunes and raisins.

A citizens' committee at Portland, Or., has secured a twelve-acre tract of land in the eastern part of town for the terminal works of the Union, Corvucopia & Eastern Railroad, to be built from Union, Or., to the Seven Devils mines in Idaho. Bids have been asked for the construction of the road, bridges, etc., for a distance of 130 miles.

Work on the breakwater at San Pedro, Cal., is to start Oct. 1st. The work will cover a period of four years. The wall is to cost \$1,310,000; is to be 8500 feet long and of pyramidal shape. The top section will be 30 feet across and the base 175 feet. It is to be constructed of stone, except at the exposed ends, which will be monoliths of concrete, measuring 40x40x20 feet. On each end of the seawall will be a light to guide ships at night.

Everything points to an exposition of rare interest at the Sacramento, Cal., State fair this year. Sec. Smith says he has assurances that the manufacturers of the State will make extensive exhibits. The leading factories, being in and about San Francisco, usually exhibit at the Mechanics' Fair in that city. This year, however, there will be no Mechanics' Fair, and it is expected that many of the usual exhibits will go to Sacramento.

A Guaymas contractor buying iron roof beams in Chicago was given a freight rate by rail direct of \$1.25 gold per cwt., by the railroad. A railway running from Chicago to New York, connecting with steamship lines, gave on the same consignment a rate from Chicago to Guaymas of \$1.0½ per cwt. In one instance the freight would travel about 3000 miles without transshipment. In the other it would travel more than 10,000 miles, and be transhipped four times—yet the longer route would carry it cheaper.

According to local reports, Tulare lake, Cal., which is usually one of the largest bodies of fresh water in the United States, is now entirely dry. One of the newspapers of Kings county states that not a drop of water remains in the lake, and that over miles and miles of the former river bed of this peculiar lake there are exposed millions of decaying fish, lying in the mud and tainting the breezes which blow over that portion of the country. The nuisance has become so great that, when the harvest is over, most of the people will take to the hills for relief.

The Coalinga oil of Fresno Co., Cal., is lighter than the oil of Los Angeles and is used for refining purposes. The average depth of the wells is about 750 feet. Ten wells, belonging to one company, have been averaging seventy-five barrels of oil each daily. W. H. Watts of the State Mining Bureau was the first to call public attention to the probable value of this oil field, which he did in one of the bulletins of the Mining Bureau. Los Angeles men, who own 320 acres of land five miles southwest of Coalinga, on the line of the oil belt, are about to form a company for its development.

The Alaska Telegraph and Telephone Co., composed of San Francisco men, has a franchise from the Canadian government granting the right to construct, operate and maintain telegraph and telephone lines in Canadian territory over the Chilkoot pass, running along the lakes and up the Lewis and Yukon rivers to Dawson City. The line will begin at Juneau, Alaska, thence in a northerly direction to Dyea, thence in a northeasterly direction over the Chilkoot pass. It will follow the line of the Lewis and Yukon rivers to Dawson City and on to Circle City, the terminus. The estimated length of the line and its branches is said to be about 1000 miles.

Following is a present list of prices in the Klondike: Flour, \$8 to \$10 per sack; bacon, 50 cents per pound; ham, \$1.75 per pound; beans, 30 cents per pound; rice, 35 cents per pound; butter, \$2 per pound; eggs, \$1.50 per case; lard, 75 cents per pound; fresh sausage, \$1.25 per pound; sugar, \$1 per pound; condensed milk, \$1.50 per can; lobsters, \$3 per can; syrup, \$3 per can; oysters, \$25 per can; oranges, \$1 each; canned meats, \$2 per can; onions, \$1.50 per pound; cigarettes, \$25 per 1000; whisky, \$50 to \$75 per gallon; coal oil, \$30 per gallon; shoes, \$13 per pair; gum boots, \$25; dressed lumber, \$25 per 1000; rough lumber, \$200 per 1000; cheap cigars, \$250 per 1000.

Recent California Mining Incorporations.

Plymouth Rock M. & M. Co., San Francisco; capital stock \$100,000; subscribed \$50,000; J. A. Parsons, C. E. Brown, W. H. Murphy, C. D. Bailey, J. A. Sanborn.

Eureka G. M. & M. Co., Randsburg; capital stock \$500,000; subscribed \$400,000; A. W. Collins, A. J. Peters, E. Hammond, Jr.; E. S. Ely, J. W. Cummin.

Alpha M. Co., Yreka; capital stock \$50,000; all subscribed; T. Y. Reed, W. C. Stanley, L. F. Coburn, J. F. McBride, A. B. Shearer.

Victor Gold Mines Co., San Francisco; capital stock \$300,000; subscribed \$5; J. C. Campbell, L. Wordman, F. L. Lezinsky, E. L. Lowe, G. Lezinsky.

Sheba G. M. Co., San Francisco; capital

stock \$100,000; subscribed \$5; C. P. Yore, M. W. McIntosh, D. J. Wren, A. D. Wunder, G. O. Perry.

Aurora Gravel M. Co., San Francisco; capital stock, \$27,000; subscribed, \$700; G. H. Hawes, C. E. Kelley, J. Mott, S. A. Kelley, B. M. Wilson.

Mine Exploiting Co., San Francisco; capital stock, \$1,000,000; subscribed, \$125; N. S. Keith, A. H. Ward, F. A. Huntington, J. P. Massie, G. W. Osborn.

San Domingo M. Co., San Andreas; capital stock, \$100,000.

Yukon Oil Co., Los Angeles, formed to develop mining claims and oil wells; capital stock, \$25,000; subscribed, \$5000; W. A. Lamb, M. L. McCray, L. A. McCray, W. T. McFie, C. E. Rayne.

Personal.

Gov. GRANT of Denver, Colo., is in Spokane, Wash.

Jno. McMURRAY of Weaverville, Cal., is in San Francisco.

R. H. POSTLETHWAITE is at Lowden Ranch, Trinity Co., Cal.

D. JONES has been appointed Supt. Johnson mine, Stanton, Ariz.

A. WESTALL, a mine owner at Gold Lake, Cal., is at Palo Alto.

C. BORGER has resigned as Supt. Satellite mine, Campo Seco, Cal.

P. HOODS, Supt. Eagle Bird mine, Maybert, Cal., is in San Francisco.

A. R. F. PENROSE, a mine operator at Pearce, Ariz., is in San Francisco.

J. EDDY becomes Supt. Pine Hill G. & S. M. Co., Shingle Springs, Cal.

D. J. McFALL, Supt. Home mine, Nevada City, Cal., is in San Francisco.

A. McDONALD, Supt. Kanaka mine, Grove-land, Cal., is in San Francisco.

C. H. DUNTON, Supt. Larkia mine, Diamond Springs, Cal., is in San Francisco.

O. O. HOWARD, Jr., is inspecting the Mt. Shasta mine, near Redding, Cal.

P. REARDEN, late Supt. Abbott Q. S. mine, Williams, Cal., is in Denver, Colo.

T. HART becomes Supt. of the Bullard & Van Deever mine, Flat Creek, Cal.

H. J. RULE, Supt. Bowen mine, Tuttletown, Cal., has returned from San Francisco.

G. BLAKE, Supt. Bell mine, Tuttletown, Cal., has returned from San Francisco.

CAPT. THOS. MEIN on July 30th was in Victoria, B. C., on his return from Alaska.

J. B. ELDERIDGE of San Francisco is examining mining properties in southern California.

B. WILLIAMS is inspecting the property of the Copper Queen M. Co. at Nacosari, Mexico.

J. B. RISQUE has been appointed Assistant Gen. Mgr. Pacific G. M. Co., Silver City, N. M.

S. T. PEARSON of Salt Lake City, Utah, is visiting his placer mines at Gibbonsville, Idaho.

J. M. MCGREGOR, B. C. provincial mining inspector, is making his first visit through Rossland.

J. I. EDWARDS, after examining mining properties in California, has returned to New York City.

C. A. HAMILTON of San Francisco is examining mining properties in Shasta and Trinity counties, Cal.

T. H. SIMMONDS, Supt. W. Y. O. D. mine, Grass Valley, Cal., is at the German Hospital, San Francisco.

H. E. PICKET, Mgr. Grand Victory mine, Placerville, Cal., has gone to Pennsylvania for a health trip.

T. EWING, owner of the Sheep Trail mine, Fort Mohave, Ariz., has returned to Kingman from San Francisco.

J. L. PARKER, who has returned from England, resumes his position as Mgr. Dundee mines at Ymir, B. C.

J. F. WOODMAN, Pres. Centennial-Eureka mine, Eureka, Utah, has returned home after an extended Eastern trip.

J. LEOHEMAN has returned to San Francisco from Shasta county, where he has been examining mining properties.

T. J. CLAVERING, Sec'y and part owner Lincoln mine, Sutter Creek, Cal., has returned to San Francisco from the mine.

AUSTIN J. DOYLE, former chief of police of Chicago, is at Jamestown, Cal., to assume the management of the Alameda M. Co.

WM. ARMSTRONG, who operates mining properties in the State of Zacatecas, has returned to the city of Mexico from San Francisco.

W. VAN SLOOTEN, M. E., of New York City, part owner in the Plumbago mine near Alleghany, Cal., is expected in California in a few days.

F. F. THOMAS, Supt. Gwin mine, Mokelumne Hill, Cal., was in San Francisco last week attending the funeral of his brother, W. H. Thomas.

C. B. WINGATE of San Francisco is at the Chloride mine near Junction City, Cal., in which he is interested and of which he is Gen. Mgr.

W. J. HAMILTON of San Francisco is examining a mining property near Forbestown, Cal., for a San Francisco capitalist, with a view to purchase.

J. MCKELVEY, a mining man of Oakland, Cal., has returned from a trip to Nevada and El Dorado counties, Cal., where he exploited mining properties.

H. BRATNOBER has men at work for the syndicate he represents in the Last Chance mining district, Alaska, 200 miles inland from Pyramid harbor, forty miles northwest of

Dalton post. At present he and J. Dalton are inspecting alleged copper ledges at the head of Copper and Alek rivers.

W. H. SHOCKLEY, formerly superintendent of the Mount Diablo mine in Candelaria, Nev., is now reported to be interpreter and secretary for Li Hung Chang, the Chinese statesman.

H. A. COHEN will leave the management of Capt. De Lamar's interests at Mercur, Utah, the present month to be absent in Europe a year. W. H. Cunningham succeeds to the position.

F. J. HURLEY of New York, treasurer of Exploration Syndicate, is in Silverton, Colo. After a four months' sojourn in Europe he is quoted that American mining investments there are receiving much attention.

JOHN P. CLUM of Washington City, Post-office Inspector for Alaska, is establishing fourth-class postoffices along the Yukon at Circle City, Fort Yukon, Fort Hamlin, Star, Eagle, Rampart, Tanana and Nulato.

V. M. BRASCHI of the City of Mexico has returned home from an extended trip through the northern part of the Republic, from which he reports greater mining activity than has been known in that part of Mexico, particularly Durango and Nuevo Leon.

J. W. YOUNG, Mgr. Invicta Hydraulic Co., near Revelstoke, B. C., has returned from a six months' sojourn in England. He says there is difficulty in engaging capital in London for new ventures in that province—not for lack of faith in the mineral productiveness of British Columbia, but from disappointment over the manner in which one or two big concerns have been floated.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JULY 26, 1898.

608,094.—TABLE—J. J. Anderson, Ellensburg, Or.

607,079.—DRAWING BEER—H. C. Black, Oakland, Cal.

608,102.—SASH FASTENER—L. H. Bowman, Walla Walla, Wash.

608,108.—RAISIN SEEDER—C. S. Cox, Fresno, Cal.

608,110.—HANDLE FASTENER—G. H. Dunlop, Hollywood, Cal.

607,844.—SNAP HOOK—Francisco & Shaffer, San Diego, Cal.

607,845.—PUMP VALVE—H. B. Gale, S. F.

607,930.—EGG BOILER—T. Holmes, Los Angeles, Cal.

608,049.—SEPARATOR—R. W. Jessup, S. F.

608,050.—SHIP'S GALLEY—F. Johnson, Seattle, Wash.

608,131.—CURRENT MOTOR—H. C. Keeler, Waterville, Wash.

608,142.—LOADING APPLIANCE—Kenfeld & Elvidge, S. F.

607,933.—FOLDING TENT—E. N. Laird, El Toro, Cal.

607,935.—DEMILJOHNS—J. Lenormand, S. F.

608,079.—HARNES—W. R. Phillips, Pomona, Cal.

607,877.—GATE SCREEN—A. P. Fritchard, Tacoma, Wash.

607,955.—ROCK DRILLS—P. H. Reardon, S. F.

607,956.—LUMBER RAFT—H. R. Robertson, Alameda, Cal.

607,965.—BOAT PROPELLER—S. S. Stevens, Point Arena, Cal.

20,096.—BELT DESIGN—J. F. Rose-Soley, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DESIGN FOR BELT.—John F. Rose-Soley, San Francisco, Cal. No. 29,069. Dated July 26, 1898. This invention relates to a novel design for a belt. It consists essentially of a flat strip of leather or other desired material of suitable width having the body portion cut into narrow strips to form as many plaits as may be desired, the extreme ends being left in their normal uncut condition. By a peculiar process of manipulation these intermediate strips are then formed into a braid of three, five, seven or more strands, thus presenting a unique and attractive appearance.

SAFETY ATTACHMENT FOR DEMILJOHNS.—J. Lenormand, San Francisco, Cal. No. 607,935. Dated July 26, 1898. This invention has for its object to provide a means for preventing demilohns and like articles from being unlawfully removed from vehicles in which they are being carried to customers while the driver is absent delivering an order. It consists essentially of a metal wire rod or bar secured within the wicker covering of the demilohn, and a ring connected with said bar and projecting outwardly through the wicker covering in such a position that it may be engaged and locked to some fixed object. The wire or rod is laid against the demilohn and the woven or wicker-work covering is woven over the demilohn and the rod which is bent so as to enclose a greater or less portion of the demilohn. A loose ring is secured to this wire or rod and extends outwardly through the interstices of the covering, and a rod or chain can be passed through the rings of several of the demilohns and securely locked to the vehicle so that no demilohn can be removed without first unlocking and removing the rod or chain.

Recently Declared Mining Dividends.

Boston & Montana Copper Co., Montana, \$4 per share and \$1 extra; payable Aug. 25.

Swansea, Utah, \$5000; payable Aug. 10.

Gold Coin, Colo., 1 cent per share, \$10,000; July 25.

The "Blue Heat."

A critical temperature, in the working of both iron and steel, is at the so-called "blue heat," which is from 450 degrees to 600 degrees Fahr. Here, iron and steel are much more brittle when cold or at redness. This heat, however, does not seem to leave any bad effect on the iron. But if the piece be worked in this range of temperature it will retain the brittleness after cooling and show a great loss of ductility, as measured by the bending test, although it has not been conclusively proven that there is a loss of ductility when the piece is pulled apart by static tensile stress. The poorer the iron the more susceptible it is to the "blue heat." The danger to steel, at the "fatal blue," is more pronounced than in iron, but it exists, to a greater or less extent, in all grades of iron. It is also more noticeable in a descending than in an ascending heat, and is especially marked in work having sharp corners, which has been worked at the blue heat. The loss of ductility and of shock-resisting power is not due to any incipient cracks, as can be proven by the restoration of the former qualities of the metal by re-heating to redness or by annealing. There seems to be some close relation between the effects of "blue shortness" and "cold working," but the injurious effects of the former are more marked than those of the latter. While blue working lessens ductility, it is not always fatal to the metal. Examples may be cited in proof of this. In hand riveting the operator usually continues hammering while the rivet cools past this critical temperature, and yet few rivets have been known to fail from this cause alone. According to a paper recently read by Prof. H. E. Smith, before the Engineers' Club of Minneapolis, on "The Effect of Heating and Working on Iron and Steel," blue working, without subsequent annealing, is prohibited in boiler work for the United States Navy, but not for hull work.

Starting a Big Machine.

A careful engineer starting a big pumping engine goes about it in a very deliberate manner. Chief Engineer Hodge, in charge of three gigantic pumping engines at the Pittsburg, Pa., waterworks, gave a personally illustrated lecture on the subject to a visitor who happened into the plant. Turning a little wheel he said: "It takes about fifteen minutes to start one of these pumps. I am turning on a little steam to sort of warm up her jacket before she gets down to hard work. A machine is like a man in a long distance race—she has to get limbered up before she is capable of her very best work. The work this engine does when she gets down to business is to take 500 gallons of water out of the river every revolution of her driving wheel and start it on its way to the consumers. She runs at the rate of fifteen revolutions per minute, and you can easily see that she has no snap, but earns every cent of her wages." Diving down into the basement Mr. Hodge turned a valve wheel a part of the way round, and then went up stairs and turned on a little steam at the main valve. Then the ponderous driving wheel, which weighs a trifle over twenty-eight tons, began to revolve slowly. Down into the basement he went again to open the intake valve a trifle more and then up to the main steam valve to give her a little more steam. With running about, turning a little wheel here and there, several assistants also helping with the work, it was fully fifteen minutes from the time the first steam had been turned on until the big machine was running at regulation speed and doing a regulation amount of work.

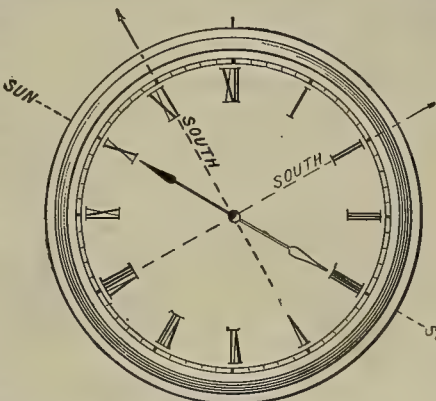
A DAY is the name for the time in which the earth rotates once, and a month for the time in which the moon revolves once. Then since tidal friction retards the earth's rotation and the moon's revolution, we may state that the day and the month are now lengthening at different rates which

are calculable, although the absolute rates in time are unknown. It will suffice for a general comprehension of the problem to know that the present rate of increase of the day is much more rapid than that of the month, and that this will hold good in the future. Thus the number of rotations of the earth in the interval comprised in one revolution of the moon diminishes; or in other words, the number of days in the month diminishes, although the length of each day increases so rapidly that the month itself is longer than at present. For example, when the day shall be equal in length to two of our actual days, the month may be as long as thirty-seven of our days, and the earth will spin around only about eighteen times in the month.

How to Use a Watch as a Compass.

For the information of those who, like myself, are fond of hunting, and in their zeal apt to lose all directions in the woods, I give my method of finding my way back again. There are two requisites necessary, the sun and a pocket watch. Of course, a man who knows the four points of the compass can come out of the woods with the assistance of the sun, but with the help of his watch he can do it so much better and more exact.

If it is in the morning and you want to come out of the woods in a southern direction, take your watch, open it and



hold it in your hand face up. If the small hand points at ten o'clock, for instance—it does not make any difference where the large hand points to—set the watch so that the small hand points straight to the sun, so that the shade will be easily under the small hand. Now take the distance from X to XII, divide into equal parts, and the result is XI, which points to the direction you want to take if you want to go south. If your destination lies in a northerly direction, follow the direction given by V, the opposite of X.

If it is towards evening and you want to find your way home, place the watch so that you get the shade under the small hand, the same as in the morning. If the small hand points to IIII, divide the distance from IIII to XII around the nearest way, the result of this being II, which gives you the direction you have to go if you want to go south, the direction north being indicated by the opposite, VIII. This is one method to find your direction when you have a watch with you. Another method is given by nature itself. Look at the straight giants of the forest, and you will find that on the side where the bark is darkest the northerly winds are blowing, while on the side where the bark is light the wind blows from the south. This may not be very practical information for men who look for workshop experience, but, then, it is not fair to have all work and no play. —L. H. Avey, Plaquemine, Louisiana, in New York Blacksmith and Wheelwright.

A GERMAN inventor proposes to manufacture leather from asbestos. He will treat the fiber in a solution of caoutchouc until it is thoroughly coated, and then evaporate the dressing. The product adheres together after this treatment so tenaciously

that after pressing it can be used for all the purposes of leather. It is claimed for it that it will not expand in moisture and possesses great durability.

THE occupations of the American people are given in the bulletin of the Eleventh Census recently published. The total number of people engaged in occupations of all kinds in 1890 was 22,735,961. Of the whole number of working people the females form 17.22 per cent. Divided by classes the working people of the country are as follows: Agriculture, fisheries and mining, 9,013,336; professional, 944,333; domestic and personal service, 4,360,577; trade and transportation, 3,326,122; manufacturing and mechanical industries, 5,091,293. Over 59 per cent of the workmen are married, over 27 per cent single, over 3 per cent widowed, and one-quarter of 1 per cent divorced. In manufactures and mechanics the carpenters and joiners, numbering 611,482, make up the greatest element, with dressmakers and milliners following, with 499,690. There are a little over 1,000,000 bookkeepers, clerks and salesmen, 690,658 merchants and dealers, 5,281,557 farmers, planters and overseers, and 3,004,061 agricultural laborers, 349,592 miners, and only a little over 60,000 fishermen and oystermen. Professors and teachers, aggregating 347,344, form the most numerous of the professional classes. Physicians and surgeons, 104,805, come next; then lawyers, 89,630; clergymen, 88,203; Government officials, 79,664; musicians, etc., 62,155; engineers and surveyors, 43,239; artists and art teachers, 22,496; journalists, 21,849; and actors, 9728.

THE compound steam turbine directly coupled to a dynamo dates from 1884, according to A. C. Parsons. The first motor ran at 18,000 revolutions per minute, giving 6 H. P., but dynamos and alternators of 500 to 700 H. P. are now driven by direct coupled turbines, more than 30,000 H. P. of such machines being at work in England. The compound turbines are of two types—the "parallel flow" and the "radial flow."

In the former the steam, entering by an inlet all around the shaft, passes through successive turbines of gradually enlarging passageway, and is expanded in small part at each turbine, finally escaping to the exhaust pipe. In the radial flow type the rows of turbine blades are keyed into and project from the faces of moving disks attached to the shaft and fixed disks attached to the casing. The steam's course is outward through the rings of blades, then inward, and again outward through the blades of the succeeding disk, and so on. The bearings are specially constructed, with concentric rings that form upon the shaft thin layers of oil to serve as a cushion to prevent hammering. A power plant of this kind is economical in first cost and in maintaining, and offers other advantages.

TWO WEEKS is too long a time between advertisements. I do not think the merchant who advertises every other week is going to get anything like the advantage from advertising that the merchant who advertises every week will get, no matter how attractive the every-other-week advertisement may be made. It is the persistent, frequent advertising that is, nine times out of ten, going to get the business.—Charles F. Jones, in Printer's Ink.

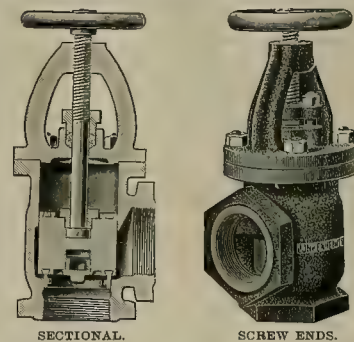
ACCEPTING a check of a corporation signed by its treasurer and secretary in payment of an individual indebtedness of the said secretary and treasurer is not an uncommon occurrence. A great deal of this is done and it usually goes through all right, but unless the recipient of such a check has had a direct or an inferential assent of the corporation that the check may be so used, it is not a valid payment and a refunding of the money may be demanded, because the check, being

signed by the corporation by its officer, puts the receiver of it upon notice that the funds represented by it are corporation funds, and are not to be diverted to any private purpose without its consent.

Iron Body Angle Blow-off Valves.

Lunkenheimer's iron body blow-off valves are guaranteed by the manufacturer for working pressures up to 250 pounds to the square inch. All parts are made of iron, excepting the stem, disc-locknut, disc-plug and seat ring, which are made of bronze; the reversible bearing faces in the iron disc are filled with Babbitt metal.

Reference to the sectional illustration shows the disc solid fitting closely in the barrel of the valve shell to prevent scale and sediment from being trapped on top of disc, thereby preventing it from being readily raised



when necessary. The disc is reversible, having two valve or seating faces which can be changed at will, increasing its durability. These valve or seating faces in the disc consist of dove-tail slots, filled with Babbitt metal; when both are cut or worn out the old Babbitt can be melted out, new metal poured in the slots, and be faced off thus renewing the principal wearing parts of this valve. The brass seat ring in the body of the valve can also be renewed when cut or worn. To reverse disc remove valve bonnet, take entire trimming out of body of the valve, then unscrew small plug at bottom of disc and disc-locknut around valve-stem; the position of the disc can be reversed so as to present a perfect bearing face to the seat ring in the shell of valve.

They are made in three sizes, 2, 2½ and 3 inches, with screw, flange, or screw and flange ends. They should be connected so that the inlet is at the side. They can also be furnished made entirely of bronze, for marine purposes. They are made by the Lunkenheimer Company, Cincinnati, Ohio.

California Game Laws.

1. No antelope, elk, mountain sheep, female deer, spotted fawn, nor meat nor hides of the same; no English skylark, robin, pheasant, humming bird, thrush, canary, mocking bird, nor the nests, eggs and skins of the same, may be taken at any time.
2. No nest or eggs of any quail, duck, grouse, dove, rail, blue or white crane, shall be taken at any time. Nor may any crane be killed at any time.

The close season for game is as follows, to wit:

- Deer, from Oct. 15 to July 15.
- Dove, from Feb. 15 to July 15.
- Duck, from March 1 to Oct. 1.
- Grouse, from Feb. 15 to Sept. 1.
- Quail, mountain, from Feb. 15 to Sept. 1.
- Salmon, above tide water, Oct. 15 to Nov. 15.
- Trout, from Dec. 1 to April 1; trout, steelhead, Feb. 1 to May 1.

From County Gov't Act of 1897: 28. "To provide by ordinances not in conflict with the general laws of the State, for the protection of game, and may shorten the season for the taking or killing of fish and game, within the dates fixed by the general State laws, but shall not lengthen the same."

From Penal Code: "Every person who willfully enters upon the enclosed land of another for the purpose of hunting, or who discharges fire arms or lights campfires thereon, without permission, is guilty of a misdemeanor."

Mining Summary.

CALIFORNIA.

Amador.

At the South Eureka mine they will run a drift from the 1550-foot level, which, it is expected, will strike the ledge below the pinch encountered at the 1250 level in the north shaft. Ore is being taken out of both shafts, and the twenty stamps in the mill are steadily dropping. The mine is paying expenses of operating and a balance each month to go into the reserve fund.

Ledger: Drifting on the ledge at the Oneida continues. Supt. Truscott is having a mill test of 500 tons made at the Zella. A shaft repairing at the Zella is being pushed forward and at the same time the management is keeping ten stamps at work on ore from the mine, and five on the Oneida test run. The trial of the suits of the Argonaut Co. against the Kennedy Co. has been set for Sept. 15.

Dispatch: The Amelia shaft is down about 600 feet, and the rock continues very hard. The water is handled without difficulty. The drift from the north to the south shaft on the 2400-foot level in the Kennedy mine is being steadily driven, and connection between the two shafts will be made soon. There is talk of bringing electric power from the plant on the Mokelumne river with which to run the 40-stamp mill.

Butte.

At the Magalia mine, near Dogtown, a 10-stamp mill is running steadily on cement gravel. The face of the lower tunnel is now down the canyon 3000 feet from the mouth of the big shaft. The ancient gold-bearing channel has the same pitch or inclination that the surface channel has. It averages about 500 feet deeper than this channel, the full 3000 feet. Forty-five men are employed. The machinery, pumps and drills are run by an air compressor driven by water power. The mine is very wet, and the men in some portions of it wear two rubber coats at one time. The Little Hope mine is running steadily and twenty men are employed. The Badermine is doing well. Forty Chinamen are gravel mining at Big Bend.

H. E. Vall is prospecting extensively on the ground of P. R. Welsh, near Oroville, and will sink ten shafts. A steam pump will be used. It is understood that, if the ground is rich enough, a mining dredger will be built.

Calaveras.

It is locally reported at San Andreas that work on the Thorpe mine will be resumed shortly and also that a 30-stamp mill will be built on which work will begin early in August. The Madison mine at Angels has closed because of water shortage.

L. Vandell has bonded the Peek Ranch quartz lead and is sinking a shaft on the lead. The vein was uncovered quite a distance some years ago when the Peek Ranch Hydraulic Co. was operating in that vicinity, but no depth was reached. P. Lancel, on the McFadden Ranch, near West Point, has struck gravel which gives good yield.

F. McNear's mines, the Buckhorn and Red Gold, and the Heinsdorff property near San Andreas are closed down, but it is presumed that work will start again when water is assured.

The Melones mines near Robinson's Ferry comprise six mines. In the South Carolina the tunnel has reached 3000 feet. The development thus far is said to show 450,000 tons of ore that is valued at from \$3 to \$10 a ton and can be milled at \$3 per ton. Development work will be continued until spring, when a mill of 120 stamps will be built. B. Deleray is Supt. and W. C. Ralston Gen. Mgr.

Echo: Work will soon be resumed in the Butts mine near Angels. Unwatering the shaft has begun. There is every prospect of the Cherokee mine being operated on a large scale shortly. It is stated on good authority that the Demarest mine near Angels is making a good showing. The vein is getting wider and richer. The Utica Co. is laying in a large lot of logs for mining purposes. The company will make extensive improvements. The water ditches are to be cleaned out and enlarged, the reservoirs are to be cleaned out, and an electric power plant is talked of.

El Dorado.

The Baltic mine near Grizzly Flat has been bonded to San Francisco capitalists and operations will be commenced without delay.

Nugget: Development is pushed at the Rose Kimberly mine near Rescue. The shaft is down 150 feet; a drift on the ledge is being driven from the 150-foot level. At the Grossman mine, near Rescue, the shaft is 100 feet deep. Crosscuts have been made east and west from the 100-foot level. The ledge prospects well. At the Eagle mine at Grizzly Flat, after having blocked out a large section of good ore, the company are erecting a 10-stamp mill. They are putting in a 50 H. P. engine to run the mill. Steam will only be used, however, when water cannot be obtained. D. H. Jackson has a force employed retimbering the Gold Bug mine, near Placerville, for extensive development work.

Nugget: The Mt. Pleasant mine, at Grizzly Flats, is being unwatered and has reached 450 feet in the old shaft. The shaft is 700 feet deep and in addition there are several hundred feet of levels. It is estimated that it will take sixty days yet to finish the work. At the Grizzly gravel mine, scarcity of water has compelled closing the mill. Several men however are opening drifts and blocking out ground for the winter run. Development at the Mt. Hope continues. The company are ready to use their 10-stamp mill, recently completed, but will probably be prevented by scarcity of water. At the Eagle King the stamps have been hung up for the season for want of water. A winze is being sunk from the tunnel.

Kern.

J. Singleton has begun work on the Windy mine, near Johannesburg. This claim, which has been in litigation for some time, has been considered the richest prospect in the camp. After six months of idleness, work is to be resumed on the Val Verde mine, under Greggs & Fisher. A run of twenty-one tons of rock from the Sunshine mine, at the Red Dog mill, turned out \$3600.

Mono.

Mine: At Bodie about 15,000 tons of tailings are treated monthly at the cyanide plants—the South End, Standard, Syndicate, Victor and Sunshine. All are producing bullion. The Dunderburg is not counted, though in operation. When the Copper Mountain and Lundy plants get to work there will be an enormous lot of sand handled in Mono county. This stuff, which was considered a nuisance a few years ago, is valuable now.

Nevada.

Work at the Mary Ann mine, near Graniteville, under bond to G. Mainhart, is progressing favorably. It is locally reported that the Ormonde mine at Washington has been bonded for \$75,000. R. B. Smylington is making a survey and report upon the old Constitution mine, near Nevada City, for a company that is about to resume work on it. The Powning G. & S. M. Co. at Grass Valley appointed G. E. Mainhart Supt. The company will soon begin development of the property.

Miners are employed at the Delaware mine, near Nevada City, although the gravel has been all worked out. Not long ago a quartz ledge 2½ feet wide was found, which yields a fair prospect. Supt. Mallon believes that there is a pay chute on the vein and is prospecting it. He will sink and drift and perhaps the Delaware will turn into a dividend paying quartz mine after years of production as a gravel mine.

Fourteen more miners were drafted at the Champion mine, Nevada City. The water supply is very short, so much so that there was hardly enough power to haul the men out of the mine. As soon as the new reservoir is completed there will be a change for the better. At French Corral R. I. Thomas has secured a company of Sacramento capitalists to work his river claim, and work has begun. A flume has been built, 192 feet long, which will carry 70,000 inches of water. In a few days they will have thirty or forty men at work.

Transcript: An 8-inch pump is being put in at the Phenix mine near Nevada City. A ledge of high-grade ore has been found. Work on the new 10-stamp mill is progressing and will be in operation by the middle of August. At the Eagle Bird mine near Mayburt on account of shortage of water operations are not in full blast. However, the company have plenty of capital and are developing the mine in a systematic way.

Plumas.

The Four Hills mine, near Johnsville, has twenty men doing development work. The Jamieson mine is employing thirty-five men. The Plumas-Eureka is being worked by tributaries, who are deriving good returns for their labor. The Red Ravine Co. have struck the channel on their claim at Nelson Creek, with about 7 feet of gravel.

Riverside.

The Good Hope mine, near Perris, will be worked during the summer by contracts, and no man will be employed by the day except those in the mill and shafthouse and the firemen. The contracts will be in large sums, as the rock is hard to work. The shaft is 600 feet deep. Work will be prosecuted on the first, second, third and fourth levels.

San Bernardino.

Near San Bernardino, in the Rose mine, a new ore body has been found. It is on the seventh level, is 4 feet wide and averages \$30 a ton. About 1000 tons are being hoisted to await the rains or the finding of water, for which a well is being sunk that has reached 200 feet, when the mill will be started.

Shasta.

The Bully Hill mine near Copper City is making a carload shipment of copper ore. The Dickinson's Point mine near Whiskeytown is showing good results in the tunnel development. The Davis & Sexton astrastra is crushing a good quality of ore and saving considerable high-grade sulphurets. The Gopher mill is running steadily on ores from the Whiskeytown district. The cyanide plant being built by San Francisco people on the Toughnut mine at Dog Creek will be in operation shortly. In the Mollie mine at Dog Creek a 7-foot wide ledge has been opened by 270 feet of tunnel.

The Old Spanish M. Co., at Lower Springs, are working a force driving tunnels to tap the two largest bodies of ore. The new 10-stamp mill was started last week on a fair grade of ore.

Democrat: D. N. Fowler & Co., owners of the New Era group, on Clear creek, bonded one of their claims to Muir & Youlden. Extensive development work has begun. Hobbs & Hemsted have begun sinking on the Copper King and Copper Giant claims on Stillwater. Thus far only surface work has been done, but the ore has paid for its extraction. It shows native copper and carries gold and a high per cent of lead.

Sierra.

Reynolds & Carter have leased the Morrison hydraulic mine for five years and have begun work.

The pump was started at the Gold Bluff mine last week. Supt. Copeland expects to have the mine unwatered within three weeks. The Croesus M. Co. is putting an air plant on the Plumbago, near Alleghany. Water power is used. The compressors are

down on the river, 5000 feet from the mine. From there the air is forced through pipes, reheated, then runs the entire plant. The Croesus Co. owns over 9000 feet of the Plumbago ledge, which is a good producer.

The Mountain mine, near Sierra City, will be worked and the mill put in operation for thirty days to exploit the property by McK. Twombly of New York City, with a view to purchasing the property. Mr. Twombly has large gravel mining interests in operation in Ecuador.

Siskiyou.

The Minetta B. gravel mine near Happy Camp is using 2600 inches of water and using an elevator to carry off the tailings. Even with this disadvantage the company meets with success.

It is stated at Sawyers Bar that future operations of the Salmon River M. Co. will depend upon the success of the cleanup which they will make in a month. A find is reported from Whites Gulch, near Fort Jones, of a ledge from 2 to 3 feet wide and giving good assays.

The Salmon River Hydraulic G. M. & D. Co. at Sawyer's Bar has built seven miles of flume, which takes in all of Salmon river at that point, or about 1600 inches. Two giants are in operation, one 6 and the other 5 inches. This is the old Wm. Klein mine, that has been worked since the '50 period. The Etna advance says J. Daggett will commence operations on the lower tunnel of the Black Bear mine on a big scale. Two shafts have been sunk in the old main tunnel, and reports say that a 2 foot ledge has been discovered that will run about \$30 to the ton. The Golden Jubilee mine, at Humburg, is worked day and night with success. The ledge is about 2 feet thick and pays well.

H. Barton, in a clean-up from a week's run at Oak Bar, realized over two pounds of gold. The Eastern Co. prospecting the Yreka creek basin from below Hawkinsville to Yreka, will continue the work. The ground is all bonded for mining, to be returned after mined, while some has been contracted for purchase outright at a stipulated time if prospects are satisfactory.

Hunter & Co. of the Cherry Hill quartz mine on Cherry creek have five men at work on the lower tunnel, which is to be connected with the upper level when completed to the ledge. They will build a mill.

Machinery is being set up at the Morrison & Coburn mine in Quartz valley. All the quartz so far taken out pays well. The San Francisco company working the old Wright and Eastlick hydraulic mines at Oro Fino have received new machinery with considerable more pipe to be fitted up for the coming winter. The American Bar claim at Klamath river is reported paying well, and is worked by a large crew. The ledge has been tapped at the Katie May mine at Greenhorn. The Commodore quartz mine at Barkhouse has been sold to San Francisco and Oakland men for \$26,000.

The Big Two and Lone Lenore mines on Little Humburg, have been sold for \$10,000 to San Francisco people.

The Salmon River M. Co. working the Klein mine, have been doing well despite low water. They have about 15,000 inches at present, but ought to have double that for running the mine to its full extent. The Aromas mine near Sawyers Bar has not been operated this season for want of water, but it is in fine shape to work when water comes.

The Reeder & Brown claim in Fool's Paradise district, which paid \$10,000 the past two months, is in litigation. J. F. Boyle is receiver.

News: The Commodore, Goodenough, Insurance, Orietta and Eastern Star mines, known as the Goodenough group, last week were sold to Capt. Thos. Mein, F. J. Fletter, R. M. Mein, E. M. Wilkinson and J. A. Chestnut, representing the London Exploration Co., for \$26,000. A mill will be erected and the mines developed on an extensive scale.

Trinity.

C. B. Wingate & Co. are building a 10-stamp mill on their Chloride-Balley mine, near New River.

Tuolumne.

The App mine at Quartz has a force of men at work placing the foundation for six motors. At the Rappahannock the shaft is down 1150 feet and crosscutting at the 1100-foot mark. The Rappahannock is one of the deepest mines in the county, but the immense bodies of ore have been practically untouched.

The Horseshoe Bend & Tuolumne M. & D. Co. is developing the Stover, Shorey and Doyle property at Horseshoe Bend. The company will increase the force August 1st and push the work steadily until a drift has been run in on one of the principal veins.

A company composed of business men of Columbia have begun operations on the Stanislaus river in search of an ancient channel. A dam will be built to turn the river.

The Golden Gate and the App mines have shut down for want of water.

Banner: The lack of water has no effect on the pocket mines. In fact, it is a benefit. The pocket mines are the sources from which two-thirds of the ready money in the county come.

Tulare.

C. H. Clambes is developing a quartz property near White river. San Francisco men are building a 10-stamp mill near the same place, and considerable development is going on throughout that section.

Yuba.

Engineer Vischer of the U. S. Debris Commission has resumed work in the Narrows near Smartsville. Twelve men are engaged in making the soundings. At the Pennsylvania mine, Browns Valley, work progresses. The shaft has been unwatered 200 feet and it is thought the water will be out and stoping begun in twenty days.

NEVADA.

About thirty-five miners were laid off recently at the mines in lone. The draft was from the group in Shamrock canyon, the Cleveland being closed down. Over half the miners employed in Austin and a number of the top men were laid off, and it is not known when they will be put back. This was on account of the Farnsworth troubles.

Ore shipments for the week ending July 29 over the Eureka & Palisade Railroad amounted to 205,710 pounds from Eureka and 169,560 pounds from Hamilton and Ely. The Dexter M. Co. of Tuscarora is making preparations to put in a 195 H. P. electric plant. When completed, the company will have 195 H. P. This will give power for mill, hoisting, pumping and lighting purposes. The Magnolia of De Lamar marketed two cars of ore giving seven ounces gold and 100 ounces silver per ton.

Wadsworth Dispatch: Gold bullion is coming from the Olinghouse mines. One shipment amounted to \$2500, and W. D. Linton melted into one bar \$450 and into a second \$600. The Chinese placer miners grin when asked what they are taking out, but the stuff is quietly shipped to San Francisco and the Chinese keep on with their rockers.

Reveille: Work at the Union mine, at Austin, has been suspended, the pumps taken out and the tracking torn from the levels. The mill is running with enough ore on hand for several weeks.

OREGON.

Another strike of good ore is reported from the Red Boy mine, near Granite. It is locally reported that the Flagstaff mine, at Baker City, will resume work Aug. 15th.

Journal: At Bourne the E. & E. is working sixty men in the mine and twenty men in their 20-stamp mill. The mill is handling eighty tons of ore daily, reducing to concentrates at a ratio of 25 to 1. The mine is capable of producing almost any quantity of ore, and, while there is a big force in the mine, nearly all are doing development work. All the pay above the main adit level is practically worked out, but a big vein of arsenical pyrites has been opened through sinking, and the work of driving in on the ore from several levels is opening a source of wealth. The Columbia is taking ore from the main works to keep their mill going while the owners are developing the ore bodies, blocking out for future output and prospecting for further pay streaks. The mill is working steadily, and while the output is not increasing in quantity, the values are greater; partly because of improved methods in handling the ores and perhaps on increased values of the ores themselves.

WASHINGTON.

In the Mountain Lion mine at Republic the tunnel has reached 724 feet and has cut a ledge 8 feet wide that assays \$10 per ton. At Loomis the Golden Zone is making good progress and the company expects to block out a large amount of ore before winter, as well as to have a method of treatment decided on and a plant in place. Mr. Kingsbury is the Gen. Mgr. Work on the Palmer Mountain G. M. & T. Co.'s tunnel goes rapidly forward. At Bossburg the Young America and Cliff Con. M. Co. concentrator is finished. Modern machinery, including an air compressor, is being placed; drills will be run by electricity. There are two tunnels on the property, both about 200 feet. The ore is high grade, running well in silver and lead. There are 2000 tons on the dump.

At Republic the Little Cove is working fourteen men. Three eight-hour shifts are working the south drift. Each shift progresses about 1 foot per day. In the north drift two shifts are working, but the rock is hard and each shift makes only 6 inches per day. The San Poil tunnel is in over 400 feet.

The tunnel on the Montana Lion mine, at Republic, has reached 742 feet. The west ledge is 8 feet wide and carries average values of \$10 per ton. The owners are considering the advisability of ordering a stamp mill. The Tenderfoot & Trail Co.'s ledge is 6 feet wide. The ore assays from \$3 to \$4 per ton.

BRITISH COLUMBIA.

The Whitewater Mines, Ainsworth, have taken a working bond on the Slocan Boy for \$40,000. Work on the property will begin immediately. The Velvet at Rossland has been successfully floated in London by the New Gold Fields of B. C. as the Velvet Mines, Limited. The new company has a capital of £100,000, of which the New Gold Fields retains a large holding. J. Morrish will be in charge of the property. The development of the Velvet continues satisfactorily. In the 100-foot level some good malachite is met, which is not often found in this camp. Much good copper ore is also encountered, mixed with white quartz and black iron.

The new concentrator which the Whitewater mine in Ainsworth district is building will handle 100 tons of ore per day, and the management estimates that there is sufficient ore in sight to keep the plant going for at least two years. The mine now employs 100 men. The Payne mine, in the Slocan, last week shipped twenty-four cars of ore, and the management expects to exceed that figure in the near future.

The development of the Whitewater vein, Slocan, has been carried on through seven tunnels varying in length from 100 to 500 feet. The highest tunnel is 500 feet above the seventh, and all are connected by winzes or shafts giving ventilation to the entire mine. Because of the soft and shattered character of the formation, little blasting is necessary; but for the same reason it is imperative to support all the tunnels and drifts with timber. The present output is about thirty-five tons per day. The net value of the ore delivered at the smelter is \$55 per ton, which gives a net profit of \$40 per ton.

The Rossland ore shipments last week amounted to 1765 tons, of which the Le Roi

furnished 1925 tons, the War Eagle 700, Center Star 160. The Le Roi is shipping 265 tons a day. The shipments range about \$30 in gold, 3 per cent copper and two ounces in silver, which gives a total value as follows: Gold, \$30; copper, at 11 $\frac{1}{2}$ ¢, \$7.05; silver, at 59¢, \$1.18; total, \$38.23. From twenty assays made in the Dundee mine at Ymir the results ran from \$2.68 to \$38.57, an average of \$13.57 a ton. The shaft is 260 feet deep and there are 235 feet of tunneling. A wire tramway 1800 feet long has been completed from the mine to the site of the proposed concentrating mill. The property has been operated with steam drills, but will be changed for a 10-drill compressor. Further on a 50 H. P. hoist will be installed. The entire plant will cost over \$20,000. J. L. Parker is Gen. Mgr. In the Sloan the Last Chance is shipping 400 tons of ore. The ore houses and tunnels are full of ore taken out in developing. Six feet of clean ore was found on the Payne last week. The strike was made at 300 feet depth on the Maid of Erin claim. There are 100 men working on the Payne. Five inches of galena running 220 ounces in silver has been struck at a depth of 500 feet on the Sovereign after running a tunnel 300 feet. The Enterprise people are building a wharf at Ten Mile to accommodate the loading of ore barges. The mine is shipping 1000 tons of ore to Omaha. At Fairview representatives of the B. A. C. are inspecting mining properties with a view to purchase. The development of the Stemwinder is being pushed. Some rich ore is sacked for shipping and a large quantity of low-grade ore lies on the dump.

ALASKA.

In July the Alaska-Treadwell mine worked 19,987 tons ore and 403 tons sulphurets were treated, the latter yielding \$35,373, and the whole averaging \$3.60 per ton. The bullion product for the month was \$72,068.

THE KLONDIKE.

The steamer Manuense is down from St. Michael, Alaska, with 260 passengers and about \$150,000 in gold dust. Of passengers thirty-four were miners who had spent one winter in the mines, the remainder being those who had gone there last spring and concluded not to remain. The passengers all agreed in the statement that hundreds of men are arriving in St. Michael daily from Dawson and vicinity seeking passage to the States and that there are upward of 1000 men in that part who have lately come from coast ports and are trying to get up the river. Many are turning back after learning the conditions at Dawson and up river points. A larger part of the Manuense's passengers are returning to their homes in California, Washington and Dakota. The river steamer Monarch is reported aground about 250 miles from Dawson.

The miners report gloomy forebodings in Dawson, whence people are leaving in hundreds. The streets are filled with idle men, for work is now difficult to get, as the city is much overcrowded. The majority of the passengers of the Manuense came down the river on the river steamers J. J. Healy, Merwin, Alice and Margaret, the last to reach the mouth of the river. The Healy arrived July 20th, the day the steamer sailed southward. She left Dawson on July 12th and reports that the river is rapidly falling and many of the bars are difficult to cross. Much suffering is said to exist along the lower Yukon, many little groups of stranded miners who are without funds and provisions being seen at points along the river.

At St. Michael things are black and everything points to trouble in the near future. The passengers who went up on the steamer Progresso are in a very bad fix. The men of the commercial company refuse to allow them to go ashore, and the steamship company owning the vessel is unable to take them up the river, having lost the river steamers which were to have taken the passengers to Dawson. Many of the passengers who have funds have transhipped to some of the river steamers, but the greater number are stranded on the ocean vessel.

The beach at St. Michael is also crowded with stranded miners and those who intended to have been miners. Many who drifted down the river have not sufficient money to pay their fare south, and there they remain, waiting for something to turn up. The two commercial companies will not allow any of the ocean liners or river steamers which are not doing business in connection with them to land at their wharves. Passengers and freight on the ocean boats must be transhipped in the stream and the river steamers not connected with the company must land their passengers at points all along the shore. Among the steamers at St. Michael when the Manuense left were the Danube, which was scheduled to sail about a fortnight after the Manuense left, the Leelanaw, Progresso, Brixham and Nordenskjold. While at Dutch Harbor, which port was called at on the way down, the Manuense officers learned that the Moran fleet of river steamers from Seattle had been destroyed and were lying in piles of firewood along the barren Alaskan coast.

IDAHO.

Mining men share in the belief that this fall will be one of unusual activity in all camps of northern Idaho. This belief is, to a certain extent, being verified by the departure from Kendrick last week of Mr. Emmett with a force to begin work on the Crescent mine. Mr. Sweet had a 5-stamp mill put on the property a year ago, but has never run it steadily. The ledge is narrow and from the last runs the result was \$25 per ton, the tailings going \$9.40 per ton. The intention is to sink, run levels and open the mine on a broader scale. The Mascot M. Co. will soon be crushing ore from the old Blanket ledge. The ore is low grade, going about \$4 and \$5 per ton, with rich pockets. Other properties are being examined with a view of purchasing. The most active work is in the New-some creek and Florence districts. In New-

some creek district the mines that are worked are paying, and some fine ledges are being opened. At Florence about 100 men are employed. The Banner mine is not working a full force, as the company is sinking a shaft 100 feet deep, and will not increase its force until levels are run. The What Cheer and Blossom are looking good, and four new Huntington stamp mills will be taken into the camp by fall. At Grimes Pass the Wells Bros. are running an arrastra and crushing ore from one of their claims that turns out \$60 a ton. They cleaned up \$700 from one week's run.

Portland, Or., men have bought the Black Hawk mine at Mineral. The Eagan group has also been sold and it is locally reported that the Cuprum Smelter Co. is the purchaser.

The Bunker Hill & Sullivan tunnel at Wallace is in 2700 feet, and progress is being made at the rate of 300 feet per month. The shaft is down 400 feet and is reported to be in good ore all the way. It will be two years yet before the tunnel reaches the point of intersection.

The bond on the Lucky Boy mine at Idaho City given to Pittsburg capitalists calls for the purchase price of the mine to be paid September 1st, but the company concluded to make the payment August 1st. It is stated that a mill will soon be shipped. At the Morning Star near Grimes Pass a large mill will be put up this year on Payette river. A tramway will be built from the mine to the mill. It is said that in all about 200 men will be employed. The Morning Star tunnel taps the ledge at 700 feet depth. The tunnel is 2000 feet long. The ledge is 12 feet wide and the ore runs \$15 a ton.

UTAH.

Work has been resumed on the property of the Creole M. Co. at Park City under conditions that warrant steady work. Seven carloads of crude ore were shipped from the Horn Silver at Frisco.

The Swansea, at Silver City, is shipping from six to ten cars of ore a week. The Horn Silver mine, at Frisco, shipped six cars of concentrates. The Utah, at Fish Springs, made an ore shipment that yielded 42 per cent lead and 209 ounces silver per ton. The output of the Ophir Hill mine, at Ophir, is 1000 tons per month. The product is chiefly lead; the copper value averages 3 per cent with a fractional amount of gold.

From Silver City were shipped last week thirty-three carloads of ore. The Sampler at Park City shipped \$1,517,540 pounds of ore and concentrates.

In the Grand Central mine, at Tintic, the ore body on the 800-level is getting bigger and richer giving assurance of regular dividends for the future. The company expects to utilize electricity for its plant upon completion of Telluride Co.'s power plant in Provo canyon, and will put in a fine new hoist as soon as the electricity is available. M. Holbrook is Gen. Mgr.

The ground at the Mammoth mine, at Mammoth began to move and several cave-ins had occurred in that portion which had been furnishing the stockholders with their dividends. How serious the "movement" is was not known, but everything will be done to arrest damage. L. R. Mayne & C. H. Scheu, mining operators of Mercur West Dip, are in Wayne county, in which they are largely interested. Their properties show ore veins from 3 to 8 feet in thickness, and running from 7 to 40 per cent in copper. Engineers are making surveys and systematic development of the ground has begun. W. W. Old has secured a lease on the Rio Grande group at Tintic, and will put a shaft down 200 feet. It is stated that in the drift of the 1100-level in the Silver King workings, at Park City, another body of ore has been uncovered and that the showing is better than at any time in the history of the mine. The entire body according to report is shipping value.

The Bullion-Beck at Eureka has about 3000 tons of good ore at the surface and the shipments promise to be active. The Grand Central mine, Mammoth, shipped a trainload of ore last week. The record for July promises to exceed that of June. The Golden Star M. Co., at Gold Mountain, marketed a carload of ore which netted \$1500. A new strike is reported in the Homestake, Silver City, in the 500-foot level, the assays showing 30 per cent copper, thirty-six ounces silver and \$2 gold per ton.

Shipments from Tintic for last week were eighty-one cars of ore, ten cars of concentrates and four bars of bullion.

Mercury: It is estimated that there is about \$150,000 worth of gold in the dump at Manning, which can be saved by a second handling of tailings. A large part of the dump contains as high values as are found in some of the ore being treated at a profit in the district, and as the cost of mining and transportation would be deducted from the cost of treatment, it is evident that considerable money can be made by the company in extracting the values from what has hitherto been considered waste. From the looks of the zinc shavings in the settling tanks at the Chloride Point mill, the extraction of values is progressing favorably. It is not possible to make the same percentage of recovery that is made in the working of gold, but if the gold values and 50 per cent of the silver can be saved the company will have no occasion to be dissatisfied.

Tribune: According to reports from apparently reliable sources a controlling interest in the Valeo, at Park City has been tied by Keith & Kearns, these gentlemen, in the event that the deal is successfully carried out, getting possession of 110,000 shares in addition to their holdings. The contract, it is understood, was entered into on July 27th, the time covering a period of but twenty days. In it Pres. Johnson and others have agreed to relinquish their holdings at a reasonably good figure, and with Keith & Kearns behind it there is no reason to believe other than that

the property will be the scene of energetic development work.

MONTANA.

At Baker, last week, thirteen cars of ore were sent out, the most that has been shipped in one week for many years. The roads are now pretty good and shipments will run from ten to twenty cars a week. Among those shipped was one from the Queen Esther which ran 37 per cent in lead and thirty-five ounces in silver. This mine is under lease to Goslin, Northan & Co.

The Snowshoe mine near Libby, recently sold to an English company, has been developed by 2000 feet of tunnel. The lead averages about 5 feet in width. The ore is galena and is concentrating in its character. A 200-ton concentrator was built on the mine two years ago by a Chicago company, which did not have sufficient capital to get on a paying basis. Since the failure of the company the mine has been worked on a lease. The ore concentrates about six tons into one and a ton of concentrates runs about 60 per cent lead, twenty-five ounces in silver and \$4 in gold. The company which has bought the mine has registered in London and is composed of the directors and leading shareholders of the West Prussia Mining Co. They have been engaged in lead mining in various parts of Europe for thirty years.

The Diamond R. Mining Co. after four years of inactivity will reopen its property at Neihart. This company owns the Moulton mine on Rock creek, where it has erected a shaft house equipped with engines and other machinery of the latest model, including an air compressor and a hoist capable of sinking 1000 feet. They have sunk a three-compartment shaft 550 feet deep, operated with two cages and containing four stations, from which levels run to the vein. There is room in this mine for working a force of 200 men, and in 1892-3 an immense amount of ore was taken out. Owing to the depressed state of the silver market in 1894 the company hoisted its pumps, drew its fires and allowed the big shaft to fill with water, in which shape it has ever since stood.

J. C. Pearce & Co. near Georgetown are making satisfactory cleanups. The property comprises eighty acres of placer ground, twenty acres of dumping ground and water right of 1000 inches, sufficient to run three hydraulic machines. Shot gold is found from the grass roots down a distance of 15 feet, but bedrock has not yet been struck. Several improvements have been made at the Leonard and West Colusa mines, in the Butte district. The big air compressor has been installed and a new station is being cut at the 900 of the West Colusa. At the 1500-foot level of the East Gray Rock crosscutting is in progress.

At the Alice mine, at Walkerville, 300 men are at work. Regular shipments of silver-gold matte are made to San Francisco for refining. A force is employed at the Valdemar property of this company removing the debris from the bottom of the shaft, at 800 feet. As soon as possible work will begin for tapping a productive vein of manganese ore, which up to the present time has been worked solely from the Magma Charta.

The tailings of the old Iron Rod mill, at Iron Rod, were sold to Busch & Watson for \$2.50 per ton. They have ordered two steel tanks of a capacity of 150 tons each, which will handle that amount in the course of a three day's treatment. In addition there are vats in the old mill, which will bring the total treatment to over 100 tons a day. There are 20,000 tons of tailings in the mill yard and they carry \$10 per ton on an average. Four thousand tons must be treated this fall.

The East Pacific mine, at Winston, is to be incorporated under the laws of Maine, with head offices in Boston. It will be known as the East Pacific M. Co., and its capital stock will consist of 50,000 shares of a par value of \$10 per share. The East Pacific is employing 110 men, and it promises to make a permanent addition to the wealth of the district when tunnel No. 4, now being run to reach the ore chute at a depth of 203 feet below the No. 3 tunnel, is completed. It is 1600 feet from the mouth of the tunnel to the ore body, and half the distance has been traversed. The tunnel is being pushed forward at the rate of from 90 to 100 feet a month, and when it does encounter the ore body will give four years' work for the mine at the present rate of production beside making it possible to sink from the tunnel an indefinite depth. A 50-ton concentrator will be built at the East Pacific to handle the second-class ore, of which there are now 8000 or 10,000 tons on the dump.

Inter-Mountain: Operations at the Moonlight mine, near Butte, have been temporarily suspended, and orders given to pull the pumps. The Moonlight is the property of the Washoe Copper Co., and a large amount of money has been expended on development work since its purchase for \$760,000 two years ago. It has copper ore bodies and is considered the richest of the Washoe properties. It is understood that the property is now sufficiently opened up to produce big quantities of ore and that it will be shut down until such time as the Washoe people make arrangements for the construction of a smelting plant to treat their own ores.

WYOMING.

The Golden Eagle mine, near Grand Encampment, has twelve men at work. Two shifts are working in the tunnel which is in 350 feet and two are sinking a shaft. J. I. Cowan is Supt.

SOUTH DAKOTA.

Work on the Chicago and Two Bit, at Two Bit, is progressing. The water is under control, and the shaft is 350 feet deep and being pushed. The Great Northern has reached a depth of 235 feet. The Hardin Standard and Great Eastern will be started within thirty days. The Golden Crest has resumed sinking with three eight-hour shifts. The shaft has reached 135 feet. At Rapid City

M. H. Day will build a smelter of 240 tons capacity. The Giltedge mine will furnish 100 tons of ore a day and the balance is expected to come from custom ore.

Loung & Co., who shipped two carloads of ore to Aurora, Ill., from the Spokane mine, near Custer, received returns which netted them \$23 to the ton. They have a ledge of good milling ore, about 4 feet of which is galena running about 60 per cent lead.

MICHIGAN.

The annual report of the Calumet & Hecla M. Co. gives the following balance sheet as of April 30th, '98:

| Assets. | 1898. | 1897. |
|---|-------------|-------------|
| Cash at mine..... | \$172,988 | \$84,535 |
| Cash at New York..... | 15,000 | 15,000 |
| Cash at Boston, exchange, copper at 84¢ per lb. and mineral at 4¢ per lb..... | 6,914,696 | 6,599,428 |
| Bills receivable..... | 543,335 | 322,413 |
| Insurance fund..... | 205,650 | ..... |
| Totals..... | \$7,851,651 | \$7,021,406 |
| Liabilities. | | |
| Drafts in transit..... | \$165,843 | \$84,354 |
| Employees' aid fund..... | 14,201 | 4,535 |
| Bills payable..... | 258,090 | 232,305 |
| Machinery contracts..... | 855,000 | 562,000 |
| Aid, hospital and insurance funds..... | ..... | 249,000 |
| Totals..... | \$1,293,134 | \$1,132,194 |
| Balance of assets..... | 6,558,456 | 5,889,212 |

The annual meeting of the company will be held in Boston on the 17th inst. In his annual report President Agassiz says: "During the past fiscal years we produced mineral equal to 41,960 tons of refined copper; our product in refined copper was 45,194 tons. For the previous year our refined copper product was 46,237 tons. The price of copper has varied from 11 to 12 cents per pound. It should be stated to the stockholders that the gradual increase of our surplus since 1890, and the larger dividends paid during the past two years, while due in part to the higher price of copper, have been due mainly to the gradual increase of our working force. This is now about twice what it was in 1890. We are increasing the product of the mine, obtaining about the same profit per pound of copper as with a small output.

"The number of men engaged in pushing our openings has continued large, and our reserves have materially increased during the past year. The amount of dead work carried on in unproductive parts of the mine is large, and must of necessity remain so. The shafts Nos. 13, 14 and 15 sinking on the Osceola amygdaloid have been equipped with small hoisting engines. They have now reached a depth of over 400 feet, and Nos. 13 and 15 have developed some promising ground. At the south end of the mine the sinking of No. 12 has been continued, but there has been no improvement in the character of the conglomerate lode. At the north end the quality of the rock in some of the openings is not up to the general average.

"The delays incident to the completion of the larger hoisting engines at the Red Jacket shaft have been greater than we anticipated. We have only been able thus far to use the sinking engines. This has greatly interfered with our openings in the vicinity of Red Jacket shaft.

"We have laid the foundation of another large coal dock of a capacity of 100,000 tons, with a depth of water of over 21 feet along the face of the dock at Torch lake. We hope during the coming season to finish the dredging of our canal from Bootjack bay to Torch lake. We shall then have a depth of 20 feet and a base of 90 feet along its whole length, enabling us to bring the largest vessels navigating the lakes to our docks.

"At the mills all the buildings are now protected with iron sheeting, and we are obtaining an abundant supply of water for our boilers from the wells sunk in our sand flats. We have also built a new carpenter shop at the mills. We are continuing at the mills our experiments relating to greater economy in stamping and washing our rock and in treating our mineral product.

"At Buffalo we have purchased an additional frontage on Niagara river of about 200 feet; otherwise there have been no changes of importance at the Lake Linden or the Buffalo Smelting Works. At Torch lake we have begun to smelt the mineral of the Quincy Mining Co. for the temporary accommodation of that company.

"The expenditures on account of the Aid Fund for the fiscal year amounted to \$51,796.73. In view of the prosperous business of the company we have determined to pay during the coming year the contributions of the men to the fund. The value of the Aid Fund at cost is \$132,966.68."

ALABAMA.

The Alabama State Mine Inspector estimates the coal output in Alabama for this year at 6,000,000 tons against 5,898,771 tons in '97.

COLORADO.

(Special Correspondence).—E. F. Palmer of Denver has given a two-year lease and bond on ten partially developed mining claims at Winfield, Chaffee county, to Cleveland, Ohio, parties, the amount of the bond being \$20,000. The lessees expect to erect a concentrating mill on the property this year.

BOULDER COUNTY.

The old Smuggler mill, at Ballarat, started June 27 to work the dump which has been accumulating for twenty-five years and contains nearly 30,000 tons of low grade ore. The mill has a capacity of twenty-five tons per day. The mill has done good work notwithstanding the old-fashioned 500-pound stamps. The ore is a mixture of sulphides and tellurides, but the saving has been close. The concentrated product runs about eighteen ounces in gold per ton, and the crude ore concentrates from fifty to sixty to one. The mine is soon to be unwatered, put in repair and worked on the

leasing system. It has not been worked for several years.

The Elkton mining claim, owned by Morgan & Co., has been leased to Miller & Crowley for \$5000 for two years at 15 per cent royalty.

J. H. Dubois paid \$13,000 for a bond and lease of Kestler's group of mines near Gold Hill.

The shaft of the Newmarket mine, Ward district, is down 505 feet and good pyritic ore is being hoisted. One piece weighed 720 pounds. It has cost one year's work to bring the mine to its present condition and open the ore bodies.

The lessees of the Lady Franklin mine, Magnolia, shipped 651 tons of three-ounce ore during their lease, besides the high-grade stuff. They have made good wages.

The Culbertson Milling Co., near Boulder, has contracted with the Big Five for all the ore it can produce and ship. The mill guarantees a saving of 90 per cent of the values contained in the stock and tested by assay.

CHAFFEE COUNTY.

A twenty-five-ton shipment was made from the Prairie mine, near Whitehorn, that will average \$75 per ton.

CLEAR CREEK COUNTY.

In the Lamartine mine, near Idaho Springs, 100 miners are at work. The ore body is independent of the old Lamartine mine and is on the crown vein, which is gold producing, whilst the former was mostly silver.

EL PASO COUNTY.

From the Gold Hill properties of the Moon-Anchor Co. 180 tons of ore were shipped last week, of this 120 tons was smelting and sixty tons mill ore.—The Elkton is sending out sixty tons a day. Of this fifty tons is mill ore, worth about \$35 a ton. The remainder is smelting grade.

Keith & Grube at Victor are shipping twenty tons daily from their lease on the Victorator. The ore runs from \$30 to \$60 a ton.—On the Christmas Moore & Johnson are saving high-grade sylvanite ore from the 180-foot level. They have reached a depth of 300 feet.—A carload shipment of two-ounce ore was made by Crow & Clark from their lease on the Los Angeles.—The lessees on the Crozier shaft of the St. Thomas have opened up 18 inches of sylvanite quartz.

The richest ore taken out of the Gold Coin mine, Cripple Creek, is being taken from the 400-foot level, the greatest depth obtained in the mine. They keep up the 100 tons daily shipment, with improvement in the average grade of the ore.—One week's shipments from the Moon-Anchor Co.'s properties, Cripple Creek, amounted to 170 tons. Of this 60 tons was mill ore and the rest was consigned to the smelters. The statement of the Moon-Anchor under the new system of quarterly dividends has been issued by Gen. Mgr. McKinnle, who says that though extraordinary expenses have been incurred, amounting to an increase of over \$40,000, yet it has been almost met by excess production for the quarter. The cash on hand is \$119,657.73, which, with ore in process of settlement, amounts to \$136,157.73, against which charging the current dividend and operating expenses for July leaves a net cash surplus of \$81,157.73.—The Victor is shipping more ore than any other mine in the district. The greater portion of the Victor is third-class mineral that runs from \$20 to \$25 per ton. The June tonnage from the mine was 4000 and for July 4500. Only a few carloads so far of first-class, good for \$250 per ton, have been marketed, but every few days a carload of second grade is sent out that runs from \$75 to \$100. The shaft has reached a depth of 790 feet and will be continued 50 feet deeper. The next quarterly dividend will be not less than \$50,000. The Victor has paid nearly \$1,000,000 dividends. There is now more ore in sight than at any time in the history of the mine. The directors have purchased fifty freight cars, capable of carrying twenty-five tons each, which are rented to the Florence & Cripple Creek Railroad to be used only in the transfer of Victor ore to the mills and smelters.—The Hull City placer at Victor has 300 men working on its various leases. The July output was \$80,000, on which the royalty is 25 per cent.—The Newell tunnel, Cripple Creek, at 1000 feet out a vein 20 feet wide, which assays from \$10 to \$15 a ton.—In June the Legal Tender of the Golden Cycle Co. output 1900 tons. The output is now 70 tons a day and the total for July reached 2000 tons. The vein has been opened up at the 600-foot level.

Twenty tons a day is the output of the Granite mine, Cripple Creek. The ore comes from a depth of 700 feet, at which point the ore shoot is 5 feet wide and averages \$30 a ton.

GILPIN COUNTY.

The First Centennial mine, near Central City, is making a daily shipment averaging fifty tons and the ore is running a little over four ounces gold per cord. The work of sinking is going on steadily, to keep development ahead before exhausting the ore bodies in the upper part of the mine. The property is being handled by the '96 G. M. & Co.

LAKE COUNTY.

The lessees operating the Wolfstone mine at Leadville are making daily shipments of 125 tons of iron sulphide ore, running in gold, silver and iron excess. The property is worked down to 1250 feet.

The Maid of Erin Silver Mines Co., at Leadville, is shipping 3000 tons per month from six shafts. This consists of copper-iron, lead sulphides, lead carbonates and oxide iron ore. All the 10 per cent lead carrying iron excess is mined at a profit. Operations are carried on above the 700-foot level.—The Resurrection G. M. Co. is hoisting 140 tons daily from the 900-foot shaft. Two leases on the New Years and Ella incline are shipping forty tons daily.

At Leadville the Pyrennes has reached the ore bodies at a depth of 1200 feet. The Mab has finished sinking and is drifting at a similar depth.—The Mahala is opening up its

drifts at a depth of nearly 1200 feet—workings which, it has been proven by the diamond drill, are richer and larger than any of the ore bodies operated on the upper levels. In the same territory the Small Hopes M. Co., through its Marion shaft, operating this and adjoining territory, is one of the biggest sulphide shippers in the camp at a depth of 1350 feet, where good ore bodies have been opened, and are producing 200 tons of sulphide per day.—For several years work has been going on at the Yak tunnel, which has reached nearly 700 feet, cutting through some fine silver mining territory, and when completed it will have passed through Breece hill ore deposits, striking the Forest Queen shaft at a depth of 1300 feet.

OURAY COUNTY.

The Silver Queen ore at Ouray is bismuth silver, and sample runs give returns of from 800 to 800 ounces to the ton. The rock also carries some gold. There is a 16-inch streak of ore.

SAN JUAN COUNTY.

The Arabian Boy mine, near Silver Lake, after years of idleness has resumed work and a vein of high-grade ore has been found.

Seven to ten tons of milling ore from the Dives-Shenandoah, near Silverton, is shipped daily. Besides this, two carloads of first-class mineral go out to Durango weekly from the property.—From one of G. Lacey's properties in Ice Lake basin there was shipped to the smelters fourteen tons of 70 per cent lead ore carrying thirty ounces silver and one-eighth ounce gold to the ton.—D. Lloyd is making regular shipments from the old Aspen property to the smelter.—O. Lockhart has opened a wide streak of ore in Maggie gulch that averages .14 gold and sixty-eight ounces silver per ton.

SAN MIGUEL COUNTY.

The Liberty Bell mine, near Telluride, is building a tramway from Cornet basin, 11,000 feet to a point where ground is being broken for a fifty-ton mill. A long crosscut tunnel is also projected to cut the vein about midway between the mill and the present workings of the mine. Fifty men are employed.

The Pennsylvania tunnel at Telluride has reached 1060 feet, which, when finished, will be 10,000 feet long, following a good part of the distance the Pennsylvania vein, and cutting the Smuggler-Union 600 feet below its present workings.

The Tom Boy mill, at Telluride, is disposing of 175 to 225 tons of ore daily, yet there is a smaller number of men working in the mine than ever before—the result of a recent widening of the vein and the completion of heavy development work. The lead carries from 10 to 16 feet of ore. The expense for developing for a number of years will be light. The vein is intersected at a depth of 450 feet below the lowest of the upper workings by the mill tunnel crosscut which is about 2100 feet in length. It is said the property is outputting \$90,000 in gold per month at an expense of less than 25 cents on the dollar, and it is believed that these figures are conservative.

In the Silver Pick mine, Mt. Wilson district, 110 men are employed. The ore in the lower levels is improving in value, on the seventh level it proves high grade.—The Japan concentrating plant, near Telluride, the daily output is about twenty tons, or two carloads of concentrates, which average \$100 per ton in gold, silver and lead, the percentage in the latter metal being large. The tailings from the Tom Boy mill are run through a canvas plant. Development is in progress in the Japan mine and large ore reserves are being blocked out. The pay streak varies from 12 to 18 inches wide and is uniform in size and value. In addition to the ore put through the mill, several cars of high grade mineral are shipped to smelters weekly, and this is said to net from \$750 to \$1000 per car.

SUMMIT COUNTY.

J. W. Breene is shipping 200 tons of sulphides daily from the Colonel Sellers mine at Kokomo. Since the curtailment in the production of sulphides in Leadville the valley smelters are making up the Leadville deficit from Kokomo.

NEW MEXICO.

The Cochiti G. M. Co., operating the Albe-marle group near Bland, N. M., has completed a steel mill and cyanide plant at a cost of \$300,000. The present capacity of the mill is 125 tons every twenty-four hours, allowing an increase of 200 tons. The water supply is conveyed by pipe line five and one-half miles to two tanks of a combined capacity of 400,000 gallons.

S. S. Davidson, lessee of the Golden Giant mine, Pinos Altos, has struck the ore chute on the 400-foot level. It is believed the ore chute is 300 feet long on the vein in which the rich ore extends. The mill will be started within a few days.—Dodd & Bell have leased the Humboldt mine, at Hazover, and started development of the property.—Nelson Bros. have purchased a three-fourths interest in the Willis mine and are at work upon a good showing of copper ore.—The Confidence mine at Mogollon, under the management of H. H. Price, has eighty men at work, and the 30-stamp mill is steadily producing silver bullion, which contains a large percentage of gold with the silver values. Now that litigation has decided that the Eberle property is owned by F. X. Eberle, he will put in a plant for the reduction of the ores of the Eberle, Clifton and other properties which he owns. Two men are employed in preliminary examinations and work upon the mill will soon begin.—The Old Abe mine, at White Oaks, is producing good ore below the 900-foot level. An ore body was struck that runs as high as \$350 to the ton.

ARIZONA.

The workings of the Franco-American Co. at Oro Blanco is in solid ore of good character. The company is doing considerable work and

is satisfied with the condition of the mine.

From the Hardshell mine, near Crittenden, three carloads shipped recently to El Paso made good returns. Ore in the mine is becoming richer. This richness has led to trouble with the Mexican miners employed on the property. For some time past the superintendent suspected that everything was not as it should be, so he discharged a number of the men; but as the stealing continued, he was obliged to discharge the whole lot.—In Table Mountain copper camp the company has one 42 inch smelter in blast and will blow in another stack of the same size as soon as some needed repairs are finished. There are upwards of 20,000 tons of good grade copper ore sprinkled with fine gold on the dumps and 125,000 tons of \$12 milling ore. Grading for a large gold mill will be commenced in a few days. A shaft has been started and an air compressor and machine drills will soon be put in.—The Johnson mine, near Stanton, has been bonded to Eastern capitalists and work has begun on the property.—G. W. Crowe is shipping ore from the mines in Josephine canyon, which he is working under bond. The ore comes into Crittenden and is shipped thence to smelters in Colorado.—The June returns of ore shipments from the Gold Bonanza in the Baboquivari were \$1850, and a recent shipment shows by receipt \$900 gold to the ton. Ore running below \$200 remains on the dump.—The steam wagon brought the first consignment of ore from Williams to the smelter from the Grand Canyon copper mines. The load weighed about forty tons. A new strike has been made in the Nellis group of mines and a large body of ore is being uncovered.—The owners of the Marcus mine, near Stanton, will soon resume work.—At a depth of 175 feet the West Oro Bonito claim in the Bradshaw mountains shows a ledge of 6 feet. While the ore is mineralized the entire width of the ledge, there are 2 feet of it in which the ore is reported rich.

G. A. Treadwell has bonded the Cliff mine and six adjoining claims near Jerome and begun developing the property.

The Diamond Joe mine in Mohave county has been bonded to J. T. Pendegast, who will continue development of the property.—Eight carloads of ore were shipped from Kingman in July.—A 20-stamp mill will be built at the Yellow Dog mine, near Yuma.

The Commonwealth Co., at Pearce, will build a 20-stamp mill which with the capacity of their mill now running, will increase the treatment of ores to over 100 tons per day. This does not include the ore shipments daily to the smelters.

Tucson Star: The Saginaw M. Co. has secured an option on the Twin Buttes mines, near Tucson. These are copper properties. Strikes of large bodies of ore are reported made during the week in the Saginaw.

LOWER CALIFORNIA.

The Santa Rosalia copper mine, El Boleo, produces about 1000 tons of copper monthly, and is working 2000 native miners, paying them 25 cents a day in Mexican silver. They ship copper direct to London, where it brings \$260 a ton.

MEXICO.

J. F. Flynn, a northern Mexico mining man, says the mining industry in Mexico has been particularly prosperous during the past five years. Silver mining has held its own, while gold, copper and lead mining has been greatly benefited by the fall in the price of silver. The greatest development in silver-lead mining has taken place in the States of Nuevo Leon, Coahuila, Chihuahua and Durango. Monterey has shown the greatest increase in production. Very large bodies of silver-lead fluxing ore have been discovered there and the production has increased from about 1000 tons per annum ten years ago to over 100,000 tons per annum at the present time. The silver output in the State of Durango is increasing rapidly, and gold and copper mines are also developing favorably there. The Avino mines in that State have just been sold to a wealthy London syndicate and several American companies have made purchases of good mines in the same district. Extensive reduction works will be erected immediately at Avino. At present the States of Guerrero and Michoacan are attracting the attention of mining men. The Ingauran copper mines have just been acquired by the Rothschilds for a consideration of \$6,500,000. A railroad about 150 miles long will be constructed from the coast of Sihuantejo to the mines, a reduction works of 2500 tons daily capacity will be established as soon as possible. These mines are situated in what is known to be the richest copper and gold district in the republic, but lack of transportation has prevented its development. There are now two railroads heading for the district, one to be built by the Rothschilds, which will run from the coast to the mines, and another by the Mexico, Cuernavaca & Pacific, which already has about 500 kilometers constructed and will run from the City of Mexico to the Pacific.

The American G. M. Co. of St. Louis, Mo., operating in Colorado, have bought the San Sebastian silver, lead and copper mines of Charcos through W. C. Weisberg, president of the company. It is stated that a fifty-ton concentrator will be built at San Luis Potosi for treating the San Sebastian ores.

The mines of San Luis Potosi last year produced gold and silver to the value of \$4,600,000, being \$1,300,000 more than the product of the previous year.

Mexicans have been miners for centuries, in the older fields at least. The practice is primitive, but is particularly suited to the conditions of their work. The principal mines are located at an elevation of 6000 to 8000 feet above sea level, where fuel and timber are scarce; but, while fuel is costly, forage is cheap and it costs only \$1.50 a week to keep a mule, hence mule and horse power replace steam wherever possible. The old method of unwatering mines is curious. All workings below water level drain into a central sump

and above this is fixed a barrel, and from this there runs an endless string of buckets which dip into the water and discharge into another reservoir 30 feet or so above the lower one. The barrel is revolved through gearing turned by a mule. A succession of these reservoirs and trains of buckets brings the water to the surface. This clumsy arrangement, although superseded to a large extent in mines, is still employed for wells and irrigation. Mexican miners form a distinct, aristocratic caste, looking down upon rancheros and agriculturists with contempt. The miner is easily worth \$1 a day and is much more independent, while the best farm laborer does not earn more than 25 cents. Three classes of laborers are employed—underground miners proper, laborers who clear out the workings after the blasting and packers who carry the material to the shaft. Skilled miners work in gangs of eight each and are paid by contract, each gang having a captain, who is responsible to the engineer of the mine only. These contractors furnish their own supplies excepting their drills, which are weighed at intervals and the wear charged against the gang. A drift of two yards square cost from \$25 to \$40 per yard, but the contractors do not remove the broken material, which is done by the laborers, who receive from 50 to 75 cents per day. These laborers also roughly sort the ore for the packers, who sack it before carrying it to the shaft. These packers are paid by the sack, according to weight and distance traversed. They carry 150 pounds up the steep winzes, earning from 75 cents to \$1 per day. Ore chutes and tramways in the levels are not used to the extent they should be; and, although there is never any difficulty in getting sufficient ore broken down, want of labor often causes much vexatious delay in bringing it to the surface. A cheaper way of working is to let a mine out in section to buscones or tributers. Each party then has so many feet along the vein or an end to drive. They pay all their expenses and are entitled to half the ore they bring out. Rock drills and air compressors are coming into use; but on account of the cost of fuel, the more primitive methods are often better. In fairly hard ground a gang of Mexicans will drive from three to four yards per week at a cost of from \$30 to \$40 per yard. Two air drills will accomplish ten yards per week each, but each yard will cost from \$30 to \$100, half of the expense of the machine work being due to the fuel and repairs. Another difficulty in using machines is the inability of the native miners to work them, and skilled drillers have to be imported.

J. R. Magruder of New York is building a smelter at Hermosillo, Sonora. Three carloads of machinery are on the ground and work has begun.

The official report of the Batopilas mine, Alexander Shepherd's property, for the year 1896-7 has been published. The total workings for these years was 23,700 feet and ore to the amount of 43,807,612 pounds was taken out, valued at \$907,626, Mexican money, of which \$690,595 was in silver bars. The expenses were \$1,360,522, showing a deficit of \$452,896. The debt of the company is \$681,347, Mexican, and \$369,997 gold, unfunded, and 6 per cent bonds for \$459,700. The Porfirio Diaz tunnel is in 6069 feet and advancing at the rate of 100 feet a month. In 550 feet more it will cut the Todos Santos vein, and the Roncesvalles 360 feet farther on, which will reduce the cost of working these veins. The company is doing its own casting and proposes to increase its milling facilities.

The American M. Co. at El Oro is putting up a 100-stamp mill and sinking two more shafts, with good prospects.—Detroit and Milwaukee capitalists have formed the Detroit & Mexican S. & R. Co., and bought for \$100,000 mining properties at Sultepec, to be worked on an extensive scale. A smelter to cost over \$100,000 is to be erected and connected with the mine by a ropeway two and a half miles in length. H. E. Emmons of Detroit is president of the company.—In the Matehuala district of San Luis Potosi the Santa Fe mine, which has been in a bad condition for seven years, is again beginning to pay. The Santa Maria de la Paz is turning out good ore. The Nuevo Paz and Esmeralda yield good results and the Tolino, Santo Nino, Graciera, Nueva Alianza and Humboldt are doing well. The Dolores is taking out ore of medium grade.

Oasis: It is credibly reported that all the shareholders in the Don Ignacio mine at Minas Prietas have signified their willingness to join in the sale of that property, and have given a bond for the property, to sell the same within six months, to the Colorado-Creston Co.—The output of six mining companies operating in the Sierra Mojada, Coahuila, amounted during the last month to 9690 metric tons, valued at \$355,005, on which were levied State taxes to the amount of \$7100 and Federal taxes amounting to \$2130.68. The highest grade ore comes from the Buena-ventura, belonging to the La Constancia Co., which yielded on an average \$58.53 per ton.

TURKEY.

The Ministry of Agriculture, Mines and Forests of the Turkish empire has issued the following statement showing the average annual production of the mines of the empire. The quantities are in metric tons, and this, so far as known, is the first official statement made of the mineral production of Turkey:

| | |
|--------------------------|--------|
| Chrome ore..... | 35,500 |
| Manganese ore..... | 55,300 |
| Emery..... | 12,500 |
| Arsenic..... | 550 |
| Antimony..... | 2,300 |
| Copper ore..... | 10,000 |
| Zinc..... | 1,400 |
| Galena..... | 1,650 |
| Argentiferous lead..... | 9,500 |
| Lead..... | 2,500 |
| Gold and silver ore..... | 15 |
| Quicksilver..... | 2 |
| Boracide..... | 16,800 |
| Borax..... | 3,000 |
| Sulphur..... | 500 |
| Lignite..... | 15,000 |

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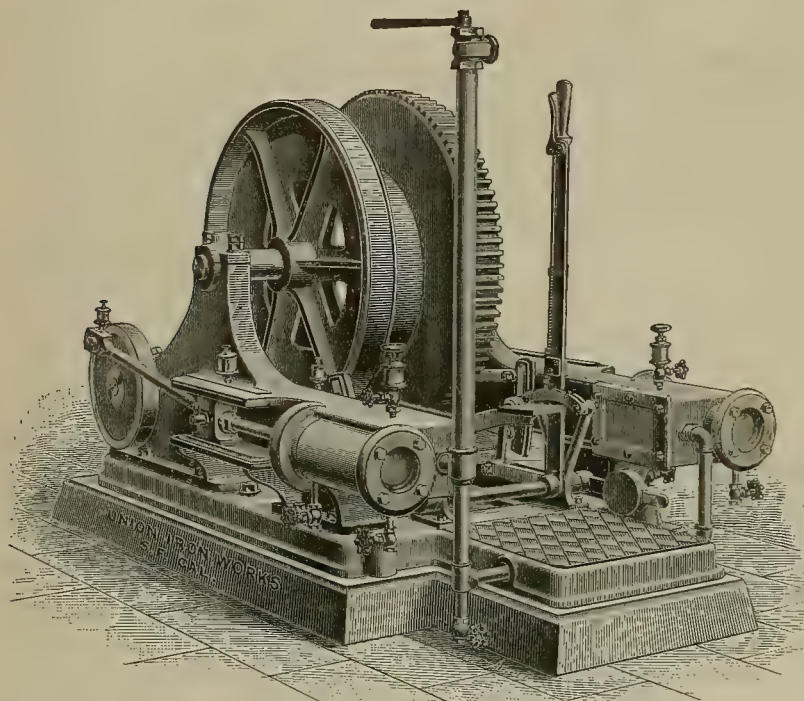
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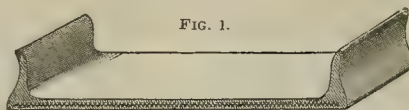


FIG. 1.

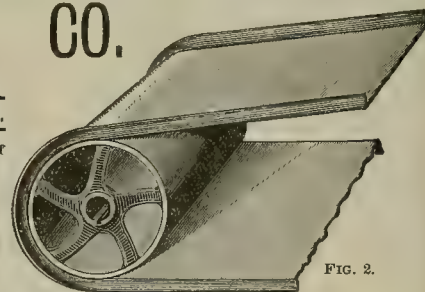


FIG. 2.

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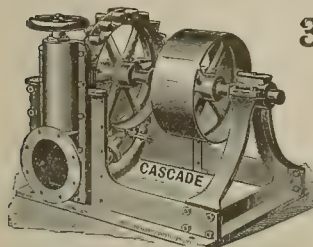
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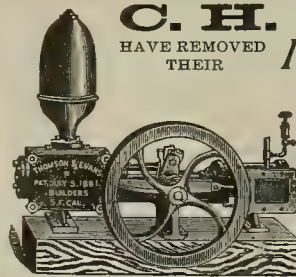
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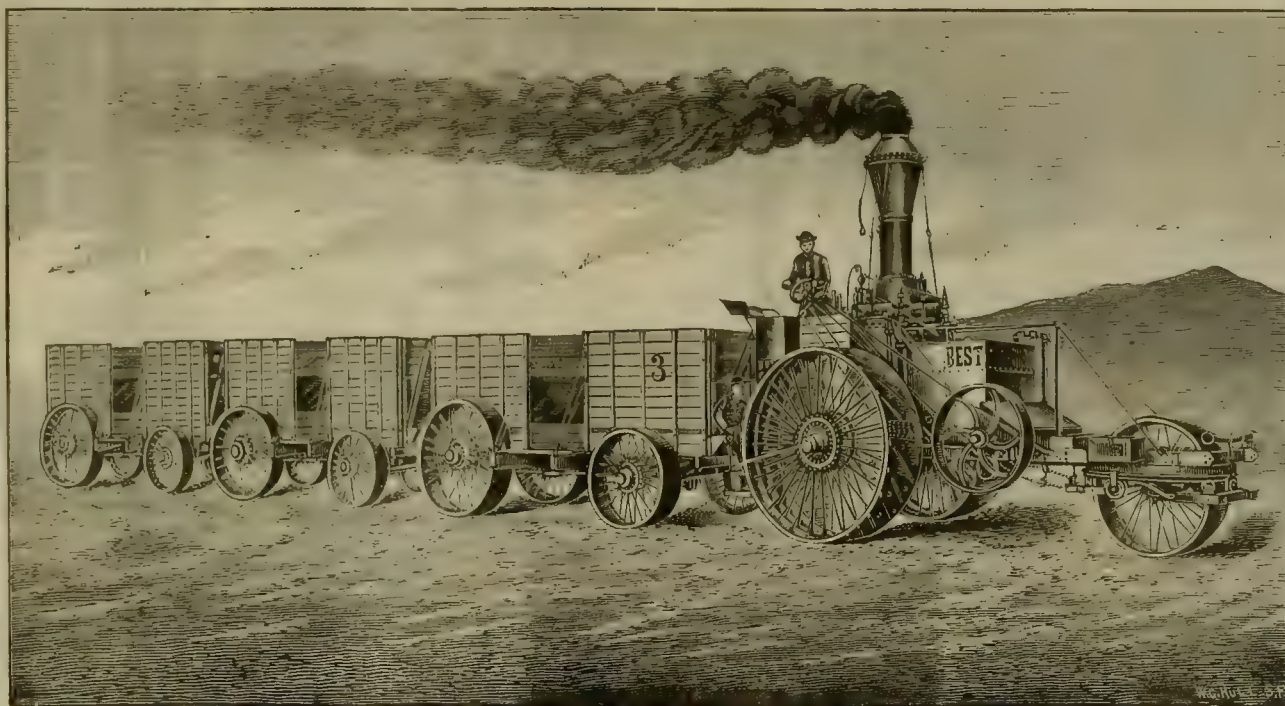
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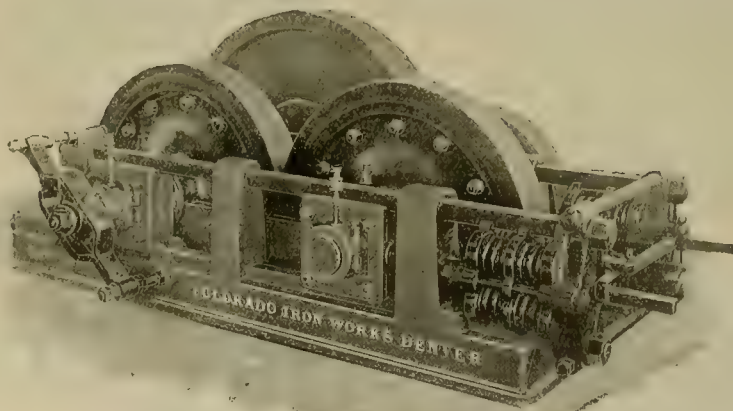
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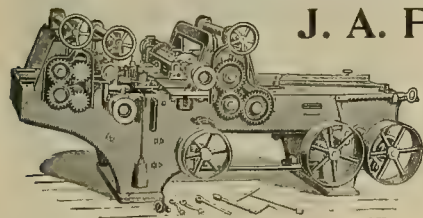
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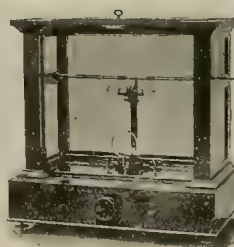
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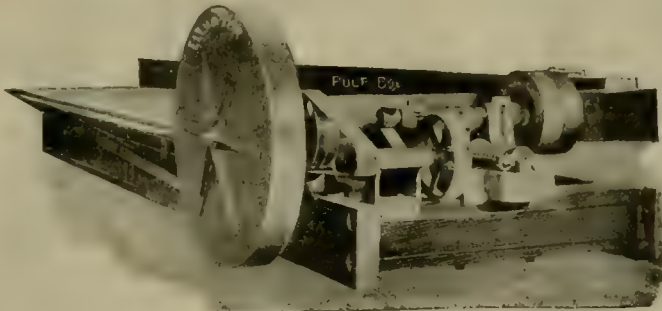
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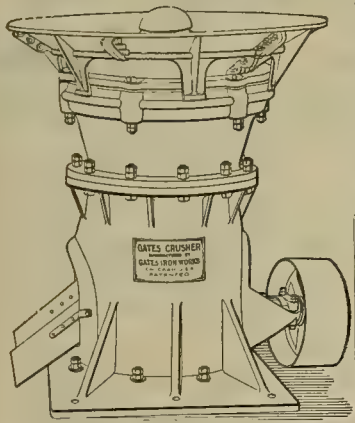
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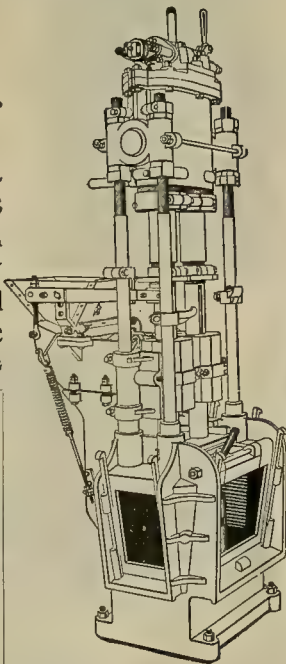
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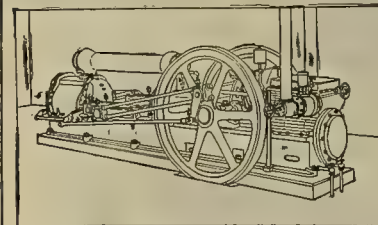
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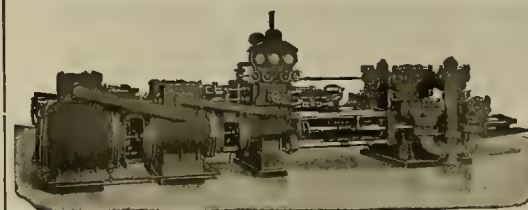
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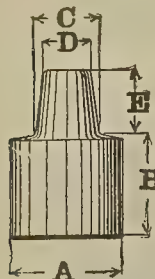
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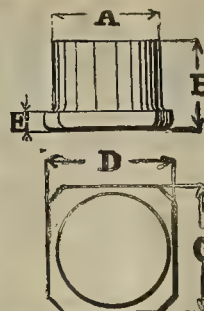
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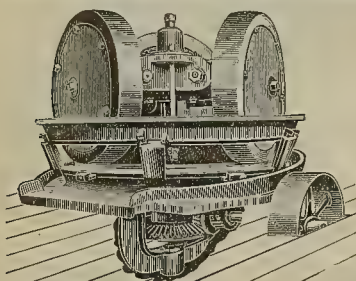


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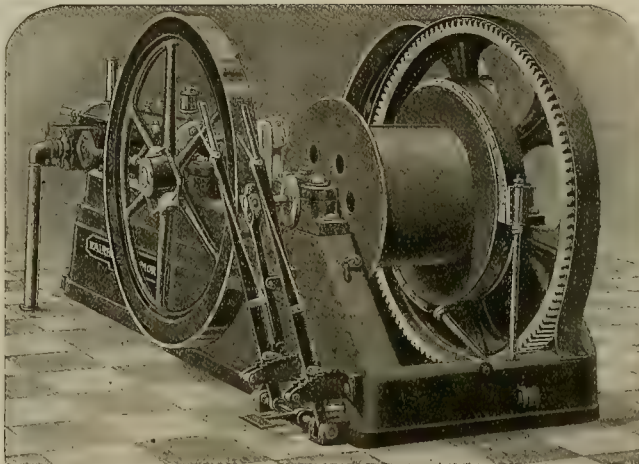
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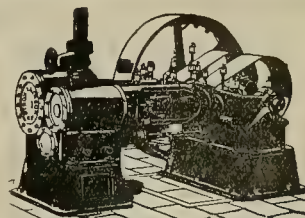
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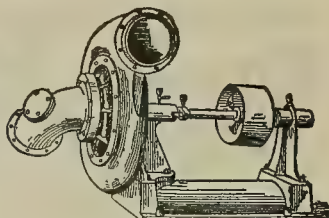
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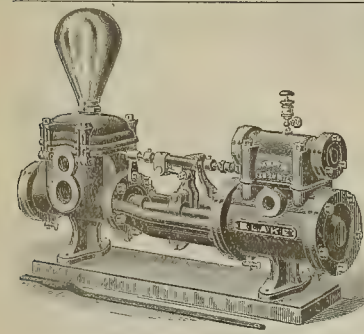
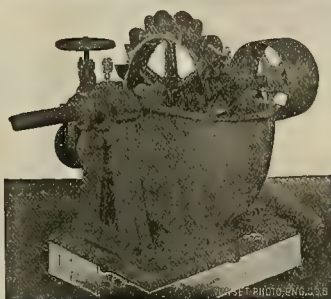
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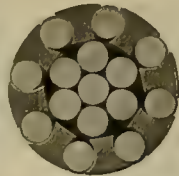
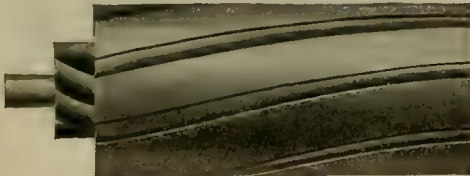
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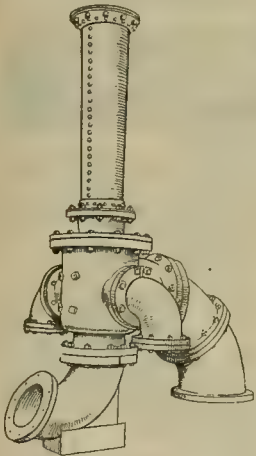
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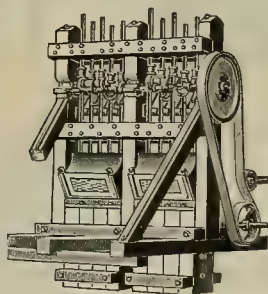
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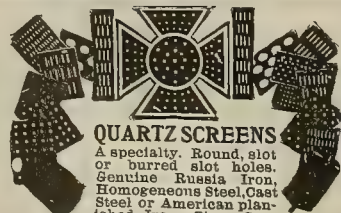
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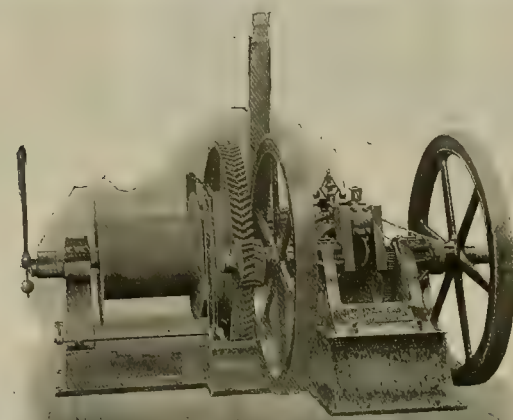
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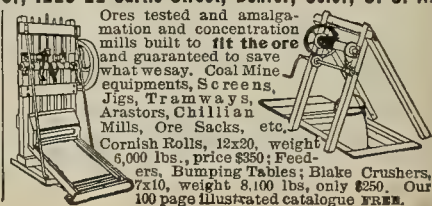
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MILLIONS of Pounds Used Annually.

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Open to the PUBLIC in Rialto Building. CALL and See Them.

Your Boilers Are Dirty.

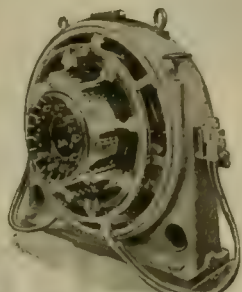
This Is Now Considered a Crime.

Look After It.

Have Your Water Analyzed and a Preparation Made to Order.

Westinghouse Electric

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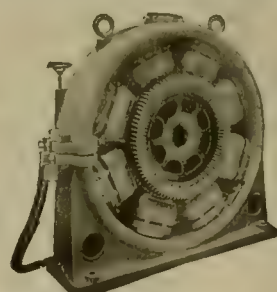
100 K W "Engine-Type" Generator--Front View.

Builders
of the
Standard
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Generators



100 K W "Engine-Type" Generator Armature.

Adopted
by all
requiring
the
Best



100 K W "Engine-Type" Generator--Rear View.

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Hydraulic Sizer or Separator.

NO WEAR.
LITTLE WATER.
NO ATTENTION..

SPECIAL
CIRCULAR.

TAKES THE
PLACE OF
FINE SCREENS.



DENVER ENGINEERING WORKS, Denver, Colo., U. S. A.

Full Universal Radial Drills.

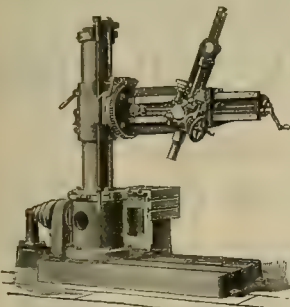
The special features which have so highly recommended this style of Drill are our double columns, steel gearing, roller bearings, rack feeds to spindles, back gears, power and hand feeds, quick return motion to spindle.

Furnished in three sizes, with large variety of tables, adapting the drills for every class of work possible.

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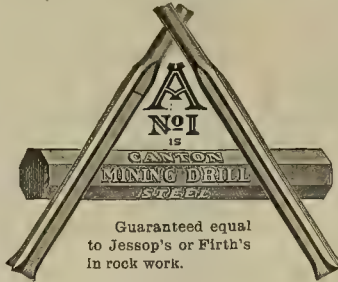
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HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal.



Canton Extra Drill Steel WARRANTED.

CANTON
Octagon, Square,
Round and Flat
STEELS
ARE
Hammered,
Not Rolled.



FOR SALE BY ALL DEALERS.

Canton Steel Co.,
WORKS:
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and
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To Gold Miners!

Silver Plated Copper Amalgamating Plates
For Saving Gold in Quartz and Placer Mining.

Every Description of Mining Plates Made.

ONLY BEST COPPER AND REFINED SILVER USED. OLD MINING
PLATES REPLATED. TWENTY-SIX MEDALS AWARDED.
GOLD, SILVER, NICKEL, COPPER & BRASS PLATING.

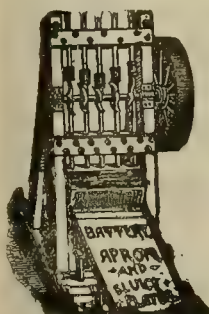
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E. G. DENNISTON,

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Proprietor
Send for Circular.



Any Book on Any Subject

Connected with Mining, Metallurgical, Mechanical or
Industrial Interests,

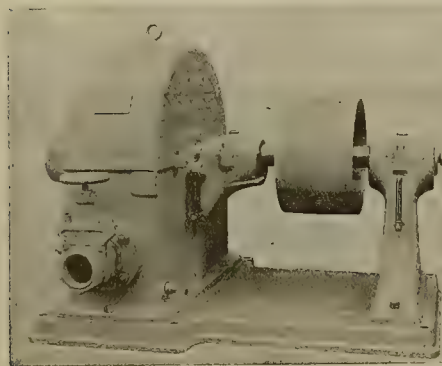
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At Publisher's Prices.

Send for Catalogue of Line Desired.

Address Book Dept. Mining and Scientific Press, 330 Market St., San Francisco.

The Pelton Water Wheel Company



Gives exclusive attention to the development and utilization of water powers by the most modern, economic and improved methods.

An experience of more than fifteen years, involving both the theory and practice of hydraulic engineering as relates to power development in its widest range of application, is at the service of its customers.

**Nine Thousand
Wheels
Now Running,**

Aggregating some 700,000 H. P.

ELECTRIC POWER TRANSMISSION.

Pelton wheels afford the most reliable and efficient power for such service and are running the majority of stations of this character in the United States, as well as most foreign countries. Highest efficiency and absolute regulation guaranteed under the most extreme variations of load.

The Pelton Water Wheel Company,
121 AND 123 MAIN STREET, SAN FRANCISCO, CAL.

MARSH STEAM PUMPS.

SINKING AND STATION PUMPS

For Mines.

**BOILER FEEDERS,
Deep Well, Tank and Vacuum Pumps.**

The MARSH SINKING PUMPS are Superior in the Following Points:

- First—Compactness.
- Second—Strength of parts.
- Third—Fast speed, quiet action.
- Fourth—No throttle valve necessary in exhaust pipe.
- Fifth—Steam valve self-governing; will not race or pound if water gives out with steam valve wide open.
- Sixth—All moving parts can be covered and protected from falling dirt.
- Seventh—No packed joint between chamber and pump to give out and need renewing.
- Eighth—Exhaust can be turned into suction.
- Ninth—All parts easily accessible and fewer than in any other pump.

Simonds Saws. Genuine Dodge Wood Split Pulleys.
Leather Belting. Rubber Belting.
Grant Corundum and Detroit Emery Wheels.
ONLY THE BEST. SEND FOR CATALOGUE.
SIMONDS SAW CO.,
31 MAIN STREET.....SAN FRANCISCO.

Mining Pipe!



STEEL OR IRON.—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.

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The Truax Pat. Automatic

SCHAW, INGRAM, BATCHER & CO., Hardware Merchants,
SACRAMENTO, CAL.

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**Rock Drilling, Air Compressing, Mining
and Quarrying Machinery,**

100 Broadway, - - New York, U. S. A.

BRANCH OFFICES IN UNITED STATES AND CANADA:

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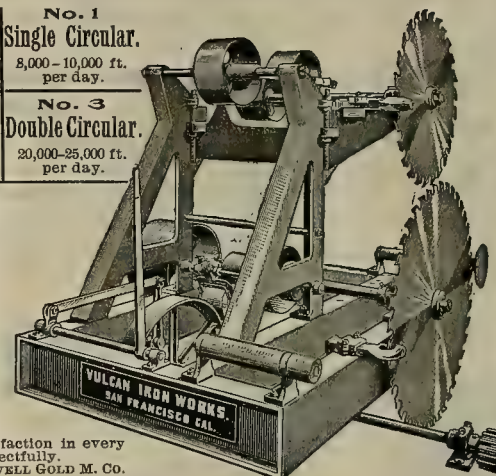


Portable Saw Mills.

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| No. 0 Single Circular. 4000 - 6000 feet per day. | No. 1 Single Circular. 8,000 - 10,000 ft. per day. |
| No. 2 Double Circular. 15,000 - 20,000 ft. per day. | No. 3 Double Circular. 20,000 - 25,000 ft. per day. |

Alaska Treadwell
Gold Mining Co.
SAN FRANCISCO.
Feb. 20, 1896.

Vulcan Iron Works,
GENTLEMEN: Our
Double Circular
Saw Mill of about
20,000 feet daily ca-
pacity, for which
you made plans
and built the ma-
chinery complete,
including a set of
three 6-inch beam
Vulcan Head
Blocks, 60-inch
opening, has given
us complete satisfaction in every
respect. Respectfully,
ALASKA TREADWELL GOLD M. CO.
A. T. CORBUS, Sec'y.



For
**Mining
Companies**

—OR—
Other Consumers
of Lumber at
Remote Points.

SEND FOR
CATALOGUE.

Manufactured by

VULCAN IRON WORKS, Office, 505 Mission Street,
SAN FRANCISCO, CAL.

P & B Roofing

Is superior to shingles or iron, and is especially
adapted to mill construction on account
of its resistance to

WATER, FUMES, GASES AND FIRE.

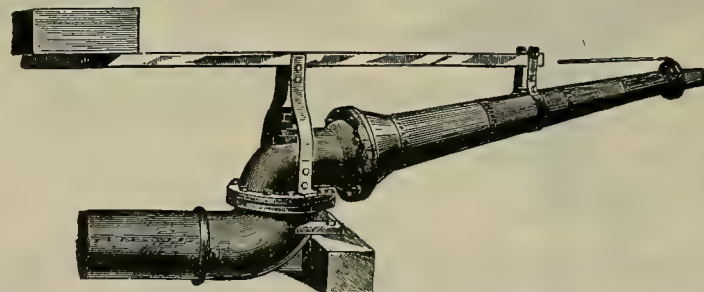
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PARAFFINE PAINT CO., Manufacturers,

116 Battery Street,
SAN FRANCISCO.

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LOS ANGELES.

Double-Jointed Ball-Bearing Hydraulic Giants.



The above presents an improved Double-Jointed Ball-Bearing Hydraulic Giant which we build. The improvement consists of the introduction of a Ball Bearing by which the pressure of the water is reduced to a minimum and the direction of the nozzle changed at will with ease. Catalogues and prices of our specialties of HYDRAULIC MINING MACHINERY furnished upon application. **JOSHUA HENDY MACHINE WORKS, 38 to 44 Fremont St., San Francisco, Cal.**

ADAMANTINE SHOES AND DIES

—AND—

***** CHROME CAST STEEL *****

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for illustrated Circular.

Manufactured by **CHROME STEEL WORKS, Brooklyn, N. Y.**

MORRIS & TREGLOAN,

141 and 143 First Street, San Francisco, Cal.,

Pacific Coast Sales Agents.



STAMP SHOES.

STAMP DIES.



Stamp Cam.

Morris & Tregloan, DEALERS IN MINING MACHINERY AND SUPPLIES.

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IN STOCK:

AIR HOSE,
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL,

CHARLES B. BOOTHE & CO., LOS ANGELES. Mining and Milling Machinery and Supplies.

SMITH-VAILE PUMPS,
(For Every Purpose.)

MINING HOISTS,
(Bolthoff's Latest.)

TRUAX AUTOMATIC ORE CAR, HORSE WHIMS, WINDLASSES,
(We Make 'em.) BUCKETS AND SKIPS.

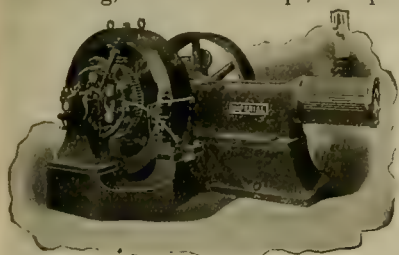
BLOWERS, FORGES, PIPE TOOLS. ENGINEERS' SUPPLIES.

CANTON Drill, Groove and Pick STEEL.

Costs no more than is asked for inferior Steel, and is guaranteed equal to Jessop's best.

The IMPERIAL ENGINES.

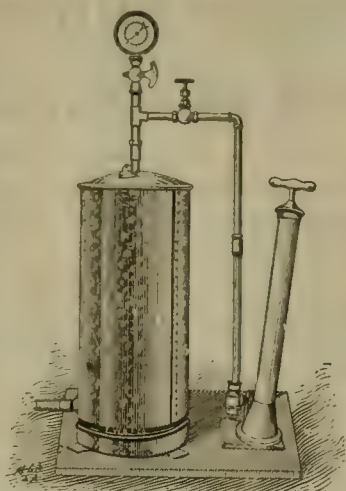
Self-Oiling, without Oil Cups, Pumps or Tanks. Adjustable and accessible bearings. Renewable bushings for main and rocker arm bearings. Frictionless four-admission slide valve. Oil chamber entirely separated from steam cylinder contact. Rite's inertia governor. Perfect regulation. All sizes. Simple or compound. Belted or direct connection. High, medium or low speed. Designed for every use.



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C. B. BOOTHE & CO., Los Angeles, Cal., Gen'l Western Ag'ts.

HENDRIE & BOLTHOFF M'F'G CO., Denver, Ag'ts for Colorado.



Assayers', Miners' and Chemists' Supplies.

Crucibles, Muffles, Furnaces, Etc.

C. P. CYANIDE POTASH (98-99 per cent.)

DIOXIDE SODIUM, ZINC SHAVINGS, BORAX
GLASS, C. P. TEST LEAD.

GASOLINE TANKS,

And everything required by Assayers, Miners and Chemists.

Write for a copy of our New Illustrated Catalogue.

F. W. BRAUN & CO.,
501 to 505 N. MAIN STREET,
LOS ANGELES, CALIFORNIA.

THE MACHINERY & ELECTRICAL CO.,

Southern California and Arizona Agents for

Gates Iron Works Mining Machinery.

Stamp Mills, Ore Crushers, Ore Cars, Etc.
Tremain Steam Stamp Mills.

Oil City Boilers and Engines.

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Ideal Automatic Engines.

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Also Dealers and Jobbers in
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Shafting, Belting, Pulleys, Packing, Etc.

Incandescent Lamps, Samson, Edison, Leland Batteries.

Construction of Electric Light and Power Plants a Specialty.

Correspondence Invited.

351 and 353 N. Main St., Los Angeles, Cal.

Mining Timber

WRITE TO-DAY

and let us make an estimate on your next order for LUMBER, SHINGLES, SHAKES and R. R. TIES. We make a specialty of MINING TIMBER and PLANK for Arizona and Mexico shipment.

The L. W. BLINN LUMBER CO.,

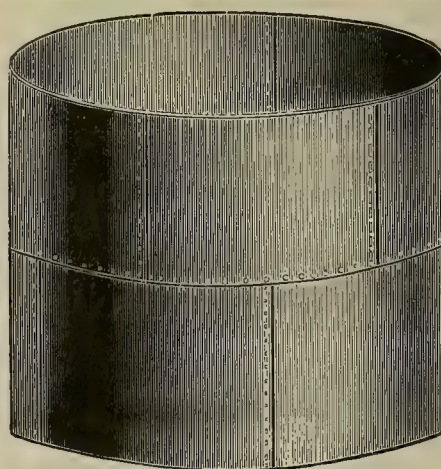
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BAKER IRON WORKS,

950 to 956 BUENA VISTA STREET, LOS ANGELES, CAL.

Stamp Mills a Specialty (from two-stamp up). HOISTING ENGINES. Agents for Henry R. Worthington STEAM PUMPING MACHINERY and the ATLAS ENGINES AND BOILERS. General Foundry Work and all kinds of Heavy Forgings. Oil and Water Well Tools. CORRESPONDENCE SOLICITED.

Manufacturers of
MINING AND MILLING
MACHINERY.



PIPE!

We manufacture Water Pipe for

Hydraulic Mining
and Irrigation.

IRRIGATION SUPPLIES
OF ALL KINDS.

WELL CASING, OIL TANKS,

—AND—

General Sheet Iron Work.

Write to us for an estimate on your next job.

Lacy Manufacturing Co., Office, Room 4, Baker Block, LOS ANGELES.

FOR HYDRAULIC MINING.



FOR PLACER MINING.

WELL PIPE,
GALVANIZED
AIR PIPE,
WROUGHT &
CAST IRON
PIPE. IRON
TANKS OF
ALL KINDS.

FOR QUARTZ MINING.

Water Supply Material. General Sheet Iron Work. Write for Estimate.

THOMSON & BOYLE CO.,

306-314 REQUENA STREET, LOS ANGELES, CAL.

ALL PIPE
MADE UP
COMPLETE
OR CUT AND
PUNCHED
TO BE
RIVETED AT
THE MINE.

Market Reports.

The Markets.

SAN FRANCISCO, Aug. 4, 1898.

SILVER.—London, 27½d; New York, 59; San Francisco, 58½¢, nominal; Mexican Dollars, 46c.

COPPER.—Lake, unchanged, 11.50.

LEAD.—New York, 3.97½ asked; smelters quote 3.85; local, pipe, 6@6½¢; sheet, 6½@7¢; pig, 5½¢.

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—5½ and 5½.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c.

ANTIMONY.—9½, 10.

BABBITT METAL.—15c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.25; cut, \$2.00; 10 to 20d, wire, \$2.30; cut, \$2.05; 8d, wire, \$2.35; cut, \$2.10; 6 and 7d, wire, \$2.45; cut, \$2.20; 4 and 5d, wire, \$2.55; cut, \$2.30; 3d, wire, \$2.70; cut, \$2.45; 2d, wire, \$2.95; cut, \$2.70. In carload lots, 10c per keg less.

QUICKSILVER.—Domestic, \$42.50@43; export and carload lots, special rates.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15¢; less than one ton, 17½¢. No. 1* 60%, carload lots, 13½¢; less than one ton, 15½¢. No. 1** 50%, carload lots, 11½¢; less than one ton, 13½¢. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½¢; less than one ton, 11½¢. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8.00 Coos Bay, \$5.00 Seattle, 6.00 Southfield, 7.50

Cargo lots, Eastern and foreign: Wallend, \$7.50 Cumberland, \$10.00 Brymbo, 7.50 Cannel, 9.50 Pennsylvania, hd., 14.50 Welsh Anthracite, 12.50 Scotch, 8.00 Rock Springs, 7.00

COKE.—Foreign, \$13; domestic, \$11 per ton.

CHEMICALS.—Cyanide of potassium, jobbing, 31@31½¢ per lb.; carloads, 28c; sulphuric acid, 2½¢ per lb. for 60%; nitric acid, 15c; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½¢ per lb.; blue vitriol, 4½¢ per lb.; borax, refined, 5@6¢ per lb.; chlorate of potash, 9½@10c; roll sulphur, 2½¢; blue vitriol, 4c.

LUMBER.—Retail: Pine, ordinary sizes, \$17@18.50; redwood, No. 1, \$18@20; No. 2, \$16@18.

In addition to the war tax decisions published in this column last week, the following are considered of interest:

A person has to place a stamp on an order for cash drawn on a merchant by one of his customers.

Real estate mortgage notes require to be stamped in addition to the stamp placed on the mortgage.

In cases of loans on real estate, where promissory notes are given, which are not paid at maturity, but on which an extension of time is granted, without the taking of a new note, it is held that every such extension is a renewal of the note within the meaning of the statute, and that the requisite stamp must be affixed for every such renewal or extension.

All checks drawn by officers of States, counties and municipalities for the discharge of the obligations of the States, counties and municipalities are exempt from stamp taxes.

The person who signs and issues a bank check without affixing the proper stamp becomes involved in liability unless it is shown that he had no design to evade the payment of the stamp tax, and that the stamp was affixed and canceled at the bank before payment.

A bank may remedy the defect of an unstamped check by affixing the stamp itself, otherwise it becomes liable to the penalty under the law.

The term "certificates of any description not otherwise specified in this Act, but which are required by law," has caused more inquiries than any other one matter. It is ruled that in order to subject any given certificate to tax it must be a certificate required by some municipal, State or national law. Certificates in the exercise of State, municipal or governmental functions are exempt; but when an officer gives a certificate on his own private business it is subject to tax.

Baggage forwarded by railroad company or express, subject to extra charges, comes within the law requiring a stamp on bill of lading.

As to mortgages, it is the general principle that a mortgage is not valid unless admitted to registration. No mortgage should be admitted to registration without the proper stamp affixed.

An original lease requires a stamp. No stamp is required for copies of the lease issued at the same time as the lease.

Reports of earnings and dividends do not require stamps.

Bonds given by persons appointed by the court, such as guardians, receivers, assignees, executors, are taxable.

There is no tax on the bill of sale of a vessel.

In regard to the cancellation of stamps, which is required by law, it is held that cancellation by initials and the date is sufficient. This cancellation may be by writing or imprinting with a hand-stamp.

Old stamps issued under repealed acts can not be used in lieu of stamps required by the present law.

Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.

Mining Share Market.

SAN FRANCISCO, August 4, 1898.

The week started with higher prices and increased volume of business, dropping a little on Tuesday, further declining on Wednesday, Hale & Norcross alone showing any life. Comparatively nothing was done to-day.

San Francisco Stock Board Sales.

SAN FRANCISCO, Aug. 4, 1898.

9:30 A. M. SESSION.

| | | |
|-------------------------|---------------------------|----|
| 100 Andes..... | 04 500 Crown Point..... | 07 |
| 250 Best & Belcher..... | 16 250 Gould & Curry..... | 09 |
| 100 Caledonia..... | 21 200 Ophir..... | 26 |
| 600 Chollar..... | 19 100 Potosi..... | 20 |
| 100 Con Cal & Va..... | 38 300 Silver Hill..... | 10 |
| 300 Confidence..... | 40 200 Yellow Jacket..... | 19 |

2:30 P. M. SESSION.

| | | |
|------------------------|---------------------|----|
| 200 Gould & Curry..... | 07 100 Ophir..... | 23 |
| 100 Mexican..... | 14 500 Potosi..... | 30 |
| 300 Con Cal & Va..... | 38 100 Justice..... | 08 |
| 100 Savage..... | 12 300 Union..... | 20 |

Commercial Paragraphs.

F. D. WALLAKER, Denver manager for Warren Webster & Co., states that he is receiving numerous inquiries from mill owners for the application of the Webster system of heating this season.

The Colorado Iron Works Company are working their plant to its full capacity and making shipments to nearly all parts of the world. Among recent shipments were two 42x144 silver-lead smelting furnaces, with complete equipments, to the Tasmanian Smelting Co., located on the island of Tasmania. This order filled six cars. This company is also building a 42x144 silver-lead smelting furnace for the Hanauer Smelting Co. of Utah, and a 45x144 silver-lead smelting furnace for the Germania Lead Works, Salt Lake City, Utah; both with complete smelting equipments; a large jacket smelting furnace for the Canadian Pacific R. R., British Columbia; one for the Great National Mexican Central Smelting Co., Old Mexico, and one for the Mountain Copper Co., in California. This firm has gotten a reputation for its smelting furnaces because of superior design, workmanship and material, which brings orders from all over the world.

WANTED.

Partner in Extensive Placer and Quartz Mines. Free wood and water. JAMES ARTHUR, Cornucopia, Union Co., Oregon.

Wanted by Sept. 1st an Experienced Assayer and Retort Man.

Daily assays and mine books to keep for ten-stamp mill, one day from San Francisco. Pay \$75 per month. Address, with references and experience, R. A. B., care this office.

Experienced Chemist, Assayer and Cyanide Operator

DESIRES ENGAGEMENT. Has had charge of cyanide plant where segregated slime and slimy material have been worked to high percentage of gold value at small cost. References. Address P. K., this office.

Bargain for Sale.

New Complete Mine Machinery Outfit, Including No. 3 Merrill Mill, Rock Breaker, Ore Feeder, Etc.

E. A. HOLMAN, 906 Broadway, Oakland, Cal.

A GOLD MINE

Seven Miles from R. R. 10 to 15-Foot Vein of Soft Ore, \$7 to \$8 Per Ton.

A half interest will be given to a responsible person for some development and a mill that will successfully treat the ore.

B. F. WILSON, Battle Mountain, Nevada.

MINE FOR SALE OR BOND.

TUOLUMNE COUNTY, EASTERN BELT.

HIGH GRADE.

PARTIALLY DEVELOPED.

Apply MINE OWNER.

Care Mining and Scientific Press, 330 Market St., San Francisco, Cal.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Sara E. Reamer, in the Pemberton Gravel Mine near Forest Hill, Placer Co., to deposit tailings in Baltimore and Dardanelles canyons, and from Penrose & Harker, in the Bull Run Mine near Relief Hill, Nevada Co., to deposit tailings in a ravine below the mine, gives notice that a meeting will be held at room 39, Flood Building, San Francisco, Cal., on August 22, 1898, at 1:30 P. M.

NOTICE OF DIVIDEND.

Jamison Mining Company, rooms 50 and 54, No. 120 Sutter street, San Francisco, California. June 20th, 1898. Semi-Annual Dividend No. 2.

At their meeting of June 20th, 1898, it was resolved by the Board of Directors of the Jamison Mining Company to pay to the stockholders of the company from the surplus funds in the treasury a dividend of Nineteen Thousand Five Hundred Dollars (\$19,500.00), being five (5) cents per share on the capital stock of the company.

The dividend will be payable at the office of the company on the 15th day of August, 1898, to all stockholders of record on the 5th of August, 1898. Transfer books will be closed at the close of business on the 5th of August and reopened on the morning of the 16th of August, 1898.

SAM. W. CHEYNEY, Secretary.

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage.

Money loaned mines.

Mining companies organized, their property experted, financed and managed.

Mines, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

Examine mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

EDW. N. BREITUNG, Marquette, Mich., U. S. A.

Cable Address: EDBEE.

Codes:

LIEBER S.

BEDFORD MCNEILL'S.

A B C UNIVERSAL COMMERCIAL.

Colorado's Mining Industry.

There have been a number of interesting and instructive pamphlets issued on this subject by the U. P. D. & G. Ry. and the South Park Line, Colorado's progressive railroads, which reach the principal mining centers of this vast mineral section. They are all carefully and conservatively prepared and will be mailed upon receipt of request and necessary postage. The various publications are as follows:

La Belle Gold Fields, 2c.
Gunnison Gold Belt, 2c.
Hints to Prospectors, 2c.
Ward Mining District, 1c.
Puma, 1c.
Breckenridge Gold Belt, 1c.

T. E. FISHER, Asst. General Passenger Agent, DENVER, COLO. Room B.

WEST COAST OF MEXICO.

WÖHLER, BARTNING Suc's, Mazatlan (Sinaloa), Mex. Bankers, Importers, Exporters and Commission Merchants. Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco. ORE BUYERS AND EXPORTERS. MINING SUPPLIES.

HEATING. Exhaust HEATING.

Webster System of Steam Heating,

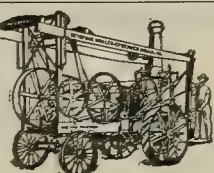
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Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Virginia Store, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of July, 1898, an assessment (No. 1) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Room 3, 15th floor, Mills building, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 15th day of August, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 25th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, ALFRED K. DUBROW, Secretary, Office Room 3, 15th floor, Mills building, San Francisco, California.

LEON GOLD MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of May, 1898, an assessment (No. 1) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Room 3, 15th floor, Mills building, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 15th day of June, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, R. L. CHENEY, Secretary, Office Room 3, 15th floor, Mills building, San Francisco, California.

POSTPONEMENT. By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 25th, 1898, and the day of sale to MONDAY, August 30th, 1898. R. L. CHENEY, Secretary, Office Room 3, 15th floor, Mills building, San Francisco, California.

POSTPONEMENT. By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to August 15th, 1898, and the day of sale to MONDAY, September 13th, 1898. R. L. CHENEY, Secretary, Office Room 3, 15th floor, Mills building, San Francisco, California.

MARINA MARISCANO GOLD MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 9th day of July, 1898, an assessment (No. 1) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 15th day of August, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on WEDNESDAY, the 7th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, CHARLES BOVONE, Secretary, Office - 217 Sacramento street, San Francisco, California.

ROSE CREEK MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1898, an assessment (No. 1) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Room 163, Crocker building, Post and Montgomery streets, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 30th day of September, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, J. M. WILMANS, Secretary, Office Room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

ROULDER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, El Dorado County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1898, an assessment (No. 1) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Room 163, Crocker building, Post and Montgomery streets, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 30th day of September, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, J. M. WILMANS, Secretary, Office Room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

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WEST SANTA ROSALIA GOLD MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, State of Sonora, Mexico. Notice is hereby given, that at a meeting of the Board of Directors, held on the 31st day of August, 1898, an assessment (No. 1) of three cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 40 Pine street, Rooms 15 and 17, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 1st day of September, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, J. W. LEW, Secretary, Office No. 40 Pine street, Rooms 15 and 17, San Francisco, California.

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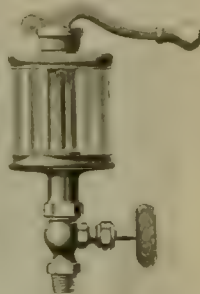
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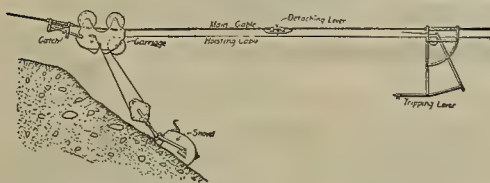
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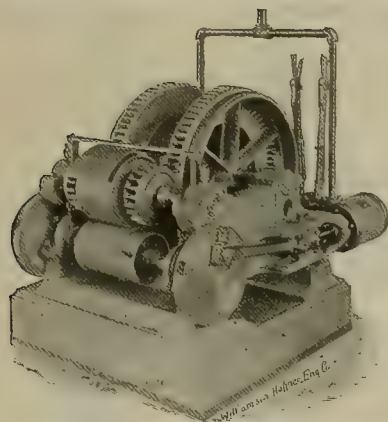
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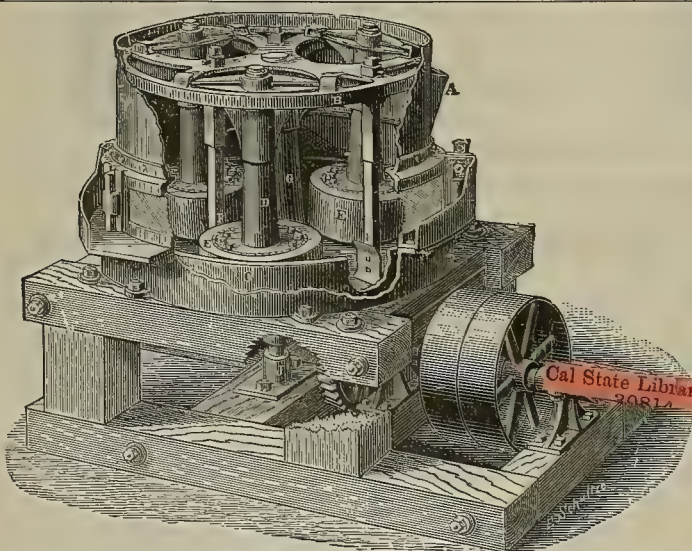
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in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness. 50 Cents a Copy.

MINING AND SCIENTIFIC PRESS, 330 Market St., San Francisco, Cal.

MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1988.—VOLUME LXXVII.
Number 7.

SAN FRANCISCO, SATURDAY, AUGUST 13, 1898.

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Single Copies, Ten Cents.

To Unwater Leadville Mines.

The accompanying illustration represents a portion of the district of Leadville, Colo., to be affected by the proposition to unwater certain groups of the down-town mines which have been closed down for the past two years or more. The mines affected include the Welden, Bonair, Henriette, Maid of Erin, Penrose, Coronado, Northern, Bohn Shaft, Augusta, Bison, which are on and at the foot of Carbonate Hill and which in the past have been heavy producers of lead-carbonate and oxidized iron ores, carrying silver values, and to successfully pump them out and resume work means a doubling of the tonnage output of Leadville district.

An important group in the district deluged with water was for a long time controlled by Smith & Moffitt as lessees. The Home Mining Co. was organized by Leadville citizens, which purchased the interests of Smith & Moffitt and joined other lessees and owners in forming a pumping association which is to undertake the work of unwatering the mines. This association is stated to have \$50,000 now available to start the work. S. W. Mudd, a Leadville mine operator, has been chosen manager of the association.



PORTION OF DISTRICT OF LEADVILLE, COLO.

Oil in Southern California.

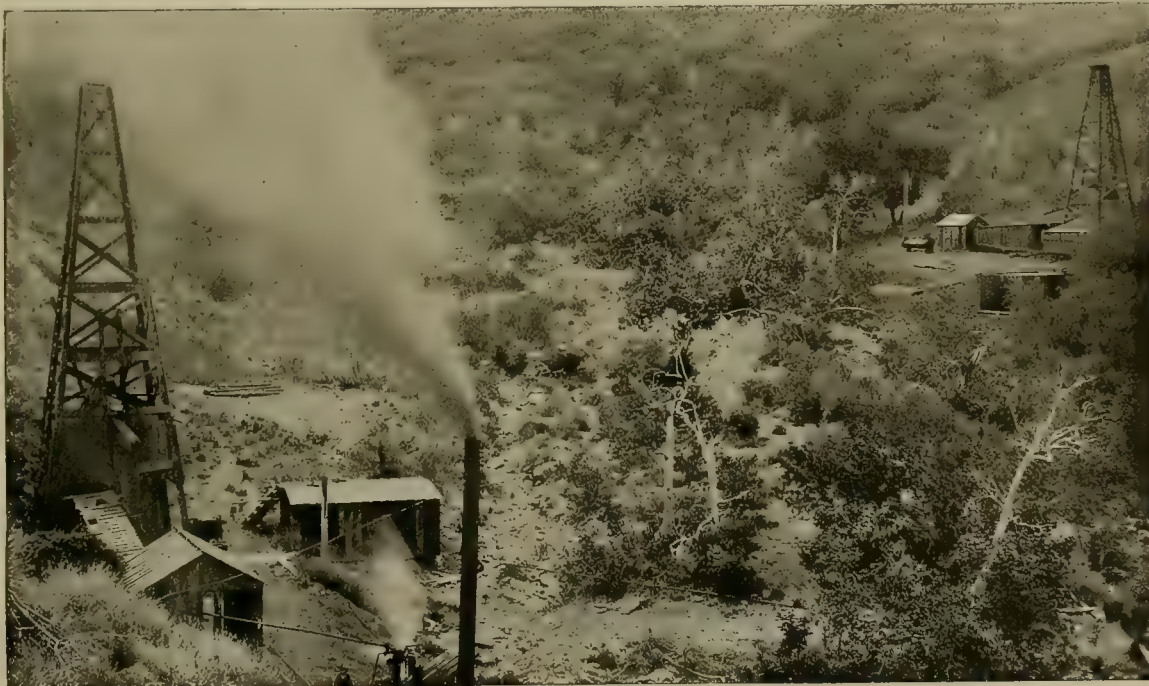
Los Angeles, Ventura and Fresno counties yield petroleum in considerable quantity, and a variety of commercial products are produced therefrom. The Los Angeles county oil fields mostly derive their oil from a 40-foot stratum of sand carrying about 10 per cent of oil, at a depth ranging from 740 to 1290 feet. The annual output is over 1,000,000 bbls., at present quoted at \$1.15 per bbl., used mainly for fuel purposes. In Ventura Co. the company which handles nearly all the oil in that section, manufactures about

forty products which meet with ready sale. Crude Ventura petroleum of 23.5° B., .912 sp. gr., analyzes: carbon 84%; hydrogen, 12.7; nitrogen, 1.7; oxygen, 1.2; sulphur, .4. All these crude oils carry asphalt, held in combination with the high-boiling members of the hydrocarbon series, and being of a complex character make refining unusually difficult: 100 bbls. mixed crude oil, Ventura Co., 24° B., will give an average product of 3 bbls. gasoline 76° B., 4 bbls. benzine 63° B., 15 bbls. kerosene 45° B., 8 bbls. heavy kerosene 38° to 40° B., 21 bbls. gas distillate 28° B., 10 bbls. light lubricating oil 26° B., 12 bbls. neutral oil 26° B., 6 bbls. heavy neutral oil 21° B., 5 bbls. re-

duced stock, lubricating oil, 14° B., 11 bbls. crude asphalt. The relative fuel values of coal and oil are about one ton of coal to three barrels oil. In locomotive consumption results favor oil in a greater degree: with coal costing \$6.60 per 2000 lbs., and oil costing \$6.03 per 2000 lbs., a passenger engine on the Southern Cal. railroad in a 7000-mile run test showed a coal cost of 26 cents per mile, as compared with an oil cost of 12 cents per mile.

Los Angeles oil has a gravity of 15, Santa Barbara 14, Ventura 15 to 26. The total quantity of crude petroleum above ground in the Los Angeles field Sept. 1st will approximate 270,000 barrels.

Since October 1st, 1894, W. L. Watts of the California State Mining Bureau has been engaged in a scientific examination of southern California oil fields, studying the geological features and comparing the stratigraphical conditions of the several oil-producing sections, some of the results of which have been given in lectures, monographs, and other published reports.



AN OIL WELL IN VENTURA CO., CAL.

THE first aluminum cable ever made will be put in place next week to carry current to the National Electrolytic Co., Niagara Falls, N. Y. It is made of bars 25 feet long, 6 inches wide, 1/4 inch thick, four such bars placed parallel and bound, riveted and bolted every 25 feet. This aluminum cable requires greater insulation than copper; but as it is expected to have double the conductivity, while being much lighter, the experiment is expected to be satisfactory from an economic standpoint. The cable weighs 22,000 pounds; a copper cable sufficiently large to carry the same current would weigh 48,000 pounds.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....Publisher

San Francisco, August 13, 1898.

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Needed Governmental Action.

A plain tale is told on page 156 regarding north-western Alaska and the Yukon region by an old experienced miner and prospector. It contradicts the dazzling reports emanating from interested sources, and confirms what this paper has all along maintained, viz., that to those fitted for the adventure in a country where none but the daring start and none but the fittest win, there is a fighting chance for good fortune, but that there are easier and quicker methods of suicide open to those who go in ignorance or unprepared. There is a heavy load of moral responsibility on those who from motives of gain have lured thousands to that region.

The U. S. Government this week determined to deal an effective blow to some of the Alaska and Klondike "transportation companies," and through Gen. Merriam, commanding this department, gives notice that the officer in command of the U. S. troops at St. Michael, Alaska, will prevent the landing on the military reservation there of anyone unable to make satisfactory showing of his ability to support himself there for one year, or to proceed at once beyond the American boundary. The "transportation companies" have been bringing up loads of improvident passengers and dumping most of them at St. Michael for the Government to feed. Some of the deluded crowd push on up the Yukon, but their strength and supplies giving out, they are stranded sick and penniless in a region whose rigors are known only to those who have experienced similar hardship. Trouble at some of the interior points is feared, for an empty stomach has no conscience, and starving men have vague ideas on the ownership and acquisition of property. Gen. Merriam is going to at once send a battery of artillery to Fort Yukon and there establish a military post. With this expedition he will also send supplies of provisions, etc., to relieve the threatened distress. It is high time such action was taken, and the Government in addition could with great propriety establish military rule in that region even to the suppression of the rascally practices of some of those transportation companies. Of course there is no law in this country to prevent anyone making a fool of himself, in addition to the large normal number to whom nature has denied that privilege, and it may be argued that it is no part of the governmental function to take care of those who haven't sense enough to keep from being fooled by newspaper stories of treasure, but there are many thousand well intentioned but misguided men now in the Yukon region who need immediate relief; there are thousands more who have mind to go, and it may well be the province of the Government to aid those who are there and help back those who unwittingly want to engage in an adventure for which they are not prepared.

Gold From Seawater.

Eastern papers are full of the fiasco at North Lubec, Maine, where the usual swindle was perpetrated with the usual result. Many well-meaning, credulous investors have lost their money through the manipulations of rogues, and the papers in Boston and elsewhere that editorially favored the swindle are trying to explain.

The theoretical existence of gold in minute quantities in seawater enabled the promoters of the most recent fraud, by speciously worded statements, to produce belief that they had succeeded in profitably producing gold from the waters of the ocean. With great show of scientific procedure, they sent regular consignments of gold to their Boston office, omitting to state that this gold so exhibited was paid for with part of the money received from their dupes by the sale of stock. To doubters they exhibited their "plant," and its workings, brought in their "chemists" and "assayers," who showed tests, analyses, and, above all, tangible results of gold "won from the waves," taking good care, of course, to keep out any one likely to be possessed of sufficient technical knowledge to see the fraud. Some of the officers of the company were not on the inside, but were duped by others in the secret, part of the "salting" being done by substituting gold amalgam for quicksilver, and the employment of a diver, who placed chloride of gold in the experimental pans under water, the "loading" being lowered through the ice in Narragansett bay last winter. The president of the company writes: "If there was any trickery, it must have been under the ice." It looks as though there was a good deal of trickery over the ice, also.

This extraction of gold from seawater has engaged the attention of men for over a century. As scientific research developed the fact some years ago that every brick in the brick-built city of Philadelphia contains two cents worth of gold, so analysis has shown that in every ton of seawater there is from one-fourth to one-half a grain of gold. But it would ordinarily cost about as much, proportionately, to extract the gold from the seawater as to secure the gold from the bricks in the Pennsylvania metropolis. It is not scientific nor other than dogmatic to say that anything is "impossible." "Impossible" things are merely things that have not yet been done. But, so far, any one claiming to have extracted gold from seawater at anything like the approximate cost of the operation may be considered a charlatan and a fraud.

In connection with this matter the following letter from J. W. Pack, the assayer of the U. S. Mint in this city, will be read with present interest. We consider it a valuable contribution on what is, in the abstract, an interesting subject:

EDITOR MINING AND SCIENTIFIC PRESS:—I have read with great interest the articles in a Boston paper regarding the Electrolytic Marine Salts Co. and their works at North Lubec, Maine. It seems to me that any company with a capital stock of 10,000,000 shares is carrying such a heavy load of stock that it will find it exceedingly difficult to reserve sufficient energy to battle with the ocean for the gold it possesses.

Several papers of late have stated that I claim to have found gold in solution in ocean water to the value of four cents per ton of water. This is somewhat misleading. I find the gold in the ocean water proper only in solution and amounting to about 0.5 of a grain—in value about two cents—while the gold in the San Francisco bay is probably about twice that amount, but largely in a finely divided state, only a portion being in solution.

The quantity of gold and silver contained in the ocean water, and the possibility of profitably extracting them, has been under discussion for many years. In 1851 Malaguti and Durocher reported their discovery of silver in seawater, but said nothing relative to the gold it contained. In 1872 Sonstadt discovered gold in seawater, but did not state the exact amount he found, but said it was less than one grain to the ton of water. Mr. James Park, formerly director of the Thames School of Mines, also mentions the fact of the presence of gold in seawater.

Prof. A. Liversidge, in his paper read before the N. S. W. Royal Society "On the Amount of Gold and Silver in Seawater," estimates the seawater off the coast of New South Wales contained .5 grain of gold to the ton. In 1897 Prof. John R. Don of the University of Otago, N. Z., in a paper entitled "The Genesis of Certain Auriferous Lodes," treats to some extent upon the amount of gold in seawater,

giving the amount which he finds, .078 grain per ton of water.

For a number of years I have been very much interested in the problem of a successful separation of the gold from seawater, my first experiments being made in 1884, and continued at different times till 1893.

The first tests were made with the idea that the extraction could be made as an independent business simply for the saving of gold alone, but after several trials I soon became convinced that this was not practical under present conditions.

After numerous other experiments the thought occurred to me that the only way in which the separation could be carried out profitably would be in saving the gold as a by-product in connection with the manufacture of some other article of general use in which salt water was largely used, and, of course, the manufacture of salt at once presented itself. I then visited some of the salt works in California and Nevada to examine their method of work and see where the separation could be carried out with the greatest probability of success.

During these investigations a curious fact was presented. After examining numerous samples of concentrated ocean water and finding the gold reaction in all, I secured ten gallons of concentrated water from salt marshes in Nevada, and after repeated tests failed to find the slightest trace of gold in the water, which at first was a great surprise, but on further study I can see how it would be out of the question to find gold in such water. These salt marshes are caused from fresh water passing through salt beds below the surface and finally flowing out in some valley or low land. These salt beds may be formed from the evaporation of ocean water, but still the condition of the gold would be changed, for after the evaporation had been carried so far that the entire amount of solid matter has been crystallized out, yet during the long period of the moistened condition of the mass thus crystallized out the electric earth currents would be gradually effecting a change on all of the metallic salts that had been crystallized out as chlorides, sulphates or bromides, eventually converting them to their metallic condition, thereby causing them to be insoluble in water, while the alkaline chlorides and sulphates would still be readily dissolved.

A peculiar circumstance which occurred several years ago during my experimental work with an electric battery convinced me of the important part played by weak, but constant, electric currents in converting metallic salts existing in nature to their metallic condition. Each of the battery jars was set on a small, glazed earthenware plate; a small quantity of sulphate of copper solution had accidentally been poured onto three or four of these plates; the strength of the battery had been about exhausted, so it was left standing in that way for several weeks. When I had occasion again to use it, I found that the sulphate of copper had crystallized, and then the weak current, by long-continued action, had converted a portion of the sulphate to metallic copper, which adhered with considerable tenacity to the glazed surface of the plate, and it was in exactly the same shapes and forms as the fern-like shapes that are often found painted by nature on porphyry rocks in black lines, and said by some to be photographed on the rocks.

Now, connecting this circumstance with the fact that so often in nature we find gold, silver and copper, when in the native state, taking the same forms and shapes, I have drawn the conclusion that all such occurrences have been caused by the long and constant effect of the electric earth currents, thereby converting these metallic salts to their elementary condition. These circumstances had an influence on my experimental work and in a measure directed the plan which was best to follow.

I also received, through the kindness of Prof. Geo. Davidson, five gallons of the water of Salt Lake, Utah, for test, which resulted very satisfactorily, not only demonstrating that this water contains somewhat more gold in solution than the water of the ocean, but also conclusively demonstrating the fact that that great lake was once a portion of the ocean and not formed by mountain streams, receiving its salt qualities from beds of salt through which some of these streams flowed, for, if the last was the case, there would be no indication of gold in solution.

A method of separating the gold might be adopted in connection with the manufacture of salt from seawater. We know that ocean water contains salts of the following elements, as carbonates, chloride and sulphates; calcium, sodium, magnesium, potassium, silver, gold, iodine and bromine. The gold may be in combination with the bromine or iodine.

The first four crystallize out of solution before the others, very much in the above order, the calcium dropping out first, then the sodium, then the magnesium; if it were not so the common salt of commerce would be unfit for use, as it would also contain salts of both calcium and magnesium.

After most of the chloride of sodium has become crystallized the remaining water is drawn off and represents about 1 or 2 per cent of the original water used, and this remaining solution, called bittern, will contain the salts of magnesium and potassium as both chlorides and sulphates. The gold also

remains in solution, salts of this metal being held in solution till nearly all of the other salts are completely crystallized.

So here we have in a condensed form as a by-product to the manufacture of commercial salt, the condensed solution containing the metal we are desirous of separating, and in a solution which is well adapted to the successful working of the separation.

This bittern is at present, after extracting the sodium chloride or common salt, discharged into the ocean again and so all lost.

The knowledge that gold is contained in ocean water, together with the fact that so much of the black magnetic sand on the ocean beach contains gold, first led me to believe that electricity played an important part in the separation. Then upon examining some of this gold contained in black sand with a strong magnifying glass, and finding the most of it to be in thin scales with edges somewhat rolled over and the surface of these scales filled with small depressions and holes, convinced me that these scales were formed on the surface of these small particles of magnetic sand and that electricity was the principal agent causing the deposit of gold of this character; the scales afterwards becoming loosened by abrasion and falling off.

My experimental work upon this subject convinces me that the proper method of reclaiming this gold is by operating upon the bittern or residue water from the manufacture of common salt, and in this way alone there is a possibility of making the separation successful, for one ton or about 200 gallons of this water should contain, still in solution, all of the gold from 100 tons of ocean water, which is the amount evaporated in making about three tons of salt. This, I believe, will be the true solution of the problem.

JOHN W. PACK,

Assayer U. S. Mint, San Francisco.

Aug. 5th, '98.

Concentrates.

The Boise, Idaho, assay office shipped \$23,641.53 in July.

The bullion receipts at the Denver, Colo., branch mint for July were \$2,001,349.48.

The Old Jordan & Galena mine at Bingham, Utah, employs 110 men and has 20 leasers.

The Snowshoe mine at Libby, Montana, has been sold to an English company for \$140,000.

"CERUSITE" is lead ore in the form of small white needles or fibers, slightly resembling asbestos.

LATE arrivals report extreme heat in the Klondike, the thermometers at Dawson registering 110° F.

PLACER miners on Rock creek in the Boundary district, B. C., are said to be making \$7 a day per man.

The Hope mining property near Salmon City, Idaho, has been sold to the Drum Lumber Co. for \$75,000.

COPPER is now being produced in commercial quantities at Cuprum, Idaho, from ore from the Peacock mine.

SYLVANITE, or graphitic tellurium, is a telluride of gold; composition, tellurium 55.8%; gold 28.5%; silver 15.7%.

The Virginia mine at Rossland, B. C., will erect a new plant at a cost of \$30,000, capable of sinking 1200 feet.

The Jay Gould stamp mill, near Helena, Mont., was destroyed by fire last week and is a total loss. It cost \$60,000.

TWENTY cubic feet broken quartz weighs a ton; eighteen cubic feet gravel in bank, or twenty-seven dry, will weigh a ton.

M. D'ARSONVAL asserts that liquid air will soon be purchasable at "a dollar a bottle." The size of the bottle is not stated.

"SILVER's highest quoted price in the last ten years" was on Aug. 20th, '90—\$1.19½ per ounce. To-day it is just one-half that.

It is locally estimated that the Ontario and Daly mines at Park City, Utah, will be operating with a full force within ninety days.

The first hydraulic gravel elevator was put in by the Yreka Creek G. M. Co. at Yreka creek, Shasta Co., Cal., in 1880. It was of the Cranston type.

ACCORDING to Arizona papers, the United Verde copper mine of Arizona, which a few years ago found difficulty of sale at \$15,000, "now pays annually \$4,000,000 above expenses."

In fifteen days eight men working on tailings from the King of Arizona mill, in Yuma county, Ariz., by the cyanide process, secured \$6000 in gold.

AMONG the improvements in the power plant of the North Star M. Co. at Grass Valley, Cal., will be a Pelton water wheel 33½ feet in diameter.

THIS is a great year for the prospector, and now is his favorite season in any part of the mining country where grass and water may yet be found.

MERCED, Mariposa, Co., Cal., mining stock is quoted on the Boston Stock Exchange at \$6; that of the Pioneer, Placer Co., Cal., Mining Co., at \$5½.

The Grand Central mine at Mammoth, Utah, will put in a hoist of 2000 feet capacity, a 10-drill compressor and a wood-working machine, all electrical.

The steam wagon in use at the De Lamar mine at De Lamar, Nev., has given such satisfaction in transporting ores that another and a larger one will be added.

APPLICATION for a patent will not hold a mining claim. The requisite annual assessment work must be done till final entry and payment of purchase money.

The Virginia, Nev., Miners' Union, whose membership is now being depleted, is the oldest similar association in the country, having been organized in 1863.

CALIFORNIA has forty mountains, the highest peaks of which are more than 10,000 feet above the sea. Colorado has fifty-nine peaks which are over 13,000 feet in altitude.

It is estimated that the output of the mines at Butte and Anaconda, Mont., is over 11,000 tons a day, and that this will be increased 20 per cent before the close of the year.

The Commonwealth Co. at Pearce, Arizona, is credited

with intention to add another 20-stamp mill, which would increase their treatment of ore to over 100 tons per day.

SEVEN different religious denominations hold consecutive Sunday service in the one church in Skaguay, Alaska, divine worship being continuous therein from 8 A. M. to 9 P. M.

THERE are two "Kootenais," the British Columbia Kootenay and the Idaho Kootenai. The latter lies within the southwest angle of the 49th parallel and 115th meridian.

Not all the money made in the Klondike is by mining direct. Interest rates range from 6% to 9% per month, the supply of coin is limited, and the collateral is usually ample.

In its report for the year ending June 30th, '98, the Victor, Colo., Gold Mining Co. figures that the average cost to it of producing each dollar in value of gold during the year was 40 cents.

It is locally reported that the Rothschilds will build a smelter of 200 tons capacity near Coyuca, Mexico, on their Ingoran mines, for which they are said to have paid six million dollars.

E. HUNT, who has spent a year prospecting in the Sierra Madre country, Mexico, reports the discovery of gold and silver properties, and a large influx of prospectors into that country.

J. EARLE, Supt. Mammoth M. Co. at Mammoth, Utah, says that recent reports of the moving of ground in the old works have no foundation. He believes they were inspired by stock jobbers.

The capacity of the new reservoir of the Homestake mine at Lead, S. D., is 1,000,000 gallons. The new engine being placed there has a capacity of 2000 H. P. and will lift four cars of ore 3000 feet.

THE rapidly with which Park City, Utah, people who sustained losses in the recent fire are rising is taken to be indicative of the confidence in the future productiveness of the mines of that locality.

SOME mining companies incorporated in Spokane, Wash., and operating in British Columbia, talk of dissolving the corporation in the United States and reincorporating in British Columbia to avoid the stamp tax.

THE Sonora, Cal., *Union-Democrat* says that in one of the main ditches of the Tuolumne County Water Co. is a gold-saving flume which has been cleaned up periodically for thirty-four years, and has yielded \$63,741.62.

W. HOSKINS, shift boss in the Champion mine, Nevada City, Cal., while ascending the shaft, raised his head, and was struck by the cable roller in the roof of the incline. He died from his injuries a few days afterwards.

NEAR Whittier, Cal., S. M. Woodbridge has tested the sulphur discovery and finds that it runs nearly 50 per cent sulphur. He has ordered machinery to work the property and expects to establish a permanent industry.

THE Smith-Moffatt electric power plant at Goldfield, Colo., will be completed Nov. 1st. Its cost will be \$150,000, and it will be one of the largest electric power plants in the State, capable of generating electricity equal to 2000 H. P.

THE Denver, Colo., *Mining Record* says that in San Miguel county, Colo., more development work is in progress than ever before in the history of the county, and that as a consequence money is more plentiful and all classes of business prosperous.

THERE is no conflict between the mining laws of the U. S. and the State of Washington. There can be no "conflict" of the kind, for whenever a State law opposes in any particular a valid federal statute on the same subject, the former is overridden.

AT any time after the discovery or location of a mining claim the claimant can file with the register the certificate of the U. S. surveyor-general that \$500 in labor or improvement has been put on the claim, and application may be made for a government patent therefor.

DURING September the offices of the California State Mining Bureau will be transferred from the Pioneer Building, on Fourth St., San Francisco, to the top floor of the ferry depot building, at the foot of Market street. This includes the museum, laboratory, library, etc.

IN the United States court at Seattle, Wash., on the 1st inst., George D. Rogers, trustee, obtained a judgment by default against the United Concentration Co. for \$172,411.45 in a suit for the foreclosure of a mortgage. The property involved is the Monte Cristo, Wash., mine.

THE Union Pacific Coal Co.'s mines, at Hanna, Wyo., have been shut down. Two months ago the miners in this property struck, but were permitted to return to work at the old scale of wages. Since then a Miners' Union has been formed, to the dissatisfaction of the company.

THE gold refinery of the De Lamar Golden Gate mill at Mercur, Utah, is constantly under armed patrol. After the door is locked within, each evening, no one is allowed to enter, the superintendent, who directs the retorting of the auro-cyanides, not excepted.

THE Associated Gold Mines of British Columbia, Ltd., has among its eight directors a duke, an earl, a baronet, a knight and a major. The capital stock is £500,000, and the prospectus says "clean, solid ore in sight can be shipped in large quantities, immediately." The combination should be irresistible.

GEO. H. PROCTOR has again appeared on earth and is pushing his Pike's Peak tunnel scheme. He is credited in Colorado with having spent \$110,000 in three days about one year ago, advertising the proposition. Leiter and Hooley blazed and darkened, but Proctor and Giles Otis Pearce still gleam.

THE Overman, one of the Comstock companies, at a meeting on the 5th prox. will consider disincorporation. Meanwhile work is suspended. In its long history the Overman has levied assessments to the amount of \$4,163,520. It has produced considerable bullion, too, but has never declared a dividend.

DURING July the receipts at the San Francisco Mint aggregated \$6,143,448.97 gold and \$8,302.86 silver, the latter being partings from gold deposits. The amount—\$6,143,448.97—is the largest single month's receipts of gold in the history of the mint in this city. The compiler of this "Concentrate" in its preparation looked up the records back to 1854.

PROBABLY no metal mine on this continent has paid greater aggregate dividends than the Con. Cal. & Va. mine of Nevada which thus disbursed \$77,608,500; this was from ore that averaged 46% gold and 54% silver. The Calumet & Hecla copper mine, Michigan, has a dividend record to date of \$53,850,000. The biggest California gold mines are unincorporated and no public record of their profits is attainable. The Idaho paid in

dividends \$5,489,000; the Standard \$3,771,159; the Kennedy has paid \$2,400,000; the Plumas-Eureka \$2,696,295.

IN experiments with the compressed air pipes of West-phalian coal mines, H. Schab has found that the greatest distance to which the sound of the voice could be conveyed in a straight pipe was between 1500 and 1700 feet. For moderate distances a pipe of about 20 inches in diameter gave the best results, a slightly larger one being better for long distances.

THE assay-ton system of weights was devised by C. F. Chandler of Columbia College. As there are 29,166 ⅔ troy ounces in one ton avoirdupois—2000 pounds—the assay ton contains 29,166 ⅔ grams; hence, if one assay ton of ore is taken for assay, and the resulting button weighs ten milligrams, the assay value of the ore will be ten ounces per ton. One ounce per ton is 0.00343%.

COLORADO STATE COMMISSIONER OF MINES H. H. LEE will present to the Legislature the following bill: "That all abandoned mine shafts, pits or other excavations, endangering the life of man or beast, be securely fenced or covered, and any person or persons removing or destroying said covering or fencing shall be guilty of a misdemeanor under this Act." The penalty will be placed at not less than \$100 nor more than \$500.

IN his voluminous report just issued, the British Consul General at San Francisco devotes much space in the report to the modern methods of acquiring mining property. He summarizes: "The misfortunes that have befallen the British mining investments in California are attributed to unbusinesslike methods in acquiring or working property, investing in mines that are fully developed, neglecting to have them thoroughly examined, sending out men to manage mines who have had no practical experience in business, and the greatest cause of disaster is the capitalization of such concerns by London promoters."

THE Mint Bureau estimates the world's production of gold for the calendar year '97 at \$340,000,000 and probable production for '98 at \$375,000,000. The gold production of the United States for '97 is estimated at \$58,000,000, South Africa \$60,000,000. Australia is only slightly below this figure. It is thought that the gold production of Africa for '98 will be \$75,000,000. If Australia, as returns indicate, shows a production of nearly \$80,000,000 and the United States shows \$63,000,000, these three countries will aggregate a gain over '97 of \$20,000,000, and will contribute nearly \$200,000,000 of the gold production of the world. The production of the Klondike region is not included in these figures for the United States. The production of the Klondike for '98 is variously estimated at \$5,000,000 to \$10,000,000.

URANINITE (uranium oxide) is the ore usually found by prospectors and generally occurs in connection with lead and silver ores, very rarely in masses. The crystals are octahedrons. The color may be gray, brown or velvet black, and sometimes has a lemon yellow coating of uraninite. It is rarely found as a pure ore. The hardness is six and the gravity ten, being softer than quartz, which is seven, and heavier than galena, which is 7.25. It will scratch about as easily as ordinary feldspar, which is six to seven. It is hard but slightly malleable. With the oxidizing flame of an ordinary blowpipe an equal amount of the ore and borax will give a red scoria when hot and yellow or gray when cold. Reduced to a powder it will dissolve very slowly in nitric acid. The streak or powder formed by scratching with file or point of knife is black. It has but little luster, being dull or sub-metallic.

SEATTLE, Wash., sends an "official statement" of the amount of gold from the Klondike this season, aggregating over \$13,000,000. Like other "statements" therefrom, the amount is greatly exaggerated. Supt. Leach of the U. S. Mint in this city estimates the output at \$5,000,000. Probably \$6,000,000 would be an outside estimate of the '98 Klondike gold shipment so far. Mr. Leach, as superintendent of the government mint, is in a position to speak with exactness. Sooner or later nearly all the gold produced anywhere west of the Rockies finds its way to the U. S. assay office or mint. So far this season the U. S. mint here has received about \$2,000,000 Klondike gold and the new government assay office at Seattle about an equal amount. Estimating another million and a half still to come would make an aggregate of \$5,500,000, which is believed to approximate the gold amount brought out from that region this season.

FOLLOWING are the depths from the holting works of the leading mines on the Comstock to the level of the Sutro tunnel or its branches; also the angles of the inclines, where there are inclines, from the bottoms of the main vertical shafts: Utah, 1465 feet, angle of incline 46°; Sierra Nevada, 1501 feet; Union shaft, 1502 feet; Ophir, 1600, pitch of incline 37°; C. & C. shaft, 1500; Con. Va., 1625; Bonner shaft (Gould & Curry mine), 1676, 55°; Gould & Curry and Best & Belcher shaft, 1443; Savage, 1650, 33°; Hale & Norcross, 1626, 40°; Chollar-Norcross-Savage shaft, 1598; New Yellow Jacket, 1513; Old Yellow Jacket, 1430, 45°; Old Bullion shaft, 1766, 41½°; Con. Imperial, 1732, 43°; Crown Point, 1394, 35°; Belcher, 1449, 33°; Overman, 1201; Alta, 1030; Forman, 1495; Caledonia, 1153; Justice, 930, 40½°; Silver Hill, 757, 38°; Old Chollar-Potosi shaft, 1695, 45°; New York, 1059; Baltimore, 1205, 38°. These measurements are from the surface to the ground at the top of the shafts.

UNLIKE low-grade metal, rich copper matte does not rapidly float up, detaching the semi-fused masses of ore from the furnace bottom and thus shortening the process. Rich matte is assumed to be thoroughly calcined, so that there is not only a less proportion of easily fusible sulphides, but much of the sulphide of iron present has been changed into ferric instead of ferrous oxide, which is nearly infusible and must be for the most part reduced to the lower oxide before it can combine with silica. For these reasons, and more especially for fear of producing too rich a slag, the Swansea custom has forbidden the production from the first fusion of a matte above 35 per cent copper. The presence of arsenic and antimony, which require for their removal a long series of alternate oxidations and reductions, has also favored this process, but with American purer and richer ores, and with the higher prices of fuel and labor, it has become the custom to produce a much higher grade matte at the first fusion. The following results of work at the furnaces of the Parrot, Montana, Copper Company illustrate the practice. Each assay represents a shipment of fifteen or sixteen tons of matte; the slag samples are average assays of each charge: Assay of matte, per cent copper: 64.3, 62.7, 66.5, 66.2, 65.9, 61.8, 63.6, 64.5, 63.3, 66.2. Assay of slag, per cent copper: 0.85, 1.05, 0.92, 1.10, 0.67, 0.64, 0.87, 0.82, 0.76, 1.32.

As Seen by an Old Prospector.

Written for the MINING AND SCIENTIFIC PRESS by "ALEX. QUARTZ,"
Alaska Correspondent.

St. Michaels, the city of huts, the scene of confusion, the nucleus of the gold seekers! A busy place. The shore and banks are covered with tents, thronged with people passing to and fro, with no apparent object in view other than to obtain information. The harbor is filled with vessels, sailing and steam, and boats of all descriptions. There are upwards of 3000 people here, some on their way home from the Klondike and other up river points laden with gold; others returning disheartened with tales of hardship, privation and disappointment, denouncing the country. A large number came down on the first boats for supplies of tools, provisions, native boots and clothing, and are going back again on the first boats up the river to try their luck another year. There is one point on which all who come from the Canadian side agree, viz., that the miner and prospector is not given a "square deal." Their laws are too strict and the Government takes the lion's share of the output of all claims and has the power to revoke the miner's lease at any time it sees fit. This drove a vast horde of miners and prospectors over the line this spring onto the American side, where the laws are liberal. From November last until the latter part of June of this year I have put in the most of my time traveling and prospecting, and during that time have seen considerable of northwestern Alaska, and, like many more, I am more favorably impressed with this section of country lying north and west of the Yukon from the Manook district west to Norton bay and Norton sound, and as far north as Golovin bay. Several important discoveries have been made in this coast country during the past winter, the best to date being Auvik and Golovin bay. They are both promising districts, and so far the surface prospects, if they indicate anything, are far better than anything found in the Manook district or any of the other districts up the river. Any other than surface prospecting has been out of the question since the rivers and streams broke up on account of high water. But now the waters are rapidly falling and the next three or four weeks will determine the richness of the principal creeks. The Auvik district, of which Edwin Engelstad, my partner, and myself have the honor of being the discoverers, is in a northeasterly direction from St. Michaels about seventy-five or eighty miles, in a broken, mountainous country, on which no white man ever set foot before us. It has been known for several years to many of the old-timers in passing up and down the Yukon that there was gold in the bars at the mouth of the Auvik, where it flows into the Yukon, but none of them ever went up the river to prospect it. Last summer Pitka Golsan, a half-breed Russian, prospected up the river for over 150 miles and found gold in the bars all the way up. On the knowledge gained from Golsan and the natives Engelstad and myself entered into partnership to prospect and explore the Auvik country. Accompanied by Pitka Golsan, three white men and two natives, with three dog teams and three weeks' supply of provisions, we arrived at the Auvik on the 5th of last February. In less than a week I discovered in different places prospects sufficient to induce me to establish a camp there and prospect and explore the country thoroughly during the winter—which is the only time to travel by land in this country.

We found all the maps and charts incorrect regarding the interior country, and especially so in relation to the Auvik and lower Yukon country. Instead of being an insignificant little stream rising in a large lake, we found the Auvik a large river draining a vast, high, mountainous country, stretching over 200 miles in width, from the coast range of Norton sound on the west to the Yukon on the east, in which there is plenty of room for the adventurous prospector.

Our discovery on the Auvik and its tributary creeks is over 200 miles above its mouth, where we organized the "Golsan mining district." The locations to date are confined to Macdonald creek, Independence creek, Ruby and Garnet creeks and the Auvik river. Shortly after our discovery the news reached St. Michaels, and some seventy odd men made their way into the new district and made locations. In the meantime, reports reaching St. Michaels were many and greatly exaggerated, which were the means of starting a stampede for the Auvik. General Randall, the commanding officer here, being satisfied that the discovery was within the 100-mile limit of the military reservation, nipped the stampede in the bud by positively refusing to allow any work or prospecting to be done in the new district until he received orders from the Secretary of War in Washington, D. C., to that effect. Prior to this, we (the discoverers) made application to the Secretary of War, through the commanding officer, General Randall, to have that portion of the reservation set aside for mining purposes, at the same time applying for permits to mine in the district, giving a full description of the claims; and so the

matter rests at the present time and will until we receive our permits from Washington, which will be in the latter part of the season. There is no doubt about the permits being speedily granted, for many reasons, even if that portion of the reservation is not set aside for mining purposes. General Randall acted wisely in the matter and deserves great credit for the manner in which he handled the case, which would have eventually ended in a mixed state of affairs and necessitated the maintenance of soldiers in the district, owing to the difference of opinion as to whether military law would apply to mining within the limits of the reservation or not, and which would cause trouble over titles and the sale of claims, which is not permitted under military law. Besides, the stampede would have deprived the companies at St. Michaels of their help and made a bad state of affairs generally.

We demonstrated to our own satisfaction during our winter prospecting, by sinking shafts through snow and ice, both on Macdonald creek and the Auvik river, that those two places, at least, will yield good pay, although we were unable to get to bedrock in either place, on account of the water, which never freezes in the channels of the coast country streams, owing, likely, to numerous thermal springs feeding the creeks and rivers. The gold of the Auvik country is of high grade, going \$19 per ounce, and its origin or source is purely local, coming from the formation tributary to the streams in the district. The formation is principally diorite, porphyry, black iron slate and granite, all of which are well mineralized. There is very little evidence of quartz in the creeks and river wash, and there is no trace of glacial action or volcanic matter.

The great advantage this new district will have over all the other districts so far discovered is because it is within eighty miles of a never-failing base of supplies (St. Michaels) where goods, tools, etc., can be had for half what they cost on the Yukon; easy transportation from the coast, being only a long day's journey from a landing on Norton sound, thirty-five miles north of St. Michaels. In summer pack animals can be used, and in winter dog teams, for freighting over the mountains. The diggings can be worked winter and summer once they are opened, and \$10 per day to the man is better than \$25 per day at any of the camps up the river. The pining process can be used during the summer months, and it is continual daylight here during the most part of the working season; so, by running a night and day shift, a six months' run can be made during the season with a giant.

The river has so much fall that it is not navigable even for a small boat; consequently, there will be no difficulty in disposing of tailings. All of the tributaries have great fall, also, which is a great point in their favor. There is an abundance of timber—spruce, cottonwood and birch—which answers all purposes. This section is destined to become the chief mining center of northwestern Alaska within the next two years. Although bedrock has not been reached by any of us, on account of water from the confined channels underneath rising over the ice in winter and high water from melting snow and ice this spring, still we have proved to our own satisfaction that on the river and Macdonald creek the gravel contains pay from the surface down, increasing gradually down as deep as we were able to sink in the water.

The Golovin bay discovery, which is located about 150 miles northeast of St. Michaels, was made last winter by the Mordaunt and Libby party, consisting of Messrs. Mordaunt, Libby, Blake and Melsing, who wintered there. The existence of gold in Fish river and its tributaries has been known to the old-time traders here for the past eight or ten years, dating from the time of the discovery of the Green galena silver mines, now idle. Three years ago my partner, Mr. Engelstad, who has been a trader here for the past ten years, fitted out a prospector to prospect Fish river and its tributaries for placer digging. After he had prospected the Neukluk, a tributary of Fish river, and found a prospect to justify working, he heard the news of the strike first made above Circle City and he dropped all work and started for the Yukon and arrived in time to be one of the first on the ground after the discovery of the Klondike.

No prospecting has been done since until last winter, when the above-named party discovered pay on Ophir and Melsing creeks, which are tributaries of the Neukluk river. There is also running water in all the streams of that section underneath the ice during the winter which prevented them from reaching bedrock also. The result of their winter's prospecting demonstrated the fact that rich pay ground exists in both Ophir and Melsing creeks, they having gotten as high as \$12 in four pans of gravel near bedrock. The gold differs from the Auvik gold. It is very fine and principally flaky or scale gold and comes from a black slate formation which is full of frozen seams of quartz which make up a large percentage of the gravel wash in those creeks and the Neukluk river. I have just returned from that district, but during my stay there the water was so high in all of the creeks and rivers that it was impossible to do any prospecting that would determine whether there is pay in all of the creeks tributary to

Fish and Neukluk rivers or not. I went up those two rivers about ninety miles from Golovin bay and prospected all of the tributary streams of Fish river from its mouth to the junction of the Neukluk and then up the Neukluk to near its headwaters, panning in all of its tributaries on my way and found gold in every one of them. But the gold was very light and fine, but no doubt the lower gravel carries coarser gold even before bedrock is reached, when as high as 250 colors of fine gold can be got to a pan on the surface of the high bars in favorable places. There is only one serious drawback to the upper Neukluk and the streams flowing into it, and that is the total absence of timber anywhere above Ophir creek. There are two districts already formed there, or rather organized, viz., El Dorado and Melsing districts. There were twelve miles of placer claims staked on Ophir creek, which is about twenty miles in length, and some half dozen quartz locations, and Melsing creek was all staked up to the head of it, a distance of about eight miles, when I left there a week ago. A townsite has been laid out and the "Council City" of the future consists to-day of a few prospectors' tents and a dense and busy population of millions of mosquitoes. But wherever you find gold you will find obstacles to overcome before you get it, especially in Alaska, and it is only too true that all the gold which a man gets in this isolated, frozen region, though it should amount to millions, he earns at terrible cost. Prospecting for quartz anywhere in northwestern Alaska, like in the interior, is slow and tedious work, for the reason that the whole country, hills, mountains and valleys alike are covered with moss varying from 4 inches to 2 feet in thickness. Some veins of rich rock have been discovered in this coast country, but there has been no development work done up to date to really prove their extent. Every one is looking for placer where riches can be got quickly at a little expense.

There is a couple of steamers here with passengers and outfits for Kotzebue sound, who intend going up the Kowak river to find some of the "mythical Klondikes" that have been extensively written up in some of the coast papers and which has been the means of luring hundreds of people to the Kotzebue sound country to suffer untold danger and hardship, starvation and death in many cases. I deeply regret that I do not possess the power to prevent those people from going to the Kowak river, for there should certainly be something done to silence those who have written up those golden dreams of the Kotzebue sound country for the purpose of duping the gold seekers, for I can see no other objects in the publication of such rank falsehood regarding the richness of the Kowak river and its tributaries as I have read in the coast papers. I have been told by friends here, who are victims of these misstatements, of information given them in San Francisco and Seattle of the gold that they, the authors of the statements, took out, saw taken out, and know for a fact to be taken out, etc., of the Kowak. Here are the undisputable facts and the history in brief of the advent of the white man in the Kotzebue sound country: There has never in the history of Alaska been a Russian trading station on the Kotzebue sound, before or after the purchase of Alaska by the United States. The native pilot, whom Lt. Stoney had with him when he went up the Kowak, for the past two years has been in the employ of Mr. Engelstad, my partner, and he states that they found plenty of mica but no gold, except where they turned back they found occasionally a light, flaky scale of gold that would float away on the water. Lt. Stoney brought out no gold that he got himself or from any one else that had been taken out of the Kowak. Lt. Cantwell and Engineer Leneghan of the revenue cutter Corwin were the only men who were to the heads of the Kowak and Noatak rivers, except Boyd and Folger, and they did not find any gold, neither did they take out any except a few light colors they found on the heads of these rivers, at least not to the knowledge of any white men in Alaska or any of the natives who were with them. The native guide and pilot (Ogitkin) who was with Cantwell on that trip on the Kowak, and one who was with Leneghan on the Noatak river, have traveled with me at intervals for the past eight months and they tell me always, though I have repeatedly cross-questioned them, that there was never anything found on either of those rivers, but occasionally a light color of float gold. Boyd and Folger, two veteran Yukon miners, during the winter of 1895 crossed over from the Koyukuk river to the head of the Kowak and prospected thoroughly and found nothing. Boyd was murdered there by natives who are a vicious set of people, and Folger escaped and is to-day at Manook or up on the Koyukuk. All of the old timers tell me, and their accounts all agree, that Miner Bruce was never ten miles inland in his life on Kotzebue sound, and no white man has ever been on the Kowak or Noatak since the above-named men, and what little gold has been obtained by whalers and traders, etc., from the Indians who inhabit that region has been obtained by trade with the Koyukuk Indians and came from the Koyukuk river and its tributaries and not from the Kowak. Those Indians have repeatedly told me this and related the history of the advent of Boyd, Folger, Stoney, Cantwell, Leneghan, Bruce and Gibson and all of the few white

men who have been in that country. I have tried to convince some of the passengers who came here on the Humboldt and Grace Dollar—people of my acquaintance in California—that it was almost like committing premeditated suicide to go on to Kotzebue sound. I took one party of them and devoted a whole day to introducing them and having them interview traders, missionaries and others who have been for the past ten years familiar with that country and who verify what I have written in this letter, but it was of no avail. The mythical golden dream has so completely entranced them that nothing will dispel it until privation, hardship, misery and death will bring them to their senses. Aside from my own practical experience in traveling and prospecting in that section, my statements in this letter are backed by all of the people residents from St. Michaels north to the Kotzebue sound, and my only object is to save my fellow-beings who intended going to that section from hardship, suffering and perhaps death, with no golden reward for their pains in view other than this mythical "Klondike" on the Kowak river.

Many of the tenderfeet have returned already from Golovin bay, cursing the country, and they say there is no gold there, while all of the experienced miners have remained there and are opening up their claims. It is safe to say that at least two-thirds of the people coming here this season will return in less than a year, worse off than when they came. But all practical miners who have the physique to stand the climate, and who will get out and hustle and apply themselves diligently to their calling of prospecting and mining, will win. This is a good country for a practical prospector or miner to come to, where he has chances to make a good stake, providing he wants to undergo the hardship to earn it. But this is no country for the tenderfoot novice who has no knowledge of mining or prospecting, and who has had no practical experience as such. To this class of people I would say: "Stay away from Alaska; it is no place for you, unless you want to come to the hardest school on earth to learn mining and prospecting."

The Auvik and Golovin bay districts herein mentioned, being new finds, will take another year to develop. Regarding the other districts which are attracting so much attention at present farther in the interior, to say the least of them, so far as developed, they are rich, viz., Manook and all of the adjacent districts, the Koyakuk river and all of its tributaries. Tramway bar, above Arctic City, on the Koyakuk, was abandoned some years ago, not for the lack of gold there, but because at that time it was impossible to get provisions in there to subsist on, which had to be transported by a few men such a great distance that during the open season they were unable to get enough in to last them until the following season. But now things are different. Many new supply points, with ample supplies, have been established nearer to this territory, and there are at least six or eight small, light draft steamers belonging to private parties, some of which are on the way and the others now ready to start within a day or two up the Koyakuk to Arctic City, all of them carrying two and three years' supplies. So next season the output of gold from the Koyakuk alone will be no small amount.

No doubt many of the people on the coast will be disappointed because the output from the Klondike this season will not amount to as many millions as has been reported before the washing season commenced. But when it is taken into consideration that the washing season did not last long enough to wash all the dirt that had been gotten out during the winter, and, again, the fact that under the existing Canadian laws a claim must produce \$40,000 during one season to insure a profit of \$10,000 at the outside to the owner—and oftener the figures range below \$7000 than above it on a total production of \$40,000, this being a liberal estimate—the net result will not be considered as proof against the richness of that section. On the American side a claim producing \$40,000 will, in the most expensive place on the Yukon, yield to its owner a profit of at least \$25,000. Of course, these instances refer to cases where the claims are worked by their owners and with hired help. Still, the people rush on to the Klondike. I have interviewed no less than twenty men here on their way out to the States who came in over the Chilkoot pass this spring, who told me they never had made a stop of five days anywhere on the trip between Dyea and St. Michaels. They all curse the country and denounce the whole thing as a fake. They will ply questions to you by the hour and occupy your time, and then tell you in conclusion that you are deceiving them and that they do not believe you. This is all the thanks a person receives from the majority of the tenderfeet for wasting time with them and giving them information. In conclusion, I will say this is no country for a man to come to without at least \$350 in cash besides his outfit. For the absolute necessities he must have in the way of footwear, clothing, etc., and can only be procured here, are high-priced, and if he does any traveling in winter a good dog team and sleigh will cost him at the least \$200, besides the expense of feeding them, which will amount to \$1 per day. It takes money to travel and prospect in this country, and

the traveler must be well prepared for cold weather. The coldest day I experienced last winter was 68° below zero, and during January, February and the first ten days of March the average was 36° below, when we were traveling back from the coast.

There is a corps of engineers here sent by an English syndicate to survey a route from Norton sound across the Unalakleet portage to the Yukon, a distance of about 140 miles, which will shorten the route to the upper and middle Yukon some 700 miles; and if this syndicate will carry out their plans, it will be the means of more rapid transportation both winter and summer to the country in the interior, and will settle the question of lack of supplies, which has been the great drawback heretofore in the interior. If this road is built as proposed, nine-tenths of the passenger traffic to the interior will go by this route, likewise the freight. Many of the outgoing people from Dawson and up the river points came down the Yukon in small boats, many of which were built at Lake Linderman this spring. The fare from St. Michaels to Dawson by the A. C. Co. and N. A. T. & T. Co.'s boats this season is \$250—a pretty stiff price to pay for those who lost their river boats on their way coming up. Nine river boats and barges up to date are reported lost, most of them being lost in Behring sea. What Alaska needs to develop her mineral resources is hardy, practical miners and prospectors, either with sufficient funds of their own or backed by others who will not limit them to a paltry, stipulated amount. This class of men, if they persevere, will succeed in nineteen cases out of twenty in any part of Alaska. But such "grub-staked tenderfeet" as I have met here generally I regret to say that their chances are slim to have their efforts result in anything else but failure. St. Michaels, Alaska, July 15th, '98.

Utilizing Heat from Exhaust Steam.

The latent heat possessed by exhaust steam is a factor which may be utilized to advantage in the heating of mills, where too often there is an unnecessary waste of fuel arising from an imperfect and unequal distribution of the heat lavishly produced. To use the exhaust steam it must be carried through pipes in which condensation takes place and the heat is liberated. Its progress through the pipes is impeded by the presence of air and water of condensation, requiring some pressure to push it through, resulting in back pressure on engine and pumps. These resisting elements render it difficult to carry the exhaust steam long distances through pipes. The products of exhaust steam are heat and water of condensation, both of which may be used at a mill as a measure of economy. As a rule, both are lost, the water being allowed to waste at the end of the exhaust pipe. At the point of condensation the steam gives off its heat and the water produced is rendered pure by distillation. If the latter can be brought back to the boiler it is more valuable than ever by reason of its purity and heat it contains. Many mills use live steam, right from the boiler, for heating, allowing the exhaust steam to go to waste, when it is a better heating agent than the live steam, owing to the fact that it parts with its heat more readily than does the live steam. This is readily understood by the engineer when he recalls the fact that exhaust steam contains 181 British thermal units of perceptible heat and 965 B. T. U. of latent heat, the latter being the important factor in the result. This question deserves consideration by mill and mine operators from the standpoint of economy. The huge stoves often used in mill buildings in cold climates are necessarily wasteful and unsatisfactory as heaters.

Marked progress has been made by heating engineers in utilizing the heat from exhaust steam in such a way as in a great degree to overcome the difficulties usually incident to back pressure, poor circulation in heating pipes and other attendant obstacles.

A case in point is the system employed at the Tom Boy mill, near Telluride, Colo., which the writer observed last winter. This system, which is known as the Webster system of steam heating, gives results which serve to emphasize the importance of the foregoing. In the Tom Boy equipment a vacuum pump is attached to the return end of the heating coils and a vacuum of 10 inches maintained in the system. At various points in the heating coils, thermostatic valves are used which open and relieve the system of water and air and close at steam, the result of which is a perfect circulation of the steam and no back pressure, and the distilled pure water with its heat is brought back to the boiler for use again.

It is well established that the primary requirements in effective steam heating are: "Absence of back pressure, efficiency of drainage of supply pipe, continuous automatic drainage of condensation, effective circulation, control of circulation, removal of air and gases from heat surface and from feed water, regulation of temperature in any part of the heating surface, return of water from some moderate distance below the line of drip or drainage, if necessary."

Denver, Colo., July 27th, '98.

WASCOTT.

The Atlantic Copper Company, of Michigan, furnish a good example of economical mine working;

the annual report shows an average production of 13.2 lbs. copper to the ton—less than 1%. The total returns averaged \$1.42 per ton. During the year the company employed 500 men, spent \$300,000 for improvements, paid all its bills, set aside a surplus of \$139,000, and paid \$40,000 in dividends.

"The Mother Lode."

It is a misconception, says D. Y. Browne, to consider the mother lode simply as a single and continuous ledge of quartz running for 200 miles through the country; it is rather a line of fissure at the foot of the Sierra Nevadas, filled partly with dykes of porphyry and ruffs of quartz, intersected by masses of black slates, and often ruins of pre-existing rocks, immersed more or less completely in crystallized quartz, the entire ventricular masses showing every sign of metamorphism in a high degree, and the walls of the adjoining country rock abounding in the crevices or cracks of an original cooling of the mass, and filled with stringers and feeders of quartz encased in films of shining black slate (slicken sides), loaded with sulphurets, and often abundant in free gold. This parallel group of veins, from its eastern hanging wall to the west, is of a very irregular width, sometimes only showing a single line of croppings, and at others spreading to several hundred feet. It is accompanied by a series of chimneys as vents at very irregular distances apart on its course, through which immense masses of pure quartz have reached the surface, and which usually lie at a steep angle longitudinally with the fissure.

These chimneys have generally been the pay shoots of the mines. The gold which they brought to the surface in the days of their activity has long since been scattered over the face of the country by the denudation to which it has been subjected from that long ago period when its lofty summits were first broken up and buried beneath the old gravel and lava beds down to the present, where these beds and the underlying rocks have again been chiseled out by the rivers and streams of our times.

There are two chief lines of gold-bearing rocks to the mother lode, the eastern and the western. The eastern rises between walls of black slate, and carries films and sheets of slate into the mass, giving a striped or ribboned appearance. The second, a short distance west, follows a stratum of magnesium rock, characterized by its rusty outcrops. In this we recognize the greenstone (diorite schistos) dykes. The general strike of the slates when not disturbed by local eruption is north and south and dips nearly or quite vertical. The greater portion of these rocks are, however, to be classed among the eruptives. They are in many cases greatly decomposed, and in the induced schistose structure are often mistaken for metamorphized sediments. This schistose structure has generally a north and south direction. As before mentioned, slate forms the western part of the lode, from a belt from a few hundred yards to more than a mile in width. It is cut by many dykes of fine greenstone, and others of hornblende and quartz porphyry.

The quartz veins are formed both in the slate and in the contact with the eruptive and inclosed in them. The diorite schistos, varying to talcose schist, forms a large portion of the system. The greenstone has been derived from a massive crystalline rock by pressure and resultant decomposition; quartz veins are very numerous in it, some of them belonging to the east and west system; float quartz is abundant, and all the gulches show signs of having been sluiced.

South of Sonora the greenstone appears more in the form of dykes; between these are long, narrow arms of metamorphic rocks, chiefly siliceous schists. In these schists are most of the veins on which are located the Rawhide, App, Golden Rule and Jumper mines.

The gold-bearing deposits may be divided into two general classes. To class one belongs the Rawhide mine, while to the other belong the white quartz veins formed after the usual manner, best illustrated by the Kennedy and Golden Rule mines, and which may be properly considered as deposited by replacement and characterized by the even distribution of the gold and small, well-formed crystals of iron pyrites.

All the material of the lode contains iron sulphides scattered through its minute cubes and calcite in small particles.

There are several parallel veins from 10 to 500 feet apart, course north, 16° east, with a dip of 76° east, and from 5 to 30 feet wide between porphyritic hanging and slate foot walls. The quartz is of ribbon structure, interstratified with black slate, carrying from 2 to 8 per cent sulphurets, mostly iron, which concentrate from \$50 to \$300 per ton. The veins are true fissures and deep seated, and I am in doubt if they can be bottomed at a depth of 5000 feet. A heavy foot and hanging wall gouge composed of pulverized quartz and slate highly mineralized accompanies the veins, and in no place have I noticed the freezing of the veins to the walls. In my opinion there is not a better district in the world or one that affords more inducements for investment of capital in legitimate mining than the mother lode of California.

Electrolytic Method for Treatment of Refractory Ores.

An English contemporary notes that during the last few years considerable attention has been given to the treatment of complex ores, such as those existing at Broken Hill, Australia, which on an average contain about 25 per cent of lead, 20 per cent of zinc, and 20 oz. of silver per ton. The following is a recent complete analysis of a sample of Broken Hill ore:

| | Per cent. |
|---|-----------|
| Lead..... | 30.05 |
| Zinc..... | 23.77 |
| Silver..... | .06 |
| Manganese..... | .93 |
| Iron..... | 3.91 |
| Sulphur..... | 18.96 |
| Alumina..... | 1.20 |
| Silica..... | 20.05 |
| Oxygen, traces of gold, arsenic, etc..... | 1.07 |
| Total..... | 100.00 |

The fine silver amounts to 22 oz. 10 dwt. per ton of 2000 pounds.

Several attempts have been made on a commercial scale to deal with such ores, but the difficulties that have arisen in practice have led to the abandonment of such processes. Extracting the zinc with sulphuric acid has been tried by Siemens & Halske, and others. To get a satisfactory leach with sulphuric acid it is essential that the ore should be roasted sweet, free from sulphur; this necessitates the ore being roasted for a long time at a low temperature. Even when the roasting has been done carefully, the extraction of the zinc has been very imperfect, and the losses of the zinc excessively heavy, as it was found necessary to throw away a large quantity of the solution to get rid of the impurities. Silica, manganese, and aluminum going in solution has also been the cause of many difficulties. The new process claims to have entirely overcome all these difficulties, and to have other substantial advantages, both as regards economical working and the purity of the products obtained.

The difficulty of the roasting has been overcome in this by the addition of a mixture of other ores, and the use of an air rake, which facilitates the process of roasting, and enables a sweet roast to be obtained with the expenditure of a small amount of fuel, the object being aimed at is not to drive off the sulphur so much as to oxidize it. The ore, after being crushed dry and roasted, is screened so as to remove the very fine dust or slimes, which are treated by a special process in separate vats, the screened ores being placed in vats which are provided with false bottoms or filter beds. The solution employed for leaching out the zinc is a weak solution of solution of sulphuric acid, which can be made from the sulphur dioxide driven off from the ore during the process of roasting. The leaching solution, after being drawn off from the eputation tanks to remove any copper that may be present, is then circulated through a series of electrolyzing cells, where the zinc is deposited in the forms of metallic plates on an aluminum cathode, or in the form of zinc sponge, which, when dried, forms a substitute for zinc dust, which is in considerable demand. The voltage at the terminals of the dynamo is 60, the electrolyzing cells being worked in series. It is found that only the zinc and copper are removed from the ore, and that the other metals present are not dissolved. The residue, after the zinc has been leached out within a few per cent, is then washed to remove the soluble zinc sulphate. The lead and silver remaining in the residue can be extracted by any of the ordinary methods.

Summary of the Present War Status.

Peace between the United States and Spain is to be declared. The present hostilities began April 21, 1898. Cost in lives to Spain, about 11,000 killed. (No official report of Spanish casualties published.) Cost to the United States, about 253 men killed and about 1324 men wounded.

What we lost: The Maine, with 266 men.

What Spain lost: Montez's fleet, Cervera's fleet, Cuba, Porto Rico, one of the Ladroneas, and possibly the Philippines.

Strength of the United States army when war was declared, 27,532 men. Strength now, 278,500 men.

Strength of the United States navy when war was declared: Battleships and cruisers, 14; monitors, 19; unarmored steel vessels, 16; gunboats, 19; torpedo boats, 23. Strength now: Battleships and cruisers, 39; monitors, 19; unarmored steel vessels, 31; gunboats, 25; torpedo boats, 25; special craft, 45.

In 1884 the total investment in electrical appliances throughout the United States was not much in excess of \$1,000,000. To-day the capitalization on electrical appliances is fully \$1,900,000,000. In 1884 a 50-kilowatt dynamo was considered a large machine, and the price of dynamos was about 20 cents per watt of output; at the present time the largest size generator built is of nearly 3000 watt capacity, and dynamos in comparatively small sizes, without switchboards, now cost about 2 cents per watt. It is estimated that about \$600,000,000 has been invested in electric lighting stations and plants in the

United States. There are to-day in the United States about 14,000 miles of electric railroad, with a nominal capital of about \$1,000,000,000, and employing about 170,000 men.

How Liquid Air is Manufactured.

An editorial article on "Liquid Air," on page 78 of the issue of July 23, has been widely copied and commented upon.

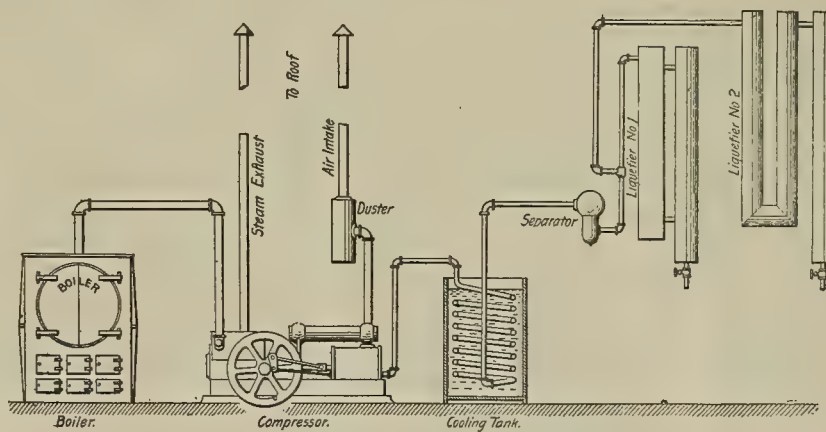
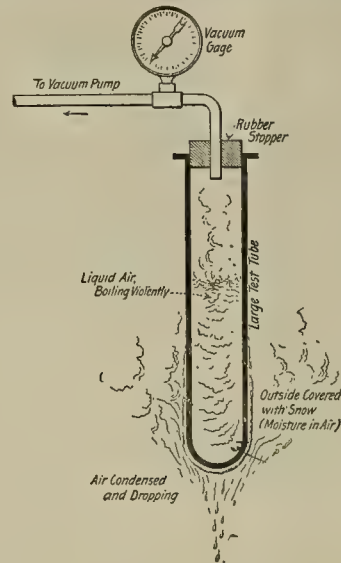
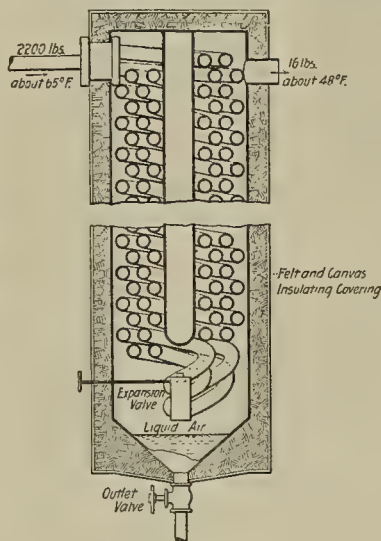
Following is a condensed account of the construction and operation of the apparatus by which C. E. Tripler of New York produces liquid air in commercial quantities. This liquefier is almost wholly a compressed air plant, a portion of the mechanism as illustrated herewith being understood to be the subject of patent by the inventor.

A steam boiler furnishes steam at 85 lbs. pressure to a Norwalk straight-line 90 H. P. compressor when running at 150 revolutions per minute. This supplies the power.

The steam cylinder is 16x16 inches. There are three air cylinders arranged in tandem with the pistons all on the same rod. The low-pressure

apparatus, therefore, the actual work of liquefaction is performed. There are two of these liquefiers in use in the laboratory apparatus here described. Their operation is substantially as follows:

The comparatively cool air under high pressure enters at one end of the liquefier, where it passes through an arrangement of coils of pipes towards the other end, where there is situated an expansion valve of peculiar construction which permits a certain amount of air to escape into the surrounding casing. This expanding air flows in a direction opposite to that of the entering air, and, in flowing in and about the coils, it absorbs heat from the incoming air, greatly reducing its temperature. This accumulative chilling action of the expanding portion of the air continues to reduce the temperature of that contained in the coils more and more, until at length its "critical temperature" (placed by Dewar at 220° F. below zero) is reached and a portion of the air collects at the bottom of the liquefier in the liquid form, while the remainder flows on, expanding and continuing to exert chilling effect on other portions of entering air. Externally, these liquefiers resemble sections of covered steam pipe, and give no intima-



APPARATUS FOR THE MANUFACTURE OF LIQUID AIR.

cylinder (10½ inches diameter) is double-acting, and raises the pressure from that of the atmosphere to 60 pounds. The intermediate is single-acting (6½ inches in diameter), and compresses to between 350 and 400 pounds. The high-pressure cylinder (2½ inches in diameter) is single-acting, and delivers the air at a pressure of from 2,000 to 2,500 pounds per square inch.

The compressor takes its air supply through a dust separator placed in the roof, thus insuring the admission of clean air. This separator is an arrangement of baffle-plates over which water is constantly trickling. From the high-pressure cylinder the air passes to a cooling tank—a spiral coil of copper pipe surrounded by a steam of running water. The purpose of this device is to carry off the heat stored in the air during its compression. The air passes on then at the temperature of the cooling water. From the cooling coil the air next passes through a "separator," or dryer, the function of which is to remove the moisture contained in it originally and that which it may have taken up in the dust separator and elsewhere.

The next piece of apparatus is what the inventor calls the "liquefier," the function of which is to transform the now cool air—which is at a pressure of about 2,200 pounds to the square inch—into liquid air at atmospheric pressure and at a temperature 312° F. below zero. In this portion of the Tripler

tion as to the duty they perform. The liquid air is removed from the liquefier by opening a valve in the bottom. The laboratory apparatus above described is said to be capable of producing from three to four gallons of liquid air per hour continuously.

Drill Steel.

A well-known steel worker says: The best grade of extra drill steel, as produced by all makers, is hammered to condense its atoms and make it of closer texture. Competition has brought into use among miners a cheaper article, the product of rolling instead of hammering. The rolling process effects an elongation of the particles instead of condensing and refining. The rolled steel is obtained at less cost, but it ultimately costs more owing to its inferiority in drill work.

In preparing drills from hammered steel much depends upon the heating for temper. The drill should be sharpened to as acute an angle as will stand up to the rock to be worked. To avoid breakage heat slowly to a cherry red, getting an even heat on cut of bit, then with clean, soft water dip slowly, taking out drill in time to leave sufficient internal heat to start the temper and toughen the bit, leaving it a light straw color. There is a difference between a brittle-hard and a tough-hard. If you chill in water without starting the temper you get a brittle-hard.

Coast Industrial Notes.

—The seven counties of southern California now figure a population of 333,235.

—The Sacramento river, Cal., has been stocked with 40,000,000 young salmon.

—From Astoria, Oregon, 100 carloads of cold storage fish will be shipped this season.

—Fruit shipments to the East from Sacramento, Cal., August 7th and 8th, were 101 carloads.

—The railway being built over the White Pass, Alaska, will require 18,000,000 feet of timber.

—California's July contribution to the Government internal revenue receipts was \$1,000,000.

—The Marysville, Cal., cannery is packing 60,000 cases of fruit this season and employing 400 people.

—The city of San Francisco's total assessed valuation is \$353,344,001—about \$5,000,000 in excess of last year.

—The Los Angeles, Cal., City Council advertises for bids for the purchase of city bonds to the amount of \$340,000.

—The Los Angeles, Cal., Chamber of Commerce has declared against government acquisition of the Philippines.

—The Monterey & Fresno R. R. purposes building 140 miles of road between Fresno, Cal., and Monterey this season.

—Since April 1st there arrived at Tacoma, Wash., 10,140,120 pounds of tea, on which the revenue to the United States was \$1,014,072.

—A railroad will be built from San Diego, Cal., to Yuma, Ariz., the *Tribune* asserts, by the owners of the sulphur mines on the desert.

—The season's salmon pack at Vancouver, B. C., is 60,000 cases. So far there has been no steady run, and the fishermen are not making wages.

—The railway from Iguala to Cocula, Mexico, will be in operation within thirty days, and from Cocula to Mariscal it will be finished within a few months.

—C. L. Conner of Bakersfield, Cal., is harvesting 10,000 acres of wheat, planted in what was once the bottom of a lake, that is yielding from twenty to twenty-five sacks to the acre.

—The estimated beet output near La Grande, Or., this season will be 50,000 tons. It will take 800 wagons, two loads of two tons each, thirty days to move the product to the factory.

—San Diego, Cal., shippers report a good demand in the East for lemons and a shortage of the crop in San Diego county. They are paying 2½ cents a pound. Nine carloads were shipped last week.

—An olive oil mill and citric acid factory will be erected by E. D. Neff for Andrew McNally of Chicago, on the latter's place at La Mirada, Cal. The building will be of brick and will cost \$12,000.

—The new 650 H. P. engine of the Pasadena & Los Angeles, Cal., Electric Railway Co. is being placed. About \$12,000 worth of copper line has been put in. The improvements will cost over \$50,000.

—According to stock taken last week by the Oil Producers' Trustees, the total quantity of oil in Los Angeles, Cal., above ground, July 30, was 310,000 barrels, showing a decrease since June 30th of 20,000 barrels.

—At Corvallis, Oregon, a trainload of 800 head of cattle is being made up for the North Dakota ranges. The prices paid are: For heifer yearlings, \$12; for two-year-olds, \$15; yearling steers, \$14; two-year-olds, \$18.

—The Chino factory expects to crush the product of 7500 acres of beets this season, of which 4500 acres will come from Chino and 3000 from Anaheim. The new Oxnard factory in Ventura county will work the product of 2000 acres.

—Forecast Official Hammond has a theory that the occasional dry seasons of California are caused by a temporary shifting of the Japan current northward, nearer to the Aleutian islands, thus bringing it to the coast in a cooled condition.

—Nelson, B. C., has sold to the Bank of Montreal \$65,000 city debenture bonds bearing 5 per cent and running twenty years at 98½. The city bought the plant and franchise of the Nelson Electric Co. for \$35,000 each and now owns the light and water systems, which will net \$18,000 a year.

—Prospectors between Copper river and Cook's inlet, Alaska, have abandoned search for gold and are locating coal claims. Lignite is found. Near Graham's bay W. A. Moore found a deserted coal mine that had evidently been worked by Russians before Alaska was ceded to the United States.

—Surveyors are locating the line of the Port Angeles & Eastern railway. It is calculated to have the line in operation from Port Angeles, Wash., to Discovery Bay, and connect with Victoria, B. C., by ferry service, early next summer. The company building the road is composed of Chicago and New York capitalists.

—The Great Northern's new trainmen's schedules went into effect August 1st. Work train conductors' wages have been advanced from \$80 to \$90, and work train brakemen's wages have been advanced from \$60 to \$65. Otherwise the scale is unchanged. The new schedule is really an interpretation of conditions applying to overtime above ten hours, which are uniformly the same on all divisions.

—One result of the present unprecedented dry year in California will be the taking care of water in the Sierras. Water has been so cheap in some parts of the State in the past that none have placed a proper value upon it. It is a time like this that teaches people what

a living stream is worth. The canyons of the Sierras furnish every convenience for storage and all that is required is the placing of dams therein.

—Two Valparaiso corporations, the Pacific Steam Navigation Co. and the South American Steamship Co., are preparing to establish a joint line from Panama north to San Francisco and way points. Their representatives have recently closed a deal with the Nicaraguan government by which they will have a joint line from Panama north to the ports of Corinto, San Juan del Sur and Ocos, the latter being in Guatemala.

—The San Francisco and North Pacific Railway Co. has decided to guarantee 5 per cent interest annually on the bonds to be issued to the California Northwestern Railway Co. for the construction of a line that will be practically an extension of the first named road. The bonds on which interest will be guaranteed will not exceed \$2,000,000, or \$35,000 per mile, for a road sixty miles long. The proposed road will run north from Ukiah, Cal.

—The California Board of Equalization, comparing county assessors' figures, finds that there has been a general falling off of values, except in the mountain counties, these latter having, as a rule, slightly increased their rolls. This is accounted for by the fact that in the mountain counties there has been a considerable development of mines, while in the valley counties there has been a shrinkage in values due to the protracted drought, which caused a shortage of crops.

—Santa Barbara reports striking a rich flow of petroleum at Summerland, Cal. The well was sunk beneath the ocean bed from a platform which runs out on the beach. The new well struck a flow from oil sand at a depth of 325 feet and the oil flows to the surface. There are other wells at Summerland, but they require pumping. This new well of Mr. Treadwell's overflows the pipes and runs directly into the tanks. The well is believed to have tapped the "mother lode" of oil.

—For forty years the officials of the Hudson Bay Trading Co. have been aware of the existence of gold in large quantities in the Klondike. But in the fear of rush of people in that country, as has been going on in the past year, all the employees of the company were positively forbidden to divulge their knowledge of the mineral wealth of the country. It was not that the Hudson Bay Co. had any designs on the gold fields that they enforced this silence. The thing they stood in fear of was that any great influx of men would frighten the fur-bearing animals from their usual haunts. And this is just what has occurred during recent seasons.

—In last week's issue were given some relative figures of cost twenty-five years ago and to-day. The same reduction is noticeable in other lines. At the close of the Civil War a reaper now selling for \$75 cost \$120; a steel plow now costing \$12 sold for \$26; a potato digger now costing \$7 sold for \$25; grain scythes now costing \$9 a dozen cost \$20; binders now costing \$130 cost \$400; mowing machines now costing \$50 cost \$110. As this process of reduction has been going on, the product of American factories in the line of agricultural implements has been generally extended and vastly improved, so that the United States is now not only at the head of all other countries, but so far at the head of all other countries that there has practically ceased to be any serious competition except in respect to the supplies sold by certain European countries to their colonies.

—Considerable money has been spent for government troops' subsistence at the military camp in San Francisco. During July 1996 men were fed. These soldiers cost Uncle Sam an average per man for feeding \$4 63 that month. Following are the items of the food bill:

| Articles. | Value. |
|------------------------------|----------|
| Beef, 251,056 lbs. | \$15,313 |
| Bacon, 65,329 lbs. | 8,153 |
| Flour, 338,644 lbs. | 6,827 |
| Baking powder, 11,614 lbs. | 3,374 |
| Beans, 43,552 lbs. | 980 |
| Potatoes, 232,280 lbs. | 1,370 |
| Onions, 58,070 lbs. | 231 |
| Coffee, roasted, 23,228 lbs. | 3,600 |
| Sugar, 43,552 lbs. | 2,169 |
| Vinegar, 304 gals. | 438 |
| Salt, 11,614 lbs. | 52 |
| Pepper, 725 lbs. | 160 |
| Soap, 11,614 lbs. | 359 |
| Candles, 4355 lbs. | 392 |
| Total | \$43,416 |

—The shingle output of the mills at New Whatcom, Wash., is estimated at 400,000 per day.

—Chicago reports that during the week contracts were let there looking to supplying Tacoma and Seattle, Wash., with electric light and power. The Snoqualmie Falls Power Co. proposes to push the project to a successful completion. Snoqualmie Falls is twenty-two miles from Seattle and about the same distance from Tacoma, in air line, and has an unbroken vertical fall of 270 feet. The flow of the river is theoretically figured to equal 3000 H. P. at low water, and the plan of installation is such that at a small additional expense for dams and reservoirs, the entire drainage from the snow fields of the Snoqualmie watershed of 1000 square miles will be available, making over 100,000 H. P. available whenever the business of the adjacent cities may demand it. The power house is to be hewn out of the solid rock 250 feet beneath the crest of the fall, where the immense water wheels will connect direct with generators, from which the electricity is to be transmitted by wire to Seattle and Tacoma.

—Lyman F. Cooley, after a visit East for a conference in New York with the representatives of the Maritime Canal Co., owners of all the rights and concessions along the proposed route of the Nicaragua canal, believes the Government will construct the great waterway in preference to letting the contract to

separate companies or corporations. Mr. Cooley says that on this point the complexion of the Nicaragua canal matter has been changed perceptibly since last winter, when he, with a party of engineers, looked over the ground of the enterprise. On being shown a dispatch from Washington stating that Admiral Walker, of the canal company, had received a number of reports, indicating that the cost would be much less than heretofore estimated, Mr. Cooley presented a list of recent discoveries, which he believes are responsible for Admiral Walker's opinions. The gist of these are: Six miles of dredging in the lower end of Lake Nicaragua; non-existence of rock in San Juan river to Toro rapids; good foundation for immense dam at Ochoa; favorable conditions for embankments at San Francisco basin; new site for dam at Tanbor Grande. According to the estimate of the formulator, a saving of several millions of dollars is expected in these items. The expense incurred by the Government in war and the rapidly developing indications that the Nicaragua canal cannot only be constructed more cheaply than at first imagined, but ought to be built by Uncle Sam himself, are conspiring, he intimated, to assure the waterway between the Atlantic and Pacific within a few years. "President McKinley," said Mr. Cooley, "and many of the leading members of Congress now appreciate more than ever before the supreme importance of the canal to this country. Senator Morgan said to me not long ago that the annexation of Hawaii practically clears up the question of immediate necessity for the Nicaragua canal. It is a question, however, whether or not Congress will be able to pass the proposed laws or take the proper action at the short session in the fall to enable the work to be begun at an early date. The construction of the waterway will not be a tremendous undertaking, though it may take seven years to complete it. The Maritime Canal Co. asks for \$11,500,000 from the Government to relinquish all its rights and concessions. The company, it is understood, will take \$7,000,000 in the stock of a new company that the Government might form and \$4,500,000 from the Government to validate its bonds. The company bought out all the concessions of the old Nicaragua association, which is said to have expended something like \$6,000,000. The Maritime Canal Co. was then organized and it has spent \$2,000,000 in Nicaragua on the canal, but has to quit work. The company is perfectly right when it says that no private corporation could be expected to take up the canal project now since Congress has put its hand in the matter and when there is a strong likelihood of the Government building the ditch itself. It is not definitely known that the commission will be ready with its report during the short session of Congress. A report may be submitted, and may cause a vast difference of views as to what course should be pursued. Senator Morgan and all other canal advocates appreciate these things, but the manifest broadening of the scope of our national policy of late has impressed every one so strongly that none can see any obstacle large enough to prevent the construction of that which will be an invaluable holding and possession of the United States in time of peace and in time of war."

Obituary.

Adolph Sutro.

Adolph Sutro died at his home in San Francisco on the 8th inst., aged 68 years. A native of Aix la Chapelle, Prussia, he came to California in '50, engaged in mercantile pursuits in San Francisco for eleven years, then went to Nevada, where the Comstock lode was beginning to attract attention. He started a custom mill at Dayton, Nevada, and rapidly made money. While there he conceived the idea of tunneling the Comstock, organized a company capitalized at \$5,000,000, and, after a series of defeats and opposition that would have dismayed a less energetic man, he succeeded in getting a bill through Congress authorizing its construction. Work began on it October 19th, '69, and it was pushed steadily for nearly nine years to completion. As the time went on it became evident that the royalty on Comstock ores would not be as fruitful a source of revenue as had been anticipated, for even twenty years ago the great lode showed signs of depletion. In '79 Sutro sold almost his entire interest in the great tunnel that bore his name, and with a fortune estimated at \$5,000,000 came to San Francisco, bought one-tenth of the city area, a portion of which fronting the ocean he proceeded to beautify and adorn. He spent great sums in turning what was a sand heap and rugged cliff into one of the handsomest gardens in the world, and in later years built what are believed to be the largest and finest baths on the continent, built and equipped an electric line of railway from the city thence, and bestowed various public bequests. In '95 he was elected Mayor of San Francisco.

He was a man of intense impulse and indomitable will; self-reliant, successful, a born fighter and would have made his mark and filled a notable place in any department of life that he had essayed to occupy. It is thought, had not his mental powers failed during the last few months, that he would have willed his great library and fine pleasure grounds to the city that had honored him and in whose welfare he had so large a part.

The mother of Herbert B. and Henry Waterman, of the Hendrie & Bolthoff Mfg. and Supply Co., died in Denver on the 31st ult. The funeral took place on the 1st inst.

Commercial Paragraphs.

ABOUT twenty-five mechanics of the Lacy Manufacturing Company of Los Angeles, Cal., have gone to San Bernardino to build an oil tank for the Santa Fe, which will have a capacity of 36,700 barrels.

Personal.

B. SMITH, Supt. Star mine, Columbia, Cal., is in San Francisco.

D. H. ANDREWS becomes Gen. Mgr. La Cigale mine, Mercur, Utah.

J. CONANT a mine operator at Scott Mountain, Cal., is in San Francisco.

J. R. THELOAN a mine operator at Amador City, Cal., is in San Francisco.

J. L. FLOOD of San Francisco is at his Allison Ranch mine, Grass Valley, Cal.

W. R. CHADBOURNE, Mgr. Lindsay mine, Maybert, Cal., is in San Francisco.

S. NEWHOUSE is expected to reach Salt Lake City, Utah, from Mexico about Aug. 15th.

C. A. BROCKINGTON, Supt. Orleans mine, Grass Valley, Cal., is at Bartlett Springs, Cal.

C. B. WINGATE, Mgr., Chloride mine, Junction City, Cal., has returned to San Francisco.

H. D. DERWIN succeeds A. Smith as Gen. Mgr. Barstow Reduction Works at Barstow, Cal.

F. J. FLETTER, Pres. Brunswick Con. M. Co., Grass Valley, Cal., has returned to San Francisco.

JUDGE SPINKS of Rossland, B. C., has appointed W. A. Carlyle receiver of the Le Roi mine.

G. FAIRFOWL has been appointed U. S. surveyor to sample and assay ores at Everett, Wash.

G. SCHMITT, managing owner National Con. mine, Redding, Cal., has returned from San Francisco.

W. J. O'MEARA of the Carissa mine, Tintic, Utah, who has been visiting in California, has returned home.

P. RYAN, Mgr. Crown Point M. Co., Park City, Utah, has returned from the East to Salt Lake City.

A. KORBEL, Pres. Texas M. Co., Nevada City, Cal., has returned to San Francisco from a trip to the mine.

W. OGILVIE has been appointed commissioner for the Yukon district of the Northwest Territory, Alaska.

W. PELLEW HARVEY has resigned the position of consulting engineer to the Associated Gold Mines of B. C., Ltd.

COMMISSIONER OF PATENTS DEUEL is in San Francisco from Washington. He expects to spend some time in California.

I. GUKER, owner Great Northern mine, Grant county, Or., will take up his permanent residence in Salt Lake City, Utah.

F. N. GUILD, professor of mineralogy in the University of Arizona, has returned home from his trip to California and British Columbia.

W. L. HONNOLD has been appointed Supt. Thorpe mine, Fourth Crossing, Cal. He will continue as Gen. Supt. California Exploration Co., Ltd.

CHAS. BUTTERS has returned from Kennet to Oakland, Cal. He has placed E. Fritz in charge of the cyanide plant he is building at Kennet, Cal.

GEO. P. THURSTON of San Francisco, Sec. Orleans M. Co., Grass Valley, Cal., has taken charge of the mine during Supt. Brockington's absence.

J. P. EVANS of the Colorado Iron Works Co., Denver, Colo., accompanied by his wife and daughter, sailed from San Francisco for Mexico last Monday.

F. B. LATHROP of Minneapolis, Minn., has returned to San Francisco from Placerville, Cal., where he has been examining mining properties with a view to purchase.

DR. KEMBALL and his Government Geological Survey party which has been operating on the upper Yellowstone, has reached Cooke City, Montana, and will devote a month to that vicinity.

THOS. J. HURLEY of the Exploration Syndicate left Silverton, Colo., for New York City last week, whence he goes to Mexico to examine mining properties. Thence he goes to London, England.

DR. H. S. PRITCHETT, Supt. U. S. Coast and Geodetic Survey, is in San Francisco, en route to the Hawaiian Islands, under direction of the Secretary of the Treasury to look after the conditions of the surveys of the islands.

WM. THOMPSON, representing the London Chamber of Mines, London, England, has arrived at Ottawa, Canada, to secure the cooperation of Canada towards the Imperial mining exhibition to be held in London next year.

Recent California Mining Incorporations.

Aurora Gravel M. Co., San Francisco; capital stock, \$27,000, subscribed, \$700; G. H. Hawes, C. E. Kelly, E. J. Mott, B. M. Wilson. Homestake M. Co., San Francisco; capital stock, \$250,000; L. W. McGlaulin, I. N. Chapman, W. Burchett, T. Pozzer, W. R. Pozzer.

Dewey G. M. Co.; capital stock \$100,000, subscribed \$500; T. F. Morse, M. D. Howell, W. L. Brown, F. S. Myrtle, S. Salomon.

Keystone D. Co., San Francisco; capital stock \$100,000, subscribed \$25; B. F. Hand, C. H. Wegener, S. Godenough, R. Garvey, R. F. Morton.

Recently Declared Mining Dividends.

Pennsylvania, Cal., 5 cents per share; payable immediately.

Grand Central, Utah, 12½ cents per share, \$31,250; payable Aug. 15.

Silver King, Utah, \$37,500; Aug. 10.

American Enterprise Abroad.

The Westinghouse Machine Company and the Westinghouse Electric and Manufacturing Company, on July 30th, invited a number of prominent engineers to their works at East Pittsburgh, to inspect some remarkable new engines and electric apparatus which are about to be shipped to England. The visitors saw three 2500 H. P. electrical generators, direct connected to three 2500 H. P. engines, which were constructed for the Metropolitan Electric Supply Company, of London.

There is a peculiar significance attached to the destination of these machines. It is no new circumstance that England sends to America for electrical apparatus, but it is a new circumstance that England sends to America for large steam engines, and this at a time when all the world is talking about the probable expansion of American trade.

The Metropolitan Electric Supply Company is the greatest electric lighting company in Europe, and their present contract with the Westinghouse interests calls for "three compound two-phase steam alternators," each consisting of an enclosed vertical compound engine with the armature of the generator coupled direct to the engine crank-shaft, the engine and generator being mounted on separate bed plates. The engines and generators are so designed that the full output can be obtained at any speed from 116 to 145 revolutions per minute, this range of speed being necessary in order to provide a variation in the frequency of the alternations, and thus enabling a supply to be given to existing transformers in London.

The engines are of the enclosed vertical compound marine type and are the most powerful engines yet made at East Pittsburgh.

The electrical apparatus built by the Westinghouse Electric and Manufacturing Company, accompanying these engines, consists of three direct connected alternating current generators, each having a nominal output of 2000 H. P. and delivering two-phase currents at a pressure of 500 volts. The armature, or the revolving element, of each generator, as before mentioned, is mounted directly on the engine shaft. There is one direct current multipolar exciter to each generator, which is arranged for direct connection to the engine shaft. This plant is to supply primarily arc and incandescent lighting to London, but a portion of the power is to be used for operating rotary transformers, which in turn supply current to direct current motors, and for charging storage batteries by the three-wire D. C. system.

The Westinghouse Machine Company has successfully built a 650 brake H. P. gas engine. This engine has three cylinders, each 25 inches in diameter, and a 30-inch stroke, and runs at 145 revolutions per minute. Its economy is very marked, resulting in the production of a brake horse power for 11 cubic feet of natural gas. This is the largest gas engine in the world, and it operates with complete success.

A Parsons steam turbine driving a 200 H. P. alternating current generator was particularly interesting to the visitors. This turbine is a somewhat new form of steam engine, although extremely old in principle. It makes use of the high velocity attained by steam in passing through an orifice from a higher pressure to a lower, and acts much in the same manner as a water turbine. The Westinghouse Machine Company have spent much time and money experimenting on this subject, and are now in a position to build Parsons turbines, which give phenomenal results as compared with ordinary steam engines.

The Parsons turbine is a similar type of engine to that fitted on a little boat named the *Turbinia*, which has lately been creating such a sensation in England by its remarkable performances. The engine consists essentially of: 1. A barrel, in the internal bore of which are fitted numerous rows of turbine blades. 2. A shaft, which revolves within the above barrel, having

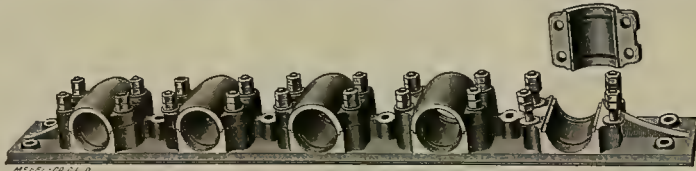
complementary blades fitted to the periphery. 3. Bearings. 4. Lubricating and governing devices.

The barrel and shaft together form a series of hundreds of complete turbines. The steam passing from one to the other expands itself and does work in each set until it arrives at the exhaust end, when it is entirely devoid of energy, by this means utilizing the steam to its utmost limit, and producing remarkably economical results.

The turbine on exhibition runs at 4700 revolutions per minute without any perceptible vibration.

The Globe Battery Stem Guide.

The Globe battery stem guide illustrated herewith is meant for a guide for the stems, and not a bearing. It is exclusively of iron, the back is one solid piece bolted to the guide beam. Any one stem can be removed without reference to the others. Among other



GLOBE BATTERY STEM GUIDE.

points of excellence it is claimed that these guides will not score or cut the stems; they are so constructed that the stems have little play in the boxes and move with no perceptible vibration, aiding in the even wear of shoes and dies and minimizing the tendency to breakage. The guide complete for a 5-stamp mill weighs 165 pounds. The Globe Iron Works, Stockton, California, U. S. A., manufacture and sell these guides and will send a catalogue, etc., to anyone interested therein.

Cutting a Cable at Manila.

As a necessary war measure, Admiral Dewey found it advisable to cut the cable from Manila to Hongkong to destroy telegraphic communication between the Philippines and Spain. Immediately after the naval battle of Cavite, Admiral Dewey proffered reasonable terms under which cable commu-

nication could be maintained, but at that time the Spanish general supposed that Admiral Camara would soon appear and hence haughtily declined any terms. Accordingly, the cable was severed.

The cutting of the Iloilo cable in Manila bay took place at 7 o'clock on the morning of May 23rd. Iloilo is an important point on the island of Panay, almost directly south of Manila. The cable connecting these points was cut by the crew of the American transport *Zafiro*, which grappled the cable in Manila bay. The accompanying illustration graphically representing the

crew at work was made from a sketch drawn by John T. McCutcheon, the *Chicago Record's* artist with Admiral Dewey's fleet. Aside from the natural interest in the event represented, the sketch possesses some historic merit. The cables of the world play an important part in war and peace. For the last two weeks the cable between New York and Madrid has been loaded with dispatches consequent upon the peace negotiations, and that desirable event has been greatly hastened thereby.

There are now twelve transatlantic cables connecting Europe with Canada and the United States, and steps have been taken to lay a cable across the Pacific from British Columbia to Australasia by way of the Fiji islands. The circle of the earth will then be completed, but not so directly as it would be by a cable from America to Japan. There are now 152,000 miles of submarine cable in round numbers, of which

10 per cent have been supplied by various governments and the rest by private enterprise. They connect into one system over 2,000,000 miles of land wires, ramifying in different countries. The cables have cost about \$200,000,000 and the land lines \$325,000,000. Telegraphy controls the commerce of the world, which has risen to nearly \$20,000,000,000 a year. It has enabled international disputes to be settled without recourse to arms, as when the British cabinet was in direct communication with the Boer leaders of the Transvaal. It brings a war that has broken out to a speedy conclusion, as in the present instance, and keeps the public informed of its hourly progress, as in the case of Egypt, where the bombardment of Alexandria was known in London a few minutes after the first shot was fired, and telegrams were dispatched from the battlefield of Suakim in the eastern Soudan, while the fight



CREW FROM AMERICAN TRANSPORT ZAFIRO CUTTING CABLE IN MANILA BAY.

was going on, and in the battle at Manila, 6000 miles away, the result being known within the hour. Above all, by putting the remotest parts of the world in contact with each other, it tends to destroy the barriers of isolation and prejudice, making antipathy give place to sympathy and hatred to kindness.

To Dissect a Piece of Coal.

M. H. Couriot suggests that the X rays may prove as efficient in showing the intimate structure or siliceous skeleton of our coals as they are in de-

fining the calcareous skeletons of animals. He states that by means of a powerful Crookes tube and a fluorescent screen it is easy to determine the purity of a fuel. Carbon in all its forms is transparent to the rays, while silica and silicates are opaque, and on placing a lump of coal between the tube and the screen, all the intimate details of the slag and clinker forming details of the fuel at once appear. M. Couriot has tested in this way anthracite coal, lignite, peat, coke and block fuel. The finest particles of silicate, though quite visible to the eye, show up at once on the screen as dark spots or bands upon a bright ground. The differences in the quality of a series of coals can be traced step by step showing at once the variations in the purity of the fuel. The conglomerate structure of block fuel is clearly exhibited, while with coke the particles of iron sulphide are indicated by black spots on the fluorescent image. Carbon is so transparent that it is unnecessary that the samples should be regular blocks, as rough lumps, the sides of which usually follow the natural planes of cleavage of the coal, serve perfectly well. M. Couriot has taken radiographs with specimens 1½ inches to 2 inches thick, the coil used having a spark 10 inches long, and the exposure being five minutes.

A Wonderful Product.

The consumption of corn for glucose in America is now over 100,000,000 bushels annually. In the glucose manufacturing process are derived not only mixing confectioner's and brewer's glucose, for which the uses are enormous and constantly becoming more varied, but among the by-products are dry starch, which serves wide domestic purposes, dextrin, used in glazing paper, for glue and mucilage and for sizing in paint works, and grape and anhydrous sugars used in the manufacture of beer, wines, cordials and vinegar. Altogether there are thirty-two different products derived from glucose manufacture.

New uses have recently been discovered for the heretofore waste cornstalks, which can be turned into valuable merchantable products, chief of which are cellulose and live stock feed.

The famous maguay plant of Mexico which supplies the peon with his hut, his hat, his fibrous clothes and shoes, his whiskey and his food, in addition to a number of other uses, is outdone in extraordinary economic versatility by the manifold uses to civilization of the corn plant.

So long as the world's visible supply of wheat continues short, the American farmers will supply Europe with high-priced wheat food. But indeed lasting are the conditions which are making of the cornfields of this country veritable mines of golden wealth.

Argentina and the Balkan States are the only districts in the world which have ever even been humbly able to dispute America's monopoly in corn production. Not only is "corn king"—but nature's territorial restrictions are such that America must forever continue to be the capital of corn's realm.

The Class of Readers Counts.

Has it ever occurred to you that the kind of circulation is of some importance? Is a circulation gotten by the forcing process, by sledge-hammer solicitation, by all sorts of subterfuges, premium schemes and gift enterprises, worth as much as a circulation founded on the intrinsic merits of the reading matter of the publication—a circulation that has grown of itself?—H. J. B., in Advertising Experience.

Mining Summary.

CALIFORNIA.

Amador.

Record: At the Potazuba mine, near Sutter, they have a 4-foot ledge at the 100-foot level of \$100 a ton rock. One hundred tons will be put through the mill as a test. Sinking continues at the Anita, at Jackson, and, though the rock is hard, good progress is made. A depth of 700 feet has been reached, and it is intended to go 300 feet deeper before sinking. The deal entered into last fall by which the Amador Queen No. 2 mine, at Jackson, was to become the property of Chicago capitalists, has been made, and W. N. Bardue has disposed of his interests to a company called the American Improvement Co. Money will be expended in the development of this mine. The repair work on the Zeile shaft will take all of August. Sinking will be commenced in September. They are taking out rock, but the mill is not running steadily. Five stamps are dropping on rock from the Oneldama mine.

Dispatch: Owing to lack of water, operations are suspended at the Reard mine, in Pine Grove district. The shaft is 150 feet deep. F. B. Livingstone is opening the old Telurium mine. The shaft, which was sunk years ago, is down 300 feet. The Kennedy Co. has felt the effects of a scarcity of water. Supt. Parks is apprehensive that the mill will be obliged to remain idle, or partly so, quite often during the remainder of the season. One day last week he was obliged to hang up twenty stamps.

Butte.

March & Co. are developing a mining property on Butte creek, in the Centerville district. They have opened a cut 400 feet in length, put in a 10-foot water wheel, which hoists the water for sluicing.

A gravel mine is soon to be opened near Lovelock. M. Wright of Nevada county has been examining the property for San Francisco people and hopes to begin work shortly.

West & Cummings, near Lovelock, have completed a ditch and 2500-foot pipe line, and have obtained a permit to hydraulic. They will work on 200 acres of gravel which yielded fair pay in prospecting.

Calaveras.

The Cal. Expl. Co. has bonded the Thorpe mine, at Fourth Crossing, and begun work. The Expl. Co. pays \$25,000 cash, and \$200,000 within a year. They begin within thirty days a two-compartment shaft 600 feet deep, and a second shaft in accordance with the laws of California, and the erection of a 30-stamp mill. On completion of mill and 600-foot shaft, reducing of ores shall begin. Should second party elect to defer second payment two years, they must sink 400 feet in 600-foot shaft at rate of 100 feet in six months.

El Dorado.

(Special Correspondence).—The Poverty Point mine near Placerville is pushing development on the tunnel.

The Gentle Annie mine is opening up some good ore bodies.

The Hall Consolidated has an extension on its bond and work will be pushed.

The Gold Bug M. Co. is working on the Ida Mitchell lode. Cleaning and retimbering the old shaft and tunnel is finished. The company has bought four acres, additional to the two mines, upon which a hoist and shaft house will be built.

Work on the electric power plant and new mill at the Griffith, at Diamond, is progressing. Electric power will be supplied by the plant projected by J. J. Crawford.

The Larkin is sinking the shaft from the 300 level and is in a good ore body.

E. W. Chapman is spending money on machinery in the development of the Gold Note and Philadelphia properties. At Omo Ranch he put in a fine plant.

E. A. Stent, it is stated here, has bought the Lemmon property near Placerville.

The Diamond property is producing good ore in its development. A thorough test to depth is to be made of this mother lode property. Placerville, August 9th, '98.

Near Fairplay the Uncle Sam mine has two shifts employed and is meeting with success. At the Sig Gulch mines men are doing development work preparatory to winter operations. The river claims are ceasing work until autumn for want of water for sluicing purposes.

At the Taylor mine near Garden Valley six cyanide tanks are being added to the fourteen now in operation. The Gentle Annie mine near Placerville has closed down for lack of water. It is thought work will be resumed in four weeks when the demand for water for irrigating purposes will have ceased. Preparations are being made for resumption of work at the Unity mine in the Webber Creek district.

At the Vandalia mine near Shingle Springs they are working twenty tons of ore a day by the cyanide process. At the Larkin mine, Diamond Springs, the mill has ceased crushing because of scarcity of water, but development work continues. Richardson & Klepper are hauling ore from the Alta Vista mine near Grate Hill to the custom mill in Placerville. At the Crown Point mine, Diamond district, the tunnel is 500 feet, sinking has resumed.

Kern.

J. M. Waugaman has sold his mines on Greenhorn mountain to G. A. Bobrick for \$45,000. The mines are the Mayflower, Rose and Plymouth.

A mill run of four tons of ore from the Gold Coin mine at Randsburg went \$208 per ton. In the Black Hawk a 12-inch ledge was uncovered on the 70-foot level. A good discovery is reported from the O. K. mine. A

mill run of twenty-five tons of ore is being made from the Golden Rule mine. Twenty-one tons of ore from the Sunshine mine at Johannesburg, treated at the reduction works, yielded \$2400.

The latest discovery at Randsburg was an ore body in the Little Butte shaft, the deepest in the camp, at a depth of 480 feet, carrying \$15 in free milling gold and \$90 in the sulphurets to the ton. The Wedge mine produced \$30,000 and the Butte \$45,000 after their ore bodies were said by experts to be exhausted.

The Golden Rule mine at Johannesburg is shipping ore to both Eureka and Red Dog mills. Machinery and tanks have arrived for the cyanide plant at Garlock. The plant will have a capacity of sixty tons per day and it will take about a year to clean up the tailings at Garlock.

Forty tons of rock from the Norvell mine, in the State range, are being crushed in Garlock from which good results are expected.

Randsburg Miner: The Yellow Aster M. Co. cleaned up \$35,370 at the Barstow mill last week, the result of the last half of July. In the middle of the month they cleaned up \$28,000, making with the last clean-up \$63,370 for the month. This is the largest run ever made in one month by the company. They are now working in a solid ore body in the Tribby mine, more than 40 feet thick, and milling every pound of it. The last clean-up was principally from Tribby ore and averaged, as near as they could estimate it, \$43 per ton. Their July dividend will be \$25,000, and this notwithstanding some heavy expenditures in water development. Their new pump, engine and boiler is on the way, and as soon as they are in place water development will again be carried forward. The pump has a capacity of 100,000 gallons in ten hours. The pipe line is 5-inch and the calculation now is to put up a 40-stamp mill, instead of thirty, as first contemplated. The pumping plant, wells, pipe line and tanks involve an expenditure of \$70,000. Work on the tank at the wells is going on. The ore being taken out is about 350 feet from the surface perpendicularly. The new Hercules tunnel, now in 800 feet, will strike the vein at a perpendicular depth of 600 feet.

Mono.

The Standard Con. M. Co., which absorbed the old Bodie Con., Bulwer Con., Mono and Summit mines, has no intention of reducing the par value of its capital stock. Nearly all the stock is held for investment purposes in the East, and as very little is changing hands in the market, the war tax on transfers cuts but a small figure. The Standard Con. will pay a dividend of 10 cents per share next Thursday.

The Standard Consolidated Mining Co. has made a bullion shipment valued at \$23,000, the cleanup on the July account.

Napa.

St. Helena Sentinel: During July the following were the quicksilver shipments from mines in this locality: Napa, 600 flasks; Etna, 300; Great Western, 146; Vallejo, 23; total, 1069. This is an increase of 168 flasks over the June shipment.

Nevada.

The hoisting works of the Granite Hill M. Co., Grass Valley, were destroyed by fire last week. Supt. Phillips says they will be immediately rebuilt.

At the Odin mine near Nevada City the water has been turned on and the new machinery started for sinking to bedrock. Improvements which will cost over \$85,000 are being made by the North Star M. Co. at the Massachusetts Hill power house near Grass Valley. The foundations are being laid and thirty men are doing the concrete and masonry work. It is proposed that the power necessary to run the Massachusetts Hill, Central Star and North Star mines shall be generated at this point, the motive power to be compressed air. Two compressors will be installed, to be operated by a water wheel 33 feet 6 inches in diameter. A large dynamo will also be placed which will be run by a water wheel 7 feet in diameter. Work at Bedrock tunnel of the Malakoff mine at North Bloomfield, which is being run for drift purposes, is progressing.

Telegraph: At a meeting of the board of directors of the Pennsylvania M. Co., Grass Valley, enlarging the mill was discussed and it is probable that ten more stamps will be added. Weissbein Bros. & Co. have bought from W. H. Martin the Federal Loan mine near Nevada City for \$8000.

Transcript: P. Tautphaus and the other owners of the Constitution and Great Western mines near Nevada City are making arrangements to start work. It is expected that the two ledges will come together at a depth of 300 feet. A chlorination plant is talked of in Grass Valley, to cost \$25,000.

Union: Supt. Shockley reports progress at the Phoenix mine, Nevada City. It is expected that the new 10-stamp mill will be in operation September 1st, when the several hundred tons of ore on the dump will be crushed. The building over the mill is completed and most of the heavy timbers are in place. Some of the machinery has been put in. The building will be painted inside and out and there will not be a more presentable looking mill in the county when it is completed. Putting in the new 10-inch plunger pump is going on. A strong ledge is shown and the Phoenix bids fair to become one of the leading mines hereabouts.

Transcript: The Providence mine, Nevada City, is said to be looking better than ever.

Herald: The Manzanita Mining Co., at Nevada City, have wound up their affairs and business. A dividend for a trifle less than 7 cents per share was declared.

Riverside.

Los Angeles Record: The Good Hope mine, between Riverside and Elsinore, several years

ago, was sold to an English syndicate for half a million dollars and \$100,000 paid down. A scientific gentleman in geological matters was sent from London as Supt., and everything looked well. Suddenly the supply of gold-bearing rock began to decrease and the shareholders brought suit to get back their money, on the ground that misrepresentation had been resorted to in the sale of the property. The defense contended that the purchasers had sent experts of their own. Recently the workmen ran into an ore body 50 feet wide at a depth of 600 feet. The rock is low grade, but said to be rich enough to crush at a profit, while the extent of the deposit guarantees that it will not soon be exhausted.

San Bernardino.

The capacity of the Barstow mill is 150 tons a day, and it is said they could handle more ore at the mill than they are getting. The Yellow Aster Co. of Randsburg utilize thirty out of the fifty stamps.

At Dale there are few men taking out ore, nor will there be many before September. There is no one working in the placers. It is estimated that there have been \$25,000 taken out of the placers in fifteen months; they will be worked this fall.

Shasta.

F. Aplin, in the Mad Mule mine, at Whiskeytown, in a contact of porphyry and manganese, took out \$1300 of honey-combed gold, free from quartz, of which several pieces were large as hen's eggs.

At Bragdon miners on the river are cleaning up on their first run. The river is low. Rogers & Thresher are sinking on their quartz prospect with success. M. Van Ness is putting in an arrastra mill, with the intention of working the accumulated tailings of his mine, and then the quartz as it is produced.

Siskiyou.

The Hazel mine at Cottonwood, operated by Jilison & Co., continues to pay; the 13-stamp mill is supplied with plenty of water. The ledge averages 3 feet in width.

Capt. Roberts has just finished a 10-stamp mill on the California Queen, two miles west of Hornbrook, and is running on high grade ore. He employs fifty-five men.

The Brown & Reeder quartz mine, in Fool's Paradise district, was started up by J. F. Boyle, the receiver appointed by the court, pending litigation. The river miners on the Klamath are crowding workday and night and have been taking out considerable gold.

The Eastern Co. prospecting Yreka creek basin from Shasta river to Yreka, has begun sinking prospect holes on the McNulty place. It will probably take three months to complete the prospecting in the basin bonded and purchased.

The Morrison & Coburn mill in Quartz Valley has started up. Jones & Daniels, at Quartz Valley, made a clean-up of fifty pounds of bullion.

Trinity.

G. L. Carr has driven a tunnel 845 feet in his Boulder property near Cinnabar. J. Conant is pushing work in his property at Scott Mountain. He has a ledge over 7 feet wide that gives encouraging prospects.

The Strode mine, near Trinity Center, is running only a day shift to keep the 5-stamp mill in operation. P. Holland is making his clean-up on Coffee much earlier than usual because of the scarcity of water. The Wedge mine is working a ton of ore from a 4-foot ledge every twenty-four hours. The property is owned by Truax & Co. They intend putting in a 5 or 10 stamp mill this autumn. Good ore has been struck in the lower levels of the Chloride-Bailey mine on Canyon creek. About seventy men are employed. R. A. Skinner has bought from the Niagara M. Co. the Yellowstone group of mines in the East Fork mining district.

Tuolumne.

Independent: The Longfellow mine at Big Oak Flat has paid all indebtedness, will build new hoisting works and put everything in shape for work. The Moody is putting in a 5-stamp mill. Mt. Jefferson at Groveland has its hoist completed and is pushing work. Tuolumne river is about all taken up in placer claims and are being worked with varying success.

Tuba.

At Brown's Valley work on Pennsylvania mine is progressing. The water is out 400 feet, and Mgr. Campbell thinks, if his pumps work well, he may see the bottom of the shaft in about ten days, when stoping and milling will begin.

NEVADA.

For the first time in nineteen months the Eureka Consolidated Mining Co. of Eureka district, Nevada, has made an assessment. This time a 20-cent one. The Eureka Con. has paid a total of \$5,112,500 in dividends and has levied \$575,000 in assessments. The Erye, at Tuscarora, marketed a load of ore which gave four and one-half ounces gold and ninety-five ounces silver per ton; it is the first from that locality. The property is an old one that was idle for several years.

In the Sulphur mines, near Lovelock, about eighty men are at work. The twelve-mule teams are hauling sulphur at Humboldt delivering twelve to fifteen tons per day. It takes four days for teams to make the round trip from the works. About \$5000 a month is being distributed for labor and supplies. It is said that operations are being planned on a more extensive scale. The ore carries about 45 per cent sulphur.

The Silver State of the 8th says: "The Peck concentrating plant at Empire, Ormsby county, of which so much was expected, was sold for taxes this morning. It is assessed at \$5000."

OREGON.

The Elkhorn M. & M. Co., F. Pfau, Mgr., is doing development work at Elkhorn moun-

tain. A crosscut tunnel is expected to be run 1500 feet.

Work on a large scale has resumed at the Braden mine near Jacksonville. Browning & Hannum of the Greenbank mine near Grants Pass cleaned up \$3700 from thirty-two tons of ore. On the Applegate property, bought by G. E. Morse & Co. of San Francisco, work has begun. Jones & Co. will have their stamp mill at Glendale running by Sept. 1st. R. W. Jones is in charge of the properties. A. M. Jordan of Cripple Creek has bonded the Homestake mine near Woodville and will put twenty men at work. In the Denny group of mines on the Baisley-Elkhorn mountains, eastern Oregon, a good 4-foot body of ore has been found. At Baker City the Beaver M. Co. purchased from Berry & Bartlett the Phoenix mine for \$20,000. The Sugar Pine mine near Grants Pass has been bonded to E. F. Wallace & Co. for \$4000. They have begun work. W. K. Rogers of the Oregon Bonanza mine received a return from the Selby Smelting Co. on 116½ pounds of ore, \$155.32. He has seventy sacks more of the same kind of ore, which is of a refractory nature, and the gold can be secured only through a smelting process.

The Sugar Pine quartz mine at Grants Pass is showing well. The company will drive an extensive tunnel to tap the ledge 1000 feet below the surface.

The Lance M. Co., near Jacksonville, is putting in a pumping plant to utilize the waters of Rogue river. The enterprise promises to be successful, despite the obstacles it has met.

Kubli Bros. started their stamp mill at the Golden Standard mine, near Ashland. They expect to crush four tons per day.

Baker City Democrat: The Golconda at Bourne has fifty men at work. The La Bellevue has the same number. All over the Robinson section there are many miners at work. The Collateral is putting on forty men. At the Eagleton, where the Bementa have started extensive operations, fifty men will be employed. There are employed at the Virtue and Collateral mines about thirty miners. Mgr. Geiser of the Bonanza mine deposited several thousand dollars in gold bricks at the bank last week for shipment to the U. S. Mint.

Courier: Last week W. H. Brevoort of New York, Prest. of the Victor M. Co. of Cripple Creek, Colo., W. J. Cartan of New York and F. T. Sutherland of San Francisco bonded the Browning & Hannum mine on Grave creek, near Grants Pass, for sixty days for \$100,000. Work of development will begin at once.

WASHINGTON.

In the Old Dominion mine, at Colville, six men are clearing out and retimbering the 4000-foot tunnel, preparatory to resuming work on the mine on an extensive scale. Fifty men will be put on as soon as this preliminary work is completed. On the Butte & Boston, at Republic, the drift was extended 70 feet last month. It is in 290 feet. At Colville the Leadville mine has broken into an 8-inch vein, which assays \$43 40 in gold. At Northport, the Castle mine, at a depth of 100 feet in the shaft, came into 8 feet of ore composed of copper and galena. Only assays on silver have been taken, and those on samples of low-grade ore. These assay fifteen ounces in silver.

The Republic mine, at Republic, produced \$63,000 worth of ore in July. The shipments to the smelter were 293 tons averaging \$174 to the ton, making about \$50,900, and the product of the mill was \$12,000. The haul was eighty-five miles from Republic up to British Columbia and then down to Marcus to the railroad.

BRITISH COLUMBIA.

The Golden River Quesselle Co. of Cariboo had placed a large order for machinery with the B. C. Iron Works at Vancouver for use on the South Fork river bed and were depending on getting in the same shortly. The failure of the Iron Works Co. some weeks since has caused a delay in the procuring of the machinery, it being now on its way from San Francisco. Among the lot are three heavy engines and three boilers, hydraulic elevators and other machinery to the amount of sixty tons. After its placing, work will begin at mining the river bed.

A Victoria dispatch says considerable activity prevails in the mining industry on the west coast of Vancouver island. Fully 300 men will be employed next month in the vicinity of Alberta and Clayoquot.

From Texada island, 100 miles north of Vancouver, comes the report that W. D. Rockefeller's Everett smelter foreman is there with large gangs of men ready to open up vast deposits of iron ore and ship it to Everett, Wash. Rockefeller, it is stated, has purchased the well-known iron mines of that island, which have been lying idle for want of capital. "The mines were bought for a song, the owners not knowing who Rockefeller was."

The clearances at the Kaslo custom house for July were: Ore, gross lbs., 4,622,000; value, \$187,631; lead contents, lbs., 2,230,015; silver contents, ozs., 231,415. The Nakusp clearances were: Ore, gross lbs., 2,697,604; value, \$99,384; lead contents, lbs., 953,910; silver contents, ozs., 119,010. The ore shipments over the Kaslo & Slocan railway from July 30th to Aug. 3rd inclusive, were 230 tons.

Rosland Miner: In the struggle for the possession of the Le Roi mine between the majority and minority shareholders one of the regrettable features was the discharging by Receiver Carlyle of 170 men. This was done to stop shipments of ore to the Le Roi smelter at Northport. The receiver deemed this advisable as shipments there would send the ore outside of the jurisdiction of the courts of the province, and would place the product of the mine at the mercy of the U. S. and of the State of Washington. It was, therefore, decided not to take out any

more ore until the differences that have arisen have been passed on by the courts.

ALASKA.

The Lucky Chance mine at the head of Silver bay, which has on it a 5-stamp mill, has been bonded by the Lake Mountain M. Co. to E. O. Smith of Sitka for \$50,000. Mr. Smith will conduct active operations on the property at once.

A desperate stampede is reported from the Copper river country to the coast, the statement being made that 3000 men are making their way over the Valdes glacier and that many of them are doomed to starvation unless the United States Government sends relief promptly.

UTAH.

The Swansea of Silver City and the Erie of Bingham each made a shipment last week of high-grade ore. The Geyser-Marion of Mercur shipped 700 pounds of auro-cyanides last week. The leaching of ore has begun at the Golden Star, near Bingham, and the shipment of cyanides will commence early in September. In the Geyser-Marion a vein has been opened 10 feet in thickness carrying fair values, though most of the ore treated at present comes from the old Marion workings, in which the values run \$8 a ton. Sixty-five men are employed and the amount of ore treated is 150 tons a day. Bingham shipped 3319 tons of ore in July. Silver City ore shipments last week were twenty-two carloads. Since the concentrating mill started in August, '97, on the Old Jordan and Galena at Bingham little development work has been done. The mill has run steadily, treating 125 tons daily. From near Marysville thirty tons of antimony have been shipped to Jersey City, N. J.

IDAHO.

At the Twin Springs Placer Co.'s mine, near Boise, Mgr. Anderson early next week will celebrate the completion of the big siphon, in presence of invited guests, by uniting the line with an eleven-ounce gold rivet. Caswell Bros. have brought to Warren ten pounds of gold, which they took out of a porphyry formation at Thunder mountain in seventeen days.

At Halley the Tyrannis mine has shipped five carloads of ore this season. The mill makes two to three tons of concentrates a day. The crosscut on the 300 level of the Golden Star mine has cut the vein and exposed 4 feet of good ore.

Linderman & Martin made a cleanup in their placer claim near Boise amounting to \$1200 from a hole 30 feet square.

Statesman: The Ironsides mine near Boise shipped 1200 tons of ore, giving a gross return of \$43,000. In addition to this 1800 tons have been treated in Boise, the average assay value of which was \$30 a ton. There are 2000 tons of ore on the dump that will average \$20 a ton. Over 200 assays from the Ironsides, taken from all parts of the mine, the good ore with the bad, gave an average of \$30 a ton. The company has been confining its operations for some time to development, and a good property is being opened up. The Ironsides ledge is large and the paystreak averages 2 1/2 to 7 feet in width. The property is owned by the Ironsides G. M. & M. Co., of which Mrs. H. Adams of Boise is president. The Trade Dollar mine at Silver City is said to have paid \$500,000 dividends the past year. The output has been heavy and the ore has yielded good returns.

Avantech: The Empire mine at Silver City, bonded to Senator Pettigrew and others, is being opened for examination. The mine was unwatered to the sixth level two weeks ago and samples taken. The assays were of such a nature that the prospective purchasers have ordered the mine unwatered to the bottom, and will also do some drifting in the eighth level before securing further and final reports. The property is said to show favorably and the assays ran higher than expected. The test run of 300 tons of Poorman ore has been completed and has proved satisfactory to the management. The process used was electro-cyanide. The ore is free milling, over 60 per cent of the gold being caught before reaching the vat. It is probable that the Poorman Co. will equip its mill with amalgamating machinery as soon as the developments of the mine call for continuous milling facilities. At the Black Jack the shaft is down 250 feet and the crosscuts have tapped two ledges. The mill is working steadily on good ore and the output is large. Over eighty men are employed.

MONTANA.

Near Big Timber, P. Nelson began work on a coal mine last year and furnished some coal to the citizens of Big Timber. The vein was about 2 feet thick. Since then he has cross-sectioned the main tunnel in two places and cut a vein about 7 feet thick.

The Liverpool mine at Clancy has passed the 500-foot mark. It is the intention to sink to 600 feet. The ore continues strong and the quality good. In reopening the Moulton mine, at Rock Creek, 1400 gallons of water are hoisted every sixty-five seconds in tanks, each tank holding 700 gallons, requiring sixty-five seconds for a round trip, one being lowered and filled while the other is hoisted. It is expected to take three weeks to unwater the mine, after which thirty men will be employed.

The Bimetallic mill at Philipsburg has been running fifty stamps since June, and last week twenty additional stamps began to drop. There are now about 300 men at work at the mines and in the mill.

Butte Miner: The Washoe Co., at Butte, is said to have a bond on the Arctic lead, which is owned mainly by Connell & Murray. A shaft is to go down 500 feet by the terms of the bond, and the price to be paid in case it is taken up is \$250,000. The Arctic lead, which extends along in part between Granite and Quartz streets, was located on top of the original townsite, and the surface rights were sold reasonably, so that no contest was made,

though there was some doubt about the validity of the claim to the surface ground. The transaction has not been made direct to the Washoe Co., but it is stated on good authority that the third party is acting for the Daly-Haggin corporation. The Parrot Co. is sinking a three-compartment shaft on the Bellona claim, adjoining the Moonlight, of the Washoe Co. The shaft is going down on what is known as the Moonlight vein, and is over 300 feet deep. The Parrot Co. is still developing the Little Minah, with good indications of making a producer of it.

SOUTH DAKOTA.

Near Lead, A. Glower is working a property that produces iron and copper, from which twenty tons a day are shipped to the smelter. The ore carries enough iron and copper to make it of value as a flux, for which \$2.50 a ton and the freight is paid. The ore carries an average of \$2 in gold, which is saved at the smelter, and a small per cent of silver.

Pioneer Times: The D. & D. smelter at Deadwood is running two furnaces, handling the ore from the mines of the company and from the Buxton at Terry and the American Express in Blacktail gulch. No other custom ore is received until the building has been finished. The Detroit & Deadwood Co., purchaser of P. H. Smith's claims at Two Bit, has three shifts at work and sinking is progressing rapidly. The Garden City chlorination plant has been leased to Alexander & Dotson, who are converting it into a cyanide plant. The lease is for one year.

WYOMING.

The Doane mine, at Battle Lake, is a chimney of copper ore with a shaft 175 feet deep. It has several hundred tons of ore on the dump giving from 15 to 20 per cent copper and \$4 in gold.

ONTARIO.

The Hidden Treasure mine at Sturgeon Falls has been sold by the Gehl Bros. and a cash payment made of \$10,000. The Emperor mine is employing twenty-five men and has a good ore body. The shaft in the Golden Star at Mine Center has reached 300 feet and is in fair grade ore.

NEW MEXICO.

A streak of ore running 100 ounces of silver and between 60 and 75 per cent lead has been uncovered by Kresge & MacKley near Hanover. J. & P. Welsh have made a strike of copper-iron at Hanover that runs high in copper. The placer grounds near White Oaks are estimated to cover about 4000 acres and the pay dirt will run on an average about 12 feet in depth. The difficulty heretofore experienced in that locality has been lack of water, which has been remedied. Water in sufficient quantity to handle 2000 cubic yards of dirt per day has been secured twenty miles away at the Capitan mountains, the discharge being 500 gallons per minute.

The Cochiti G. M. Co. at Bland is finishing a complete reduction plant. The plant has a daily capacity of 125 tons, which can be increased to 200 if necessary. About 500 men are at present employed in the mines and mills. The crushers have already been started and the whole plant will be in full operation this week.

COLORADO.

In the special correspondence from Cripple Creek in the issue of July 30th, a misprint credited the group comprising the Christinas, Longfellow, Pinto, Specimen, Free Coinage, Shurtleff, Garfield-Grouse, Favorite, Pharmacist, Burns and Mountain Beauty with a monthly production from each property named of 2500 tons. That amount represents the aggregate and not the individual yield of the group of mines specified.

BOULDER COUNTY.

The Galvin group, at Quigleyville, is making a good showing. On one claim the vein is 20 feet wide and on another it is 10 feet and gives good returns. H. H. Green bought the White Crow dump of several thousand tons and will experiment on it with his new method of treatment.

CHAFFEE COUNTY.

Near Whitehorn, the Golden Eagle vein has been opened about every 100 feet for the full length of the claim, and it carries solid ore that varies in width from 1 to 3 feet and assays from \$50 up. A quantity of ore has been sacked for shipment.

GLENN CREEK COUNTY.

At Georgetown the Griffith mine shipped ninety tons of ore, producing gold and lead, which is a distinctive feature of the property.

EL PASO COUNTY.

The Half Moon mine in the Carl Johnson lease at Cripple Creek has a vein 30 feet wide, which runs \$25 a ton without sorting. It is the largest body of ore reported in the district. The latest strike in the Elkhorn was made in the fifth level, in the old Elkhorn chute. The ore runs from \$37 to \$940 per ton. It is believed to be longer than where it was opened on the 300-foot level. There are 5 feet of ore filling the drift. The output is 1500 tons per month of a good grade.

The Barnard creek section of Cripple Creek is being thoroughly prospected. One prospect has sent to the mills three wagon loads of ore that netted \$25 per load. The entire shipment was about six tons and the result will be an increased amount of development in the district. So far most of the work has been confined to prospecting. The ore chute in the Garfield Consolidated is 400 feet long, making a good body of average grade, carrying a 4-inch pay streak of high grade that shipped \$10,000. The deepest workings are only 300 feet, but it has shipped \$250,000 worth of ore. The lessees are driving ahead on the repairs and improvements night and day.

FREMONT COUNTY.

At Barehills the Galveston M. & D. Co., E. M. Lamont Gen. Mgr., has a large number of claims, one of which—the Warren—has a shaft

down 300 feet and has a 16-inch contact vein of chalcedony formation in agate and jasper quartz that gives a working value so far as tested of \$24.80 to the ton. Work on the Mayflower is progressing. The depth reached is 300 feet, and as soon as the road can be completed a steam hoist of large size will be put on the property. Their mill tests give values of \$65 in gold, silver and copper.

GILPIN COUNTY.

The Geiger mine near Central City has had pay ore from the surface, and at 100 feet depth has 5 feet of \$40 sulphides which at 150 feet has opened into a chamber of high grade ore.

The shipments of smelting ore and concentrates to the smelter for July foots up 227 cars.

Post: The Gunnell property in the Eureka mining district has a daily output of from thirty-five to fifty tons, mostly of a milling character. Many of the mines in this county are being worked on the leasing system by local pools, and some are producing splendidly. Pools are formed consisting of business and mining men to start up work anew on old and abandoned property, and this system of joint operations is becoming popular and is doing good for the county. The July shipments of ore from this county were 279 cars.

GUNNISON COUNTY.

Denver Post: At no time since 1893 has Crested Butte experienced such activity in mining as it has this summer. Many properties that have been neglected have been taken hold of by enterprising mining men and resolved into paying properties, which will result in the tonnage from this district exceeding any year since the decline in the price of silver. The Sylvanite, a mine that has produced over \$2,000,000, is yielding ore that runs 1200 ounces in silver, and is shipping regularly. The Augusta, another former producer, has commenced shipping good ore which carries a high percentage of lead.

HINSDALE COUNTY.

At Lake City a strike has been made in the Bob Ingersoll mine of tellurium that runs 8.20 ounces gold and 962.66 ounces silver per ton. The pay streak is 2 feet 6 inches wide. Two new companies have started work at Burrows Park and several smaller enterprises are opening up in the higher lands. The St. Jacobs and the George III have been heavy producers of high-grade gold and silver ore in the past, and their resuming work will give an impetus to mining in this district.

LAKE COUNTY.

In five properties in the Twin Lakes mining district 800 feet of work has been done and large bodies of \$15 ore opened. During the development one lead was cut that carried \$200 in gold and sixty ounces of silver. Shipments will commence as soon as the amount of development laid out is completed. The Iron mine of Leadville is being worked by a lessee, who is employing thirty-five men. The ore carries six ounces silver and 55 per cent iron excess, which makes it a good shipping ore. They are also shipping to the smelters a fair grade of lead sulphides and carbonates. From the first 25 feet sunk on the Ruby claim, Red Mountain district, thirty tons of smelting ore shipped netted \$460 per ton. Seven men are sinking the shaft and running a crosscut tunnel which in 30 feet more will catch the vein at 110 feet surface depth. The vein is 180 feet wide.

The Bull Hill group on Mt. Elbert is opened by over 1000 feet of shafts, tunnel and drift. One shaft at 100 feet shows 3 feet of ore which assays \$42 per ton.

News Reporter: J. R. Curley, Supt. Iron silver mine at Leadville, says he is hoisting as much water every day as the down-town mines will be required to hoist and that he is lowering the water an inch an hour. He expects to put men at work in the mine in a week; and, as he is pumping water for the Louisville, Ruby and other mines in that district, they will probably be able to start operations about the same time. It is understood that the Pumping Association has assessed itself \$40,000. This will increase the fund to about \$90,000. There seem to be no obstacles in the way of pumping now, and the probabilities are that it will begin at once.

The Silver Standard M. Co. has made a five-year lease of its ground in Iowa gulch to Milwaukee capitalists, and it is understood that operations will commence in a short time. The Silver Standard group consists of six claims—the Leadville, Silver Standard, Henry M. Teller, Free Coinage, Wolcott and Detroit—the total area of the group being about sixty acres.

OURAY COUNTY.

A body of milling ore varying from 8 to 28 feet in width is encountered in the Silver Ledge mine, Ouray, from which forty tons per day is taken to the mill. Forty-five men are working in the mine and mill. In the 355-foot level a streak of tellurium was struck and a carload shipped to the smelter.

The Fowler smelter, Ouray, is running night and day, employing thirty-two men and turning out 100 tons of ore a day.

SAN JUAN COUNTY.

The Bonne Homme property near Burrows Park has shipped ten cars of sorted ore this season and before the season ends there will be that many more shipped. There is enough ore in sight at present to warrant the management to put in a concentrator.

Seven tons of cobblings from the ore of the Robert Bonner at Silverton were milled and plated over seven ounces gold per ton, besides seven sacks of concentrates, which sampled seventy-six ounces silver and two and one-half ounces gold.

SAN MIGUEL COUNTY.

Twenty-five cars of ore have been shipped from the San Bernardo mine at San Bernardo this year. The product runs principally in silver and lead, some cars sent to the smelters

yielding \$1800 per car. It is worked entirely by leasers and is owned in London. The Gipsy Queen, which has been idle for years, has passed into the hands of lessees, who have had thorough tests made of the ore which was found to be high-grade silver with fair values in gold.

ARIZONA.

Senator Dorsey, en route from San Francisco to New York, reports the sale of the Harris group of gold mines in the Harqua Hala district to the Del Monte M. Co., who will at once erect extensive machinery and operate the mines on a large scale.

Work on the Diamond S. mine at Crown King is progressing. Several shipments have been made of high-grade ore, the smelter receipts showing 1600 ounces silver and considerable gold. J. W. Searles is developing the property.

The plant of the Mammoth G. M. Co. at Mammoth is in operation on 200 tons of tailings. There are twenty men employed in the work. Fifty stamps are dropping on ore and prosperity is manifest. The payroll of the Copper Queen Co. at Bisbee is above the 1150 mark, including store and railway forces.

The Cochise Copper Co., which has thirteen claims in Dubecker canyon, will do some active work before October. The Bessemer, Alta and Atlas mining claims in Castle Creek district have been deeded to the Bessemer Copper Co. by J. W. Norton. E. E. Greenwood worked twenty-two tons of ore recently from the Sunrise at Placitas, from which the returns were seventy-nine ounces in gold, or an average of \$50 per ton. A bar of bullion was brought to the bank at Tucson last week by the Mammoth M. Co. valued at \$8000.

The bridge across the Gila river is finished, and there now remain but thirty miles of road to be built to Globe City. The Old Dominion mine is expected to be producing copper by Nov. 1st, and some think it should produce 8,000,000 pounds of copper the first year.

In the Big Bug district the old Trilite mine was sold for \$5000 cash; Comer & Sons sold a mine to a Philadelphia company for \$15,000, and the Shelton group is sold to a Denver company for \$40,000.

The Franco-American mines near Tucson are showing a large body of high-grade shipping ore of sulphide carrying copper, gold, silver and lead. The development of the Louise of the same company has a strong vein of sulphides. There are about 3000 or 4000 tons of fine grade ore on the dumps which will not stand transportation as far as Tucson, and which will mill a very handsome profit, which means that the company will erect a mill very soon. The president is Karl Miller.

The Tres Amigos mines of Oro Blanco were sold to Peoria, Illinois, people for \$50,000, of which a good part was cash. The group comprises three claims, the Tres Amigos, Caniada and San Juan. The properties are gold and are promising. An average taken from nine different workings gave a return of \$41.20 gold. All of the ore will run \$9 to \$39 per ton. There has been 500 feet of development at the mine. A mill will be erected at once and the mines incorporated. A large force will be put to work. A. P. Essen is the Supt.

Progress is satisfactory at the Table Mountain, Pima county, copper camp. There are about 150,000 tons of ore on the dump, including 20,000 tons of high-grade. A large stamp mill for the reduction of gold ore will be erected shortly. The Azurite Co., operating in Pima county, has purchased the Apache smelting plant, which will be moved to the company's ground, where the dump holds about 4000 tons of high-grade ore. Work on the Planet-Saturn mines in Pinal's gulch, Yavapai county, which was suspended on account of the flooding of the mines, will soon be resumed. Supt. Clark has started pumping. The ore from the Grand Prize mine, in Green Valley district, Gila county, which has been shipped in concentrates, will hereafter be reduced to matte. J. C. Underwood and J. R. Grant bonded the Hidden Treasure mine on Lynx creek in Yavapai county. There is considerable prospecting going on near Bisbee and some fair ore has been found in that locality. The C. W. M. & M. Co. of Pearce ship about two cars of ore per day. They have ordered a 20-stamp mill, which will be put in as soon as possible.

Mineral Wealth: Some time this month Temple bar will have the water turned on it with great force. Mohave county expects great things from the working of these mammoth bars, and when the machinery is all in place and at work and the gold coming out the people will realize what a big thing it is. Machinery for months past has been going to Temple bar and being put in place, but placer or hydraulic mining has been a new thing in Mohave county. In addition to the advance in quartz mining in the county the success of these hydraulics will add largely to the gold output of that section.

SIBERIA.

F. W. Beasley of Miles City, Mont., and Louis Spitchet of San Francisco have returned from prospecting along the Siberian coast. They were within 100 miles of the convict mine settlement, where they met a Russian commissioner, who warned them to leave the country under the penalty of imprisonment. The officer told them the laws strictly prohibited prospecting on Russian soil. Six men, four Englishmen and two Americans, who persisted in violating the law in 1896 were arrested and sentenced to a term of imprisonment in the Siberian mines. The commissioner, explaining the manner of working the Siberian mines, said that shafts 60 or 70 feet were sunk to bedrock and the pay streak was followed by drifting. Instead of burning the frozen ground, as in the Klondike, the ground is loosened with powder and pick. One shaft has followed the pay streak down the bed of an old river to a depth of 700 feet below the surface. Most of the claims, he added, paid from 18 to 20 roubles to the man. Between 7000 and 8000 convicts are employed in the mines.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Deway, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING AUGUST 2, 1898.
 608,548.—DRILL—Columbus & Hesseltine, Creston, Wash.
 608,327.—DRESS FORM—Augusta B. Friel, Los Angeles, Cal.
 608,425.—PRESERVING FRUIT JUICES—C. Graf, Bannock, Cal.
 608,350.—KITCHEN CABINET—J. L. Heustis, Stockton, Cal.
 608,365.—VEGETABLE SLICER—C. B. Lawson, Stockton, Cal.
 608,465.—GATE—M. K. Lewis, Albany, Or.
 608,337.—BREAD CUTTER—W. Merkle, Oakland, Cal.
 608,393.—PIPE BENDING MACHINE—Parker & Gross, S. F.
 608,217.—RELIEF VALVE—J. C. Parker, S. F.
 608,218.—STEAM GENERATOR—J. C. Parker, S. F.
 608,477.—WRENCH—R. R. Parrish, Independence, Or.
 608,350.—BICYCLE—C. E. Stockford, Sulphur Creek, Cal.
 608,351.—GARMENT AND TENT—F. Terramorse, S. F.
 608,241.—BICYCLE GEAR—H. Wilbur, Ritzville, Wash.
 608,434.—BOXING GLOVE—W. G. Wood, S. F.
 2,162.—DESIGN—E. P. Buren, Santa Ana, Cal.
 NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Deway, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Deway, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BREAD CUTTING KNIFE.—Wm Merkle, Oakland, Cal. No. 608,337. Dated Aug. 2, 1898. This invention has for its object an improved device for cutting bread, cake and like articles. It consists essentially of a plurality of knives with a transverse extension bar and means for adjusting the knives with relation to each other in said bar and also for setting them at any desired angle with relation to the holding bar and locking them in position thereto. This extension bar has a handle which enables the operator to use all the knives at one time, thus enabling him to make either a vertical or diagonal cut and slice the bread or cake into as many pieces as may be desired at a single movement.

CONVERTIBLE GARMENT AND TENT.—F. Terramorse, San Francisco, Cal. No. 608,351. Dated Aug. 2, 1898. This invention relates to a device which is especially designed for the protection of soldiers, travelers and others who are liable to be exposed to the elements during the day or night. The object of the invention is to provide an article of wearing apparel which may be employed as a cloak and hood during the day, and it is so constructed that it may be spread out and set up as a shelter tent to equally protect the user from the elements at night. It is so formed that it is easily rolled into small compass for transportation when not in use. The body portion is approximately rectangular and has triangular projecting end flaps and a central opening. This opening has a hood or head-piece connected with it and a flap adapted to hang upon the back when used as a garment and to fold over and cover the opening and head-piece when it is employed as a tent. The rectangular portion may be set up by the use of supporting sticks at the ends, and the triangular end pieces will fold inwardly at each end so as to form a closure for the tent.

BICYCLES.—Charles E. Stockford, Sulphur Creek, Cal. No. 608,350. Dated Aug. 2, 1898. This invention relates to improvements in bicycles. The main frame and the wheels of the bicycle are essentially similar to those in ordinary use. The propelling device consists of a clutch mechanism fixed to the sprocket wheel shaft and arms extend from the clutch casings and are provided with sockets into which other arms are adjustably secured so as to lengthen or shorten the levers by which the clutches are actuated. The outer ends of these levers are connected by links with bars which extend upwardly at the front of the machine and have handles which are grasped by the rider. These parallel bars are fulcrumed to the lower front bar of the frame so that the handles may be oscillated backward and forward and the machine thus propelled. Upon each side of the front fork are foot pieces or pedals upon which the rider may place his feet and by turning the fork in one direction or the other the machine is readily steered.

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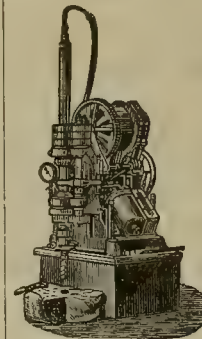
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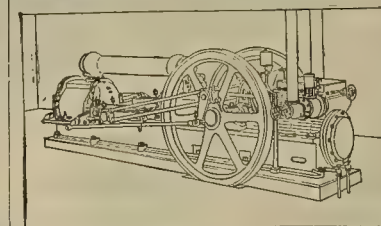


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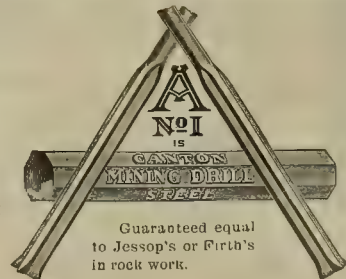
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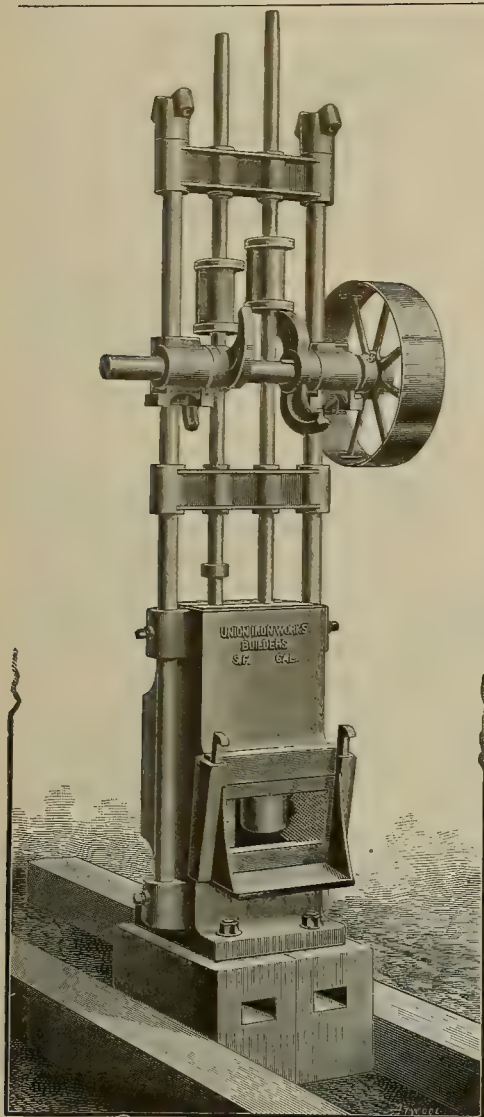
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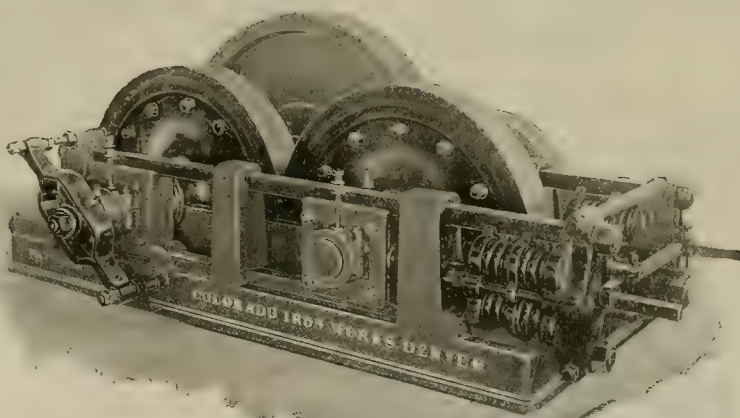
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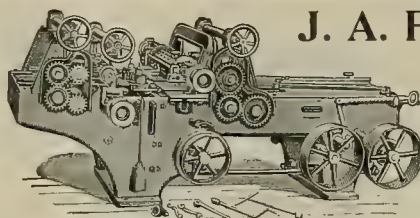
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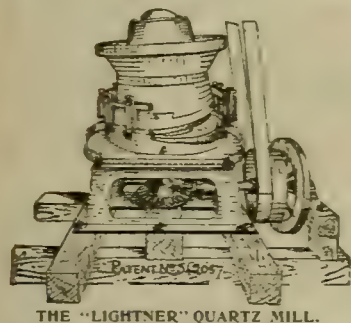
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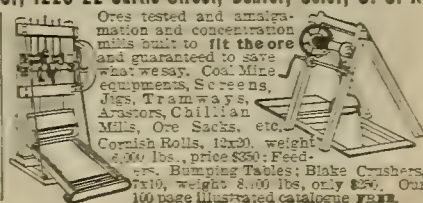
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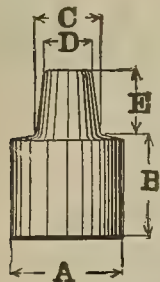


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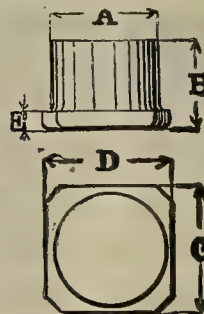
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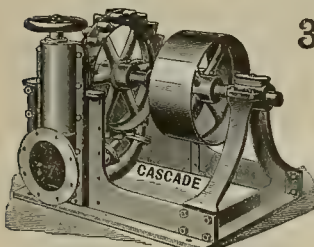
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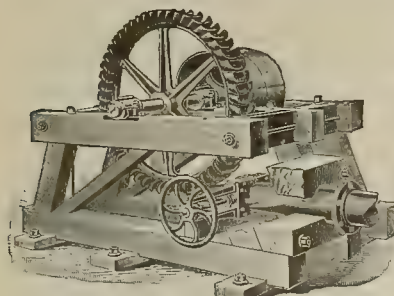
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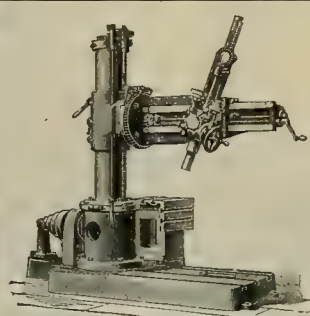
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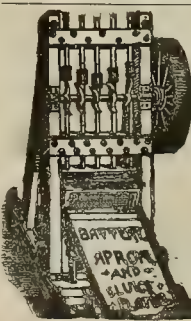
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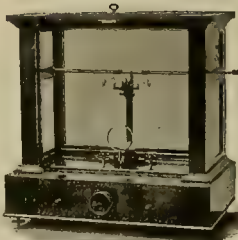
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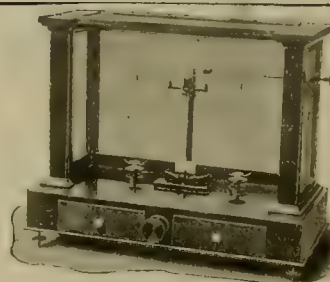
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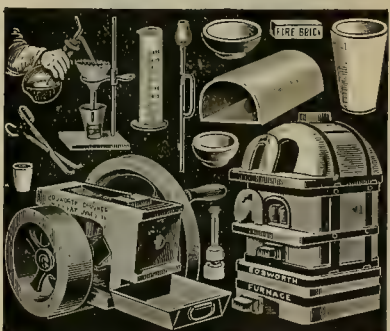
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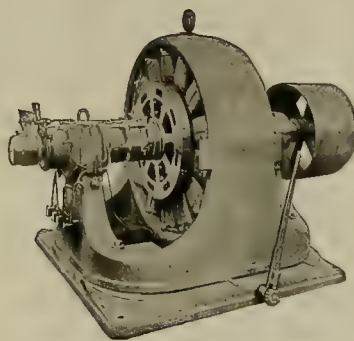
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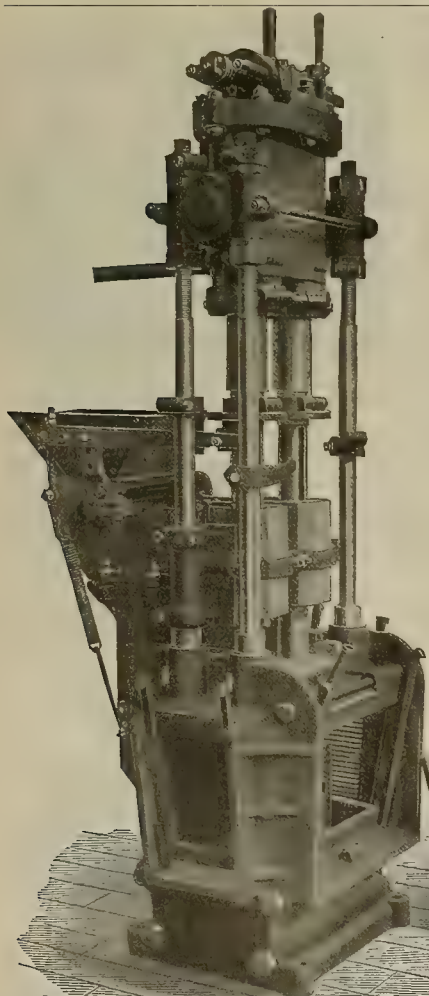
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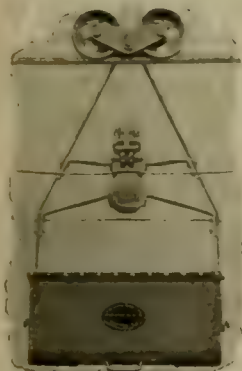
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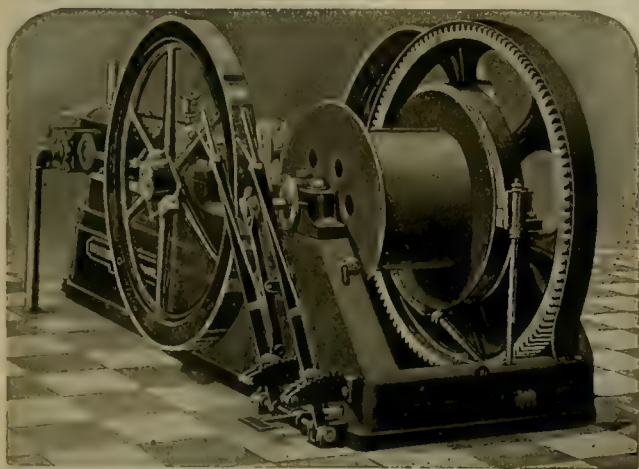
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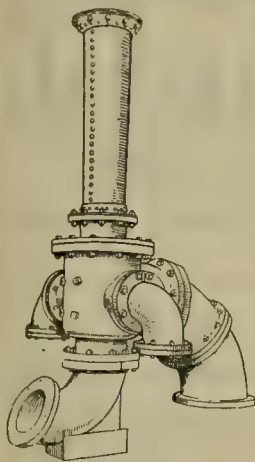
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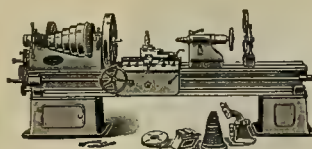
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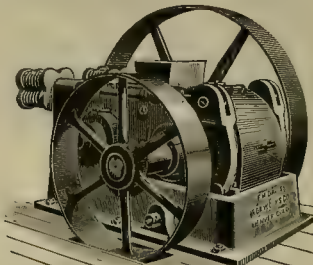


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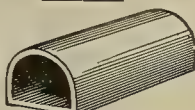
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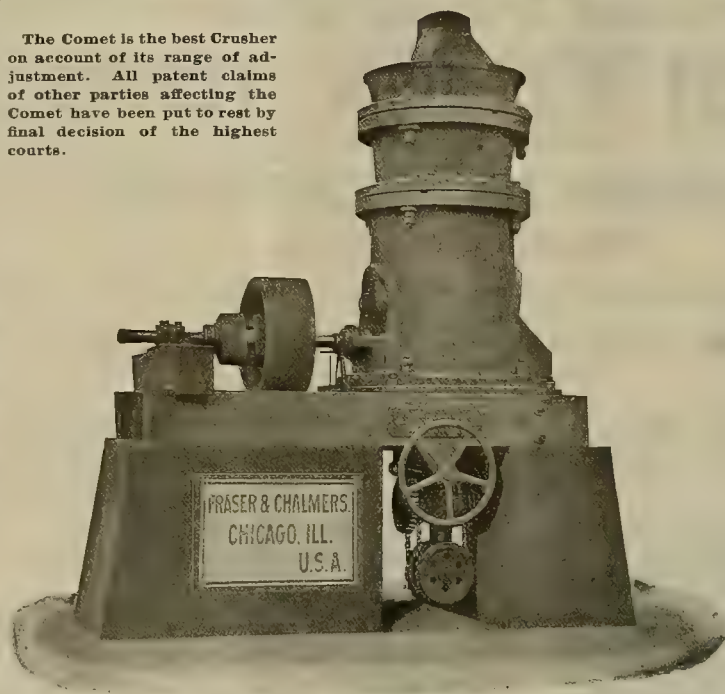


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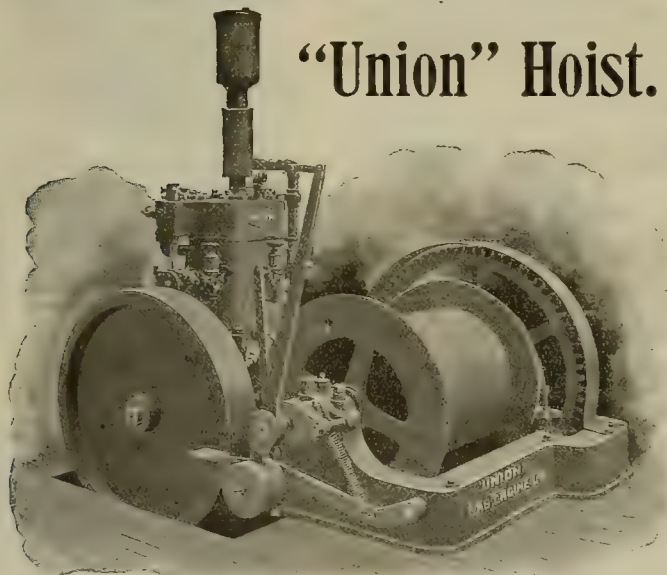
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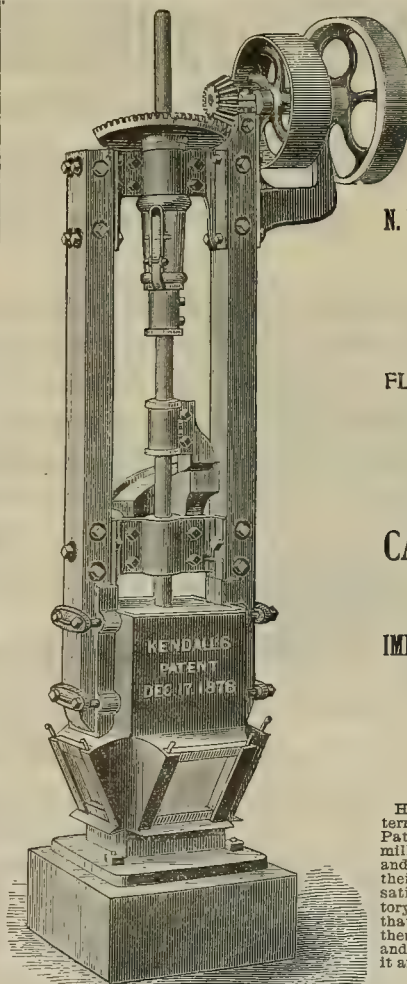
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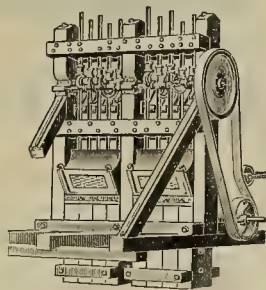


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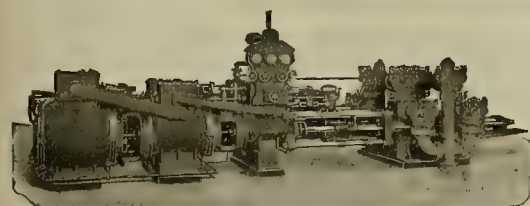
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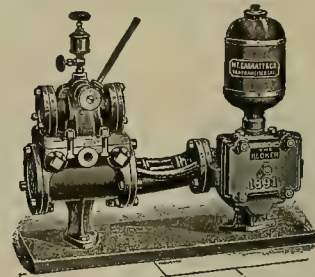
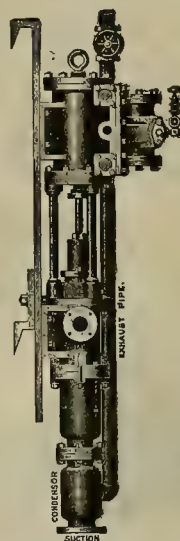
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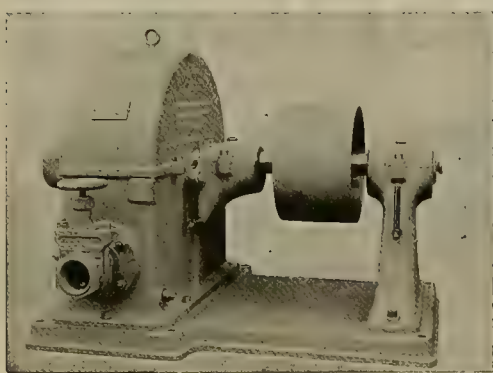


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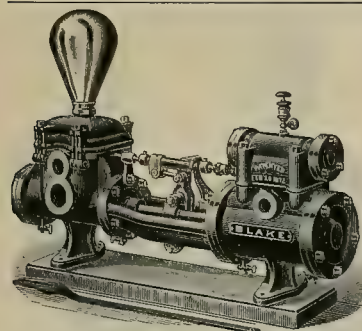
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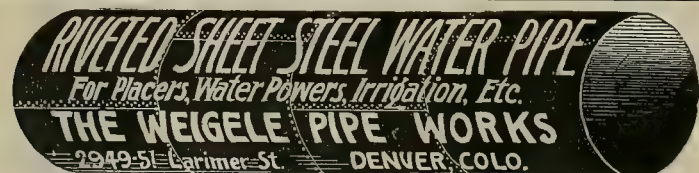
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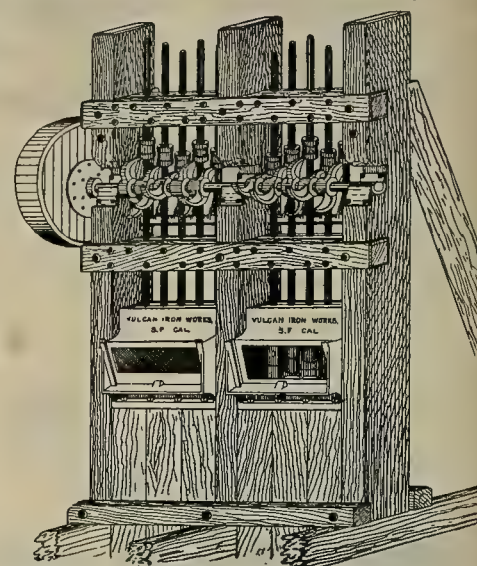
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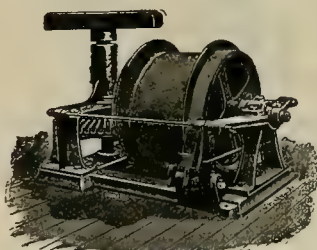
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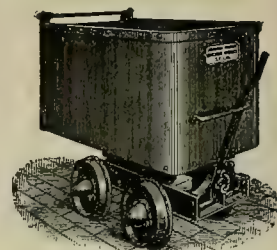
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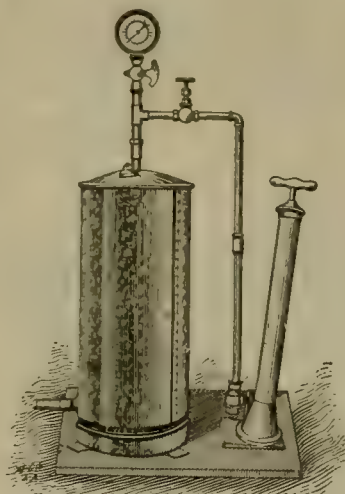
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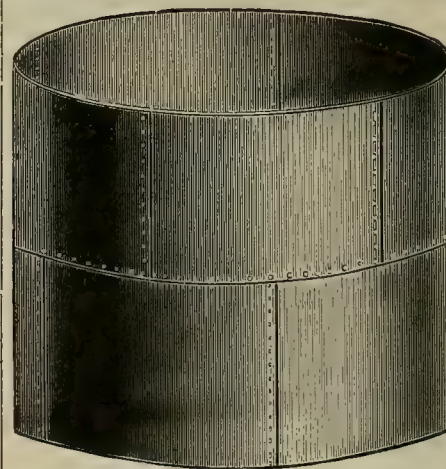
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Market Reports.

The Markets.

SAN FRANCISCO, Aug. 11, 1898.

SILVER.—London, 27½d; New York, 59½; San Francisco, 59, nominal; Mexican Dollars, 46@46½c. A Washington special says: Information from London is to the effect that the Indian mints are to be reopened to free coinage, and the assertion is made that this will occur at an unexpectedly early date. The report of the Indian commission is to be published before September 1st, and this is expected to throw some light upon the details of the matter. The announcement that the important step of reopening the mints will take place comes from a source which is usually reliable. An effort to have the ratio changed from 16 to 1 to 22 to 1 is also hinted at.

COPPER.—Lake, strong at 11.75.
LEAD.—New York reports "very firm, 4 bid, 4.05 asked;" smelters quote 3.85; local, pipe, 6@6¼c; sheet, 6½@7c; pig, 5½c; bar, 6c.

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—5¼ and 5½.
TIN.—Mento Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c.
ANTIMONY.—9½, 10.
BABBITT METAL.—10-12-14—best 16c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.25; cut, \$2.00; 10 to 20d, wire, \$2.30; cut, \$2.05; 8d, wire, \$2.35; cut, \$2.10; 6 and 7d, wire, \$2.45; cut, \$2.20; 4 and 5d, wire, \$2.55; cut, \$2.30; 3d, wire, \$2.70; cut, \$2.45; 2d, wire, \$2.95; cut, \$2.70. In carload lots, 10c per keg less. In Chicago wire nails have been advanced \$1 a ton, making the price \$1.35 per keg for carload lots. The rise is in consequence of the advance of \$2 a ton in the price of steel, which was attended with considerable excitement in the iron trade. "I look to see steel make further advances and I expect that wire nails will reach \$1.50 a keg," says one of the officials of the American Steel and Wire Co. "At this season of the year we usually close for repairs and we are unable to keep up with orders."

QUICKSILVER.—Domestic, quiet and unchanged, \$42.50@43; export and carload lots, special rates.

POWDER.—F. O. B., San Francisco: No. 1, 75% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1* 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2* 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.
CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8.00; Coos Bay, \$5.00; Seattle, \$6.00; Southfield, \$7.50.

Cargo lots, Eastern and foreign:
Wallend, \$7.50; Cumberland, \$10.00; Brymbo, \$7.50; Cannel, \$9.50; Pennsylvania, hd., 14.50; Welsh Anthracite, 12.50; Scotch, 8.00; Rock Springs, \$7.60.

COKE.—Foreign, \$13; domestic, \$11 per ton.

CHEMICALS.—Cyanide of potassium, jobbing, 31 @ 31½c per lb.; carloads, 28c; sulphuric acid, 2½c per lb. for 60%; nitric acid, 15c; soda ash, \$1.60 per 100 lbs. 53%; hyposulphite of soda, 2½c per lb.; blue vitriol, 4½c per lb.; borax, refined, 5@6c per lb.; chlorate of potash, 9½@10c; roll sulphur, 2½c; blue vitriol, 4c.

LUMBER.—Retail: Pine, ordinary sizes, \$17@18.50; redwood, No. 1, \$18@20; No. 2, \$16@18.

Regarding imports of gold, by request is herewith presented in tabulated form the parities of gold bars and gold eagles at various prices in London. By calculating from these and taking into consideration the expenses of transportation of gold, it will be possible to arrive at a good idea of gold points. The first table gives the parity of gold bars at various prices from 77s 9d to 78s:

| London price per ounce standard. | Parity. |
|----------------------------------|---------|
| 77s 9 d | 4.8744 |
| 77s 10 d | 4.8891 |
| 77s 10½ d | 4.8967 |
| 77s 11 d | 4.9040 |
| 77s 11½ d | 4.9115 |
| 78s 6 d | 4.9587 |

In estimating the parities of eagles, an average weight of 5.369 dwts. per bag of \$5000 is assumed. A variation of 1 dwt. is equivalent

to 91.1000 of 1c per pound in the rate of exchange.

As long as money is not above 2%, it is safe to reckon the total expenses of bringing over gold at, roughly, ¾ of 1%, to recover everything. This is equivalent to about 1.80c per pound in the rate.

| London price per ounce. | Parity. |
|-------------------------|---------|
| 76s 3½ d | 4.882 |
| 76s 4 d | 4.880 |
| 76s 5 d | 4.874 |
| 76s 6 d | 4.868 |
| 76s 7 d | 4.863 |
| 76s 8 d | 4.858 |
| 76s 9 d | 4.854 |
| 76s 10 d | 4.850 |

Dealing with imports from France, a similar method may be adopted. The par of gold bars is 5.1714. Expenses, exclusive of premium, are about 2.10 centimes to the dollar, which would make the gold import point, supposing gold could be obtained at par, 5.1924. To this must be added the premium charged, whatever that premium is, and at present it is 3¼ per mille. This is equivalent to about 1.75 centimes per dollar, which would bring the rate up to 5.2099 or practically 5.21. In this way, by noting the changes in the premium, it will be easy to arrive roughly at the gold point premium.

Up to quite recently Spain seemed devoid of the ability to make war or capacity to make peace, but within the last ten days that humbled kingdom seems to show some understanding of the situation, and peace negotiations are now presumably well enough advanced to justify the statement that the war is over, something that will be satisfactory to general business, which was necessarily disturbed since the first mutterings last February, immediately after the sinking of the Maine.

Mining Share Market.

SAN FRANCISCO, August 11, 1898.

The week showed no improvement in volume of sales or prices. There is no market and no business. Following is to-day's transactions:

| | |
|---------------------------|-------------------------|
| 9:30 A. M. SESSION. | |
| 100 Caledonia.....16c | 100 Crown Point.....10c |
| 200 C. Cal. & Va.....30c | 200 Utah.....6c |
| 2:30 P. M. SESSION. | |
| 100 G. & C.....14c | 100 Challenge.....13c |
| 1160 C. Cal. & Va.....40c | 100 Occidental.....52c |
| 100 Potosi.....10c | |

The conference of the Comstock companies as a sort of ways and means committee regarding drainage and the resumption of deep mining will hold their first meeting to-morrow afternoon. Jas. G. Fair was probably as good a miner as was ever on the Comstock. Twenty years ago he said he had prospected Hale & Norcross, "and swept the walls with a broom," yet, afterwards Supt. Keating struck a body of ore within 5 feet of one of Fair's prospecting upraises, from which ore to the value of over \$4,000,000 was taken. No one is infallible, and the men who now scout the idea of unwatering the Comstock levels are particularly fallible.

In response to an inquiry from Secretary Taffe of the Best & Belcher Mining Co., Commissioner of Internal Revenue Scott to-day sent the following decision concerning the transfers of stocks: "The issue in the same name of two or more certificates of stock in place of and for the same shares contained in a single preceding certificate of stock does not require stamps upon the certificate so issued. Issues of certificates of stock in other names without sale, of which he makes mention, are not understood. The presumption would be of sale of some transfer of interest and a stamped memorandum of sale or transfer should be required, or else the certificate must be stamped. So, in cases of certificates of stock carried in the names of brokers, which the holders wish re-issued in their own names in order to vote at an election held by the corporation, unless the certificates are accompanied by properly stamped memoranda of sale in the name of the holder the new certificates issued should be stamped. Where a portion of the shares contained in a certificate of stock are sold, the other remaining in the vendor, and new certificates are issued, the certificate for the stock sold or a proper memorandum of sale must be stamped, but the new certificate issued for the remaining shares which were not sold will not require a stamp. Such new certificates of remaining shares cannot, however, be issued in any other names without payment of tax."

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Sara E. Reamer, in the Pemberton Gravel Mine near Forest Hill, Placer Co., to deposit tailings in Baltimore and Dardanelles canyons, and from Penrose & Barker, in the Bull Run Mine near Relief Hill, Nevada Co., to deposit tailings in a ravine below the mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on August 22, 1898, at 1:30 P. M.

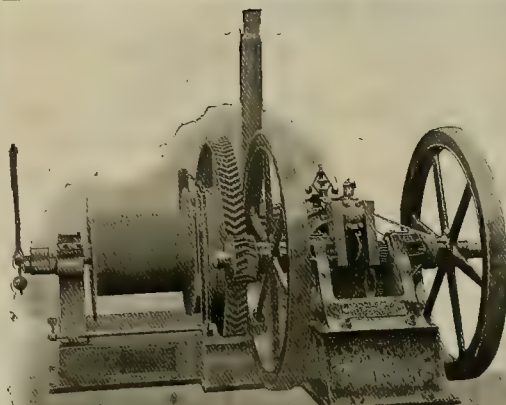
Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.



FRESNO, June 25, 1898.

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIRS:—

The fifteen-horse power gaso-
line engine and hoist purchased
from you is doing fine work
and is perfectly satisfactory in
every respect.

Yours truly,

TUOLUMNE MOTHER LODE
M. & D. CO.,

Per N. W. Moodey, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

Cal. Anti-Caloric Company,

SOLE MANUFACTURERS OF

Anti-Caloric Sectional Coverings and
Blocks for Boilers.

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The Best and Cheapest Insulating Plaster
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Mail and other large corporations.

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Denver Ore-Testing Works,

*CHEMISTS *ASSAYERS *ENGINEERS.*

521-525 Seventeenth St., DENVER, COLO.

WORKING TESTS by Amalgamation, Concentration, Chlorination and Cyanide.

ORES CRUSHED AND SAMPLED. ♦ MILL RUNS.

Prices on Application.

NOTICE OF DIVIDEND.

Jamison Mining Company, rooms 50 and 54, No. 120 Sutter street, San Francisco, California. June 20th, 1898. Semi-Annual Dividend No. 2.

At their meeting of June 20th, 1898, it was resolved by the Board of Directors of the Jamison Mining Company to pay to the stockholders of the company from the surplus funds in the treasury a dividend of Nineteen Thousand Five Hundred Dollars (\$19,500.00), being five (5) cents per share on the capital stock of the company.

The dividend will be payable at the office of the company on the 15th day of August, 1898, to all stockholders of record on the 5th of August, 1898. Transfer books will be closed at the close of business on the 5th of August and reopened on the morning of the 16th of August, 1898.

SAM. W. CHEYNEY, Secretary.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

DEWEY, STRONG & CO.,

PATENT AGENTS, 330 Market St., S. F.

HOISTING ENGINES

for Steam, Compressed Air and Electricity.

BOLTHOFF'S IMPROVED DESIGNS.

Single and Double Cylinder Flat Friction,

Quadruple Flat Friction,

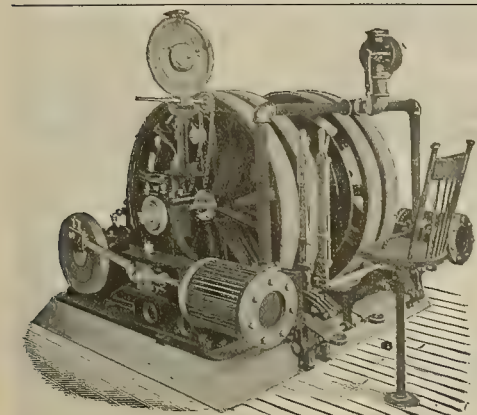
Combined Noiseless Gear and Friction,

Direct Acting, First and Second Motion Hoisting Engines.

WRITE FOR ESTIMATES AND PRINTED MATTER.

The Hendrie & Bolthoff M'f'g & Supply Company,

COR. 17TH AND WAZEE STREETS, DENVER, COLO.



10 x 12 LIGHTNING QUADRUPLE FRICTION HOIST.

Assessment Notices.

MARINA MARISCANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 14th day of July, 1898, an assessment (No. 14) of 2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of August, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 7th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
Office—217 Sacramento street, San Francisco, California.
CHARLES H. VANCE, Secretary.

ROSE CREEK MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1898, an assessment (No. 2) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 31st day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. WILLIAMS, Secretary.
Office—Room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

BOULDER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, El Dorado County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1898, an assessment (No. 1) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 31st day of September, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. M. WILLIAMS, Secretary.
Office—Room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

WEST SANTA ROSALIA GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, State of California, Mexico.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of August, 1898, an assessment (No. 1) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 310 Pine street, Rooms 15 and 17, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. W. PEW, Secretary.
Office—No. 310 Pine street, Rooms 15 and 17, San Francisco, California.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 16th day of May, 1898, an assessment (No. 1) of 1 cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 7, fifth floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
R. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 8th, 1898.

Office—Room 7, fifth floor, Mills building, San Francisco, California.
R. L. CHENEY, Secretary.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to August 6th, 1898, and the day of sale to MONDAY, September 5th, 1898.

Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to September 3rd, 1898, and the day of sale to MONDAY, October 5th, 1898.

Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 6th day of August, 1898, an assessment (No. 20) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 31st day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
Office—106 Leidesdorff street, San Francisco, California.
ALFRED K. DURBIN, Secretary.

GOULD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of July, 1898, an assessment (No. 84) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 31st day of August, 1898, shall be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 26th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
ALFRED K. DURBIN, Secretary.
Office—Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

POSTPONEMENT.

The date of delinquency of the foregoing assessment (No. 84) has been postponed to TUESDAY, the 6th day of September, 1898, and the day of sale from the 26th day of August, 1898, to MONDAY, the 26th day of September, 1898. By order of the Board of Directors.

Office—Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.
ALFRED K. DURBIN, Secretary.

DELINQUENT SALE NOTICE.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the 24th day of June, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. \$ |
|---------------------------|-----------|-------------|---------|
| Harvey M. Blackley..... | 20 | 4 | 8 00 |
| Alice E. Blackley..... | 23 | 20 | 40 00 |
| Alice E. Blackley..... | 24 | 20 | 40 00 |
| Alice E. Blackley..... | 25 | 20 | 40 00 |
| Alice E. Blackley..... | 26 | 20 | 40 00 |
| Alice E. Blackley..... | 30 | 1 | 2 00 |
| Alice E. Blackley..... | 40 | 2 | 4 00 |
| Caroline S. Townsend..... | 18 | 20 | 40 00 |

And in accordance with law, and an order from the Board of Directors, made on the 24th day of June, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, room 14, Nevada block, 309 Montgomery street, San Francisco, California, on MONDAY, the 26th day of August, 1898, at 10 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with the costs of advertising and expenses of sale.

WILLIAM MCPHERSON, Secretary.
Office—Room 14, Nevada block, 309 Montgomery street, San Francisco, California.

DELINQUENT SALE NOTICE.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 10) levied on the 20th day of June, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. \$ |
|-----------------------|-----------|-------------|---------|
| G. F. Volz..... | 7 | 500 | 50 00 |
| Frantz Schmitz..... | 32 | 250 | 25 00 |
| Chas. Winters..... | 39 | 1,000 | 100 00 |
| M. Raschen..... | 65 | 250 | 25 00 |
| Simon Stiefvater..... | 78 | 500 | 50 00 |
| Marcus Schwab..... | 79 | 500 | 50 00 |
| Marcus Schwab..... | 80 | 500 | 50 00 |
| G. F. Volz..... | 90 | 500 | 50 00 |
| Meta Ecks..... | 102 | 150 | 15 00 |
| A. Wirtner..... | 114 | 250 | 25 00 |
| Henry Knust..... | 115 | 200 | 20 00 |
| G. F. Volz..... | 116 | 500 | 50 00 |
| Wm. C. Loewe..... | 127 | 87 1/2 | 8 75 |
| F. M. Freund..... | 137 | 500 | 50 00 |
| F. M. Freund..... | 138 | 500 | 50 00 |
| F. M. Freund..... | 139 | 300 | 30 00 |
| F. Kayser..... | 146 | 1 1/2 | 12 50 |
| B. Egenberger..... | 210 | 100 | 10 00 |
| Jose Dias Svares..... | 204 | 100 | 10 00 |
| Simon Stiefvater..... | 211 | 400 | 40 00 |
| N. Kieneker..... | 228 | 100 | 10 00 |
| B. Egenberger..... | 229 | 100 | 10 00 |
| Chas. Kayser..... | 243 | 100 | 10 00 |
| B. Egenberger..... | 257 | 100 | 10 00 |
| F. M. Freund..... | 261 | 100 | 10 00 |
| F. M. Freund..... | 262 | 66 | 6 60 |
| F. M. Freund..... | 263 | 42 | 4 20 |
| F. M. Freund..... | 268 | 134 | 13 40 |
| F. M. Freund..... | 300 | 100 | 10 00 |
| B. Egenberger..... | 310 | 100 | 10 00 |
| Adam Miller..... | 350 | 125 | 12 50 |
| N. Kieneker..... | 351 | 200 | 20 00 |

And in accordance with law, and an order from the Board of Directors, made on the 20th day of June, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, No. 237 Twelfth street, San Francisco, California, on SATURDAY, the 3rd day of September, 1898, at the hour of 4 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with the costs of advertising and expenses of sale.

F. METTMANN, Secretary.
Office—No. 237 Twelfth street, San Francisco, California.

Lunkenheimer's "Clip" Gate Valve.

Single Disc
DOUBLE SEATED.
Made with Screw Ends
from 1/2 in. to 3 in. sizes.

BEST IN QUALITY.
LOWEST IN PRICE.
THE ENGINEERS' FAVORITE.



These Valves are made of cast iron and all wearing parts of gun metal. They are superior to the common cheap brass valves with which the market is flooded.

WHY?

BECAUSE they possess all the advantages of a cast iron pipe fitting. Elbow, Tee, Coupling, Union, etc., namely—are heavy and rigid—not injured by expansion and contraction or rough handling in pipe fitting. TAKE PRESSURE FROM EITHER END—Body and hub are held together by a steel clip, consequently always easily taken apart. Joint between body and hub made permanent by an imbedded seamless oval copper wire washer. If you desire the BEST, STRONGEST and MOST DURABLE valve for general purposes on all ordinary pressures, use this valve. IT IS A STANDARD FITTING OF NEAT APPEARANCE and FULLY WARRANTED TO SATISFY. Made also in All Iron for Cylindrical Plants. Try them and be convinced. Specify them and order through your dealer. Our Catalogue of superior Steam Specialties FREE for the asking.

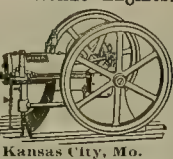
THE LUNKENHEIMER CO., Cincinnati, Ohio, U. S. A.,
SOLE MANUFACTURERS,
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WEBER Gas and Gasoline Engines.

Simplest and most economical engines on earth.

Fully Guaranteed.
Requires only a few minutes' attention a day. Guaranteed cost of running, one cent per hour per Horse Power.

WEBER GAS & GASOLINE ENGINE CO.,
430 S. W. Boulevard, Kansas City, Mo.



An Improvement in Modern Stamp Mill Practice.



GLOBE BATTERY STEM GUIDE.

PATENTED AUGUST 24, 1897.

RIGID. SIMPLE. DURABLE. EFFICIENT. ECONOMICAL.
Effect a Saving in Friction Losses. No Trouble to Install. No Alterations of Mill Necessary. No Keys or Wedges to Adjust.

Manufactured only by GLOBE IRON WORKS, STOCKTON, CAL., U. S. A.

Manufacturers of All Classes of Mining Machinery. Estimates Furnished.
Office of WILDMAN GOLD MINING COMPANY, SUTTER CREEK, CAL., June 28, 1898.
Globe Iron Works, Denver, Mass. and Conning Street, Stockton, Cal.—GENTLEMEN: Replying to your inquiry about the Globe Patent Battery Stem Guides furnished us by you last fall, will say that you supplied us with Guides enough for ten stamps of the Wildman Mill. These Guides have been in constant use for the past eight months, and so far do not show any wear either on the Guides or the Stems. They are more convenient than any Guide I ever handled, and much time is saved with them in changing stems, etc. The Guide can be set so close you always get a fair blow on your dies, and the use of these Guides materially increases the crushing capacity of your batteries. It is our intention to replace all of our Guides with those of your make, and I cheerfully recommend them to anyone desiring a good, serviceable and economical Guide. Very truly yours,
JOHN ROSS, JR., Superintendent.

Our System for Heating Mills and Mine Buildings

Is the Most Economic, Perfect and Reliable.

Ask Us for Particulars.

Our Feed "Vacuum" Water Heater

Gives Highest Temperature, Relieves Back Pressure, Saves and Purifies Water.

Write Us About It.

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Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced first-class agency. We have able and trustworthy associates and agents in Washington and the capital cities of the principal nations of the world. In connection with our scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us to give advice which will save inventors the expense of applying for patents upon inventions which are not new. Circulars and advice sent free on receipt of postage. Address DEWEY, STRONG & Co., Patent Agents, 330 Market St., San Francisco, Cal.

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Constantly on hand a full assortment of Manila Rope, Sisal Rope, Duplex Rope, Tarrad Manila Rope, Hay Rope, Whale Line, etc., etc. Extra sizes and lengths made to order on short notice
611 and 613 Front St., San Francisco, Cal.

M. CRAFTY,
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BARGAINS IN DYNAMOS, ENGINES, ETC.

DIRECT CURRENT DYNAMOS of 55, 150, 270, 350, 700, 725, 900, 810, 900, 1075, 1350, 1610 and 2500-light capacity. ALTERNATING CURRENT DYNAMOS of 750, 900, 1300 and 2000-H.P. capacities. A.C. DYNAMOS—24, 30, 40, 50 and 60-light, both 1500 and 2000-candle power. ENGINES—2, 50, 75, 85, 100, 115, 125, 150, 175 and 200 H. P. BOILERS—50, 100, 250, 375 and 500 H. P. HEATERS—150, 1000 and 2000 H. P. STEAM PUMPS—All sizes.

SEND FOR OUR PRICE LIST NO. 24.

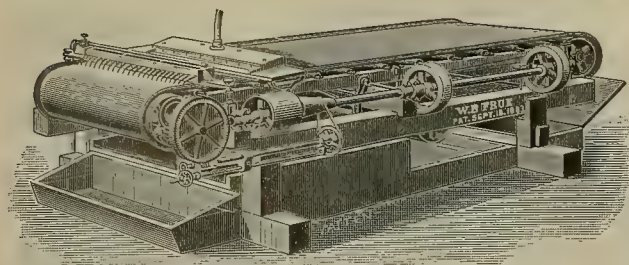
Most of this apparatus has been removed from our own central stations to make room for larger units, and is therefore in excellent condition.

CHICAGO EDISON COMPANY, 139 Adams Street, CHICAGO, ILL.

FOUR and SIX-FOOT FRUE VANNERS

With Brownell "Patent Lip" Flange Belts.

STANDARD MACHINE OF THE WORLD.



When a Concentrator like the Frue Vanner has been on the market nearly two decades, and the sales have constantly increased, it is safe to say it is the "Standard Machine of the World." More Frue Vanners have been sold during the last twelve months than for the same period at any time during the history of the machine. Practical mining men in all parts of the world where mining is carried on will testify as to its merits. It is the "standard" which all competitors are trying to imitate.

The results obtained by this machine are the "acme" of concentration, and several cheap and untried machines that have lately come on the market compare by it. The manufacturers will tell you that they are "just as good, and cheaper," etc. The facts are that no other concentrator made has an equal capacity, or will yield as clean a concentrate with as small loss in the tailings as the Frue Vanner. The amount saved from the lower first cost of an inferior machine counts little in the year's results, when compared with the increased output from a Frue. This machine not only gives better results at both ends of the belt (i. e., clean product and poor tailings), but is operated at less expense and requires less attention than any other machine on the market. At the Alaska-Treadwell mine, where they have ordered over 350 Frue Vanners, one man attends 48 machines for 12-hour shift.

FOR DESCRIPTIVE PAMPHLETS, ADDRESS

J. S. BROWNELL, Western Agent FRUE VANNING MACHINE CO.,
132 MARKET STREET, (Successor to Adams & Carter.) SAN FRANCISCO, CAL.



RISDON IRON WORKS, SAN FRANCISCO, CALIFORNIA.

Cable: "Risdon's."

Code: A. B. C. & Leibers.

— MANUFACTURERS OF —

Gold Dredging Machinery

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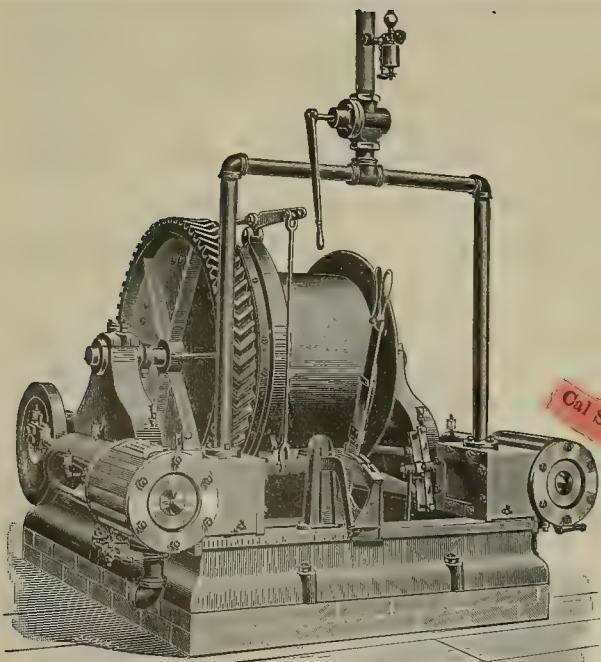
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No. 1989.—VOLUME LXXVII.
Number 8.

SAN FRANCISCO, SATURDAY, AUGUST 20, 1898.

THREE DOLLARS PER ANNUM.
Single Copies, Ten Cents.

California Asphalt and Bitumen.

California's hydrocarbon productions average in value \$2,000,000 annually. Of this amount, asphalt and bitumen form a large proportion. Discarding exact technical definitions, asphalt may be considered as the residue consequent upon the distillation of petroleum; bitumen, a sandstone impregnated with oil. In ordinary use the two terms are almost interchangeable, asphalt, geologically speaking,

by Louis Falkenau of a sample of rock taken from this mine gives the following:

| | |
|--|--------|
| Volatile at 130° Centigrade (200° Fahrenheit)..... | 1.470 |
| Petroleum..... | 12.967 |
| Asphaltene..... | 1.466 |
| Organic, not asphalt..... | .077 |
| Sand (silicious)..... | 84.020 |
| Total..... | 100. |

Brought in its natural state from the mine to the street to be paved, bituminous sand rock is melted and disintegrated in portable, steam-heated, double-

seven years ago and steadily advocated—drainage and deep mining on the Comstock, Nevada, lode. Twenty-three mining companies were represented at a meeting held last Saturday to devise practical methods to unwater the Comstock mines below the level of the Sutro tunnel. Resolutions were adopted requesting the superintendents of all the companies represented to report to the committee by the 14th prox. the condition of the several mines as shown by actual work below the tunnel level and their opinion



BITUMEN MINE, SANTA CRUZ COUNTY, CAL.

being the base of the bituminous rock, the most important of the latter deposits being of Miocene age.

In several counties of California, notably Kern, Kings, Fresno, Ventura, San Luis Obispo and Santa Cruz, are large deposits of asphalt and bitumen, which have at various times been scientifically described in these columns. Considerable has been done in the production of asphalt, and the constant "manufacture" of streets in San Francisco has deservedly brought bitumen into notice. On this page is illustrated a bitumen mine in Santa Cruz Co., which graphically portrays the general appearance and manner of mining; on page 181 is an engraving of another open-cut mine of bitumen in San Luis Obispo Co. It is from the mine portrayed on this page that much of the material used in San Francisco pavements of that character is taken. An analysis

walled kettles. When discharged as a black, sticky meal from the kettles, it is wheeled in barrows to the foundation it is to cover, and there spread with hot iron rakes to an even layer about 3 inches thick. Hot iron hand-rollers immediately pass over it, weighing about twenty pounds to each inch of tread, accomplishing initial compression. A light sprinkling of infusorial earth (a powerful absorbent with a natural affinity for bitumen) is then spread upon the surface, when the rolling process is renewed with large steam rollers weighing 300 pounds to the inch of tread. These rollers continue operation until the bitumen has received its ultimate compression and is cold. The street is then open to traffic.

AT LAST there is a practical movement toward the realization of the plan proposed in these columns

on the feasibility of the proposed work. The old mine is not worked out, but the old stock methods are. A consolidation of interests and a lessening of expenses by having one general management will be among the changes if the present effort amounts to anything practical. It is believed that, with the water out of the mines, the lode can be explored to the depth of 6000 feet. At the time the lower levels were abandoned and the clamor for dividends started the superintendents to extracting ore from the old upper levels, the Union Consolidated mine was down 3350 feet; the combination shaft 3250 feet. There was then but one deeper shaft in the world; there are now many deeper, one—the Calumet & Hecla in Michigan—being nearly 5000 feet deep. Deep mining on the Comstock should never have been abandoned and should be now resumed.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....Publisher

San Francisco, August 20, 1898.

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Corporation Stock Assessable.

A recent decision in the Los Angeles Co., Cal., Superior Court is to the effect that in California there is no such thing as non-assessable stock in a corporation, that stockholders are responsible for the amount of assessments on corporate stock held by them, and that a corporation has no legal right to determine or limit a stockholder's liability therein. The plaintiff in the case was a corporation, suing the defendant, one of its stockholders, for payment of an assessment regularly levied on the corporate stock. Defendant had refused payment, exhibiting a contract made at the time of purchase with the company, in which the company agreed that the stock so sold defendant was "fully paid up and non-assessable." The court held that "a promise and agreement on the part of the corporation that it will never in the future avail itself of that power given it by positive statute to levy an assessment made necessary by losses or unforeseen disaster in business would be to assume that a corporation in the very beginning of its corporate existence, having undertaken a duty under the law and accepted a franchise, was voluntarily depriving itself of the only means of protection afforded it in the raising of money other than by loans, and waiving a right and power which the Legislature, in its wisdom, deemed necessary to confer in order that it might maintain its corporate existence.

"No power existed in the corporation to waive the legal right as to assessment on account of debts, or that the contract that no assessment would be made applied only to the unpaid subscription price. Accepting either theory, the stock issued to defendant remained assessable for the purposes for which this assessment was levied, notwithstanding the indorsement on the certificates."

WHILE so far in '98 gold bullion receipts from California are almost equal to that of previous years, yet it is evident that the prevalent drouth will occasion considerable decrease in the sum total for the year. From all parts of California come reports of unprecedented drouth, stamps hung up, placer operations suspended, and in many places an almost entire cessation of mining operations, that untoward condition of affairs extending north of the Oregon line. Statistics show that not in forty years has there been such a scarcity of winter snow and rain and such a lack of water, and every one affected hopes that such a failure in the operations of nature will not occur again in forty years to come. The drouth has occasioned great loss to California mining interests. In many instances considerable preparation had been made for an unusually busy season and large expense incurred, much of which is a loss. The only consolation to the California miner is that such things are sufficiently unusual to not require reckoning with next season, and that, meanwhile, the gold cannot rot nor run away, and will be secured later on.

Practical Articles Wanted.

In its thirty-eight years of continuous and successful existence this paper has made the interchange of ideas and personal experience one of its strongest features, thus constituting it a medium of communication between progressive men, mutually aiding each other. Such contributions are always welcome, and those who feel so disposed are hereby requested to note the value to themselves of such articles and in their own case to make such contribution as they feel their knowledge or experience justifies. No one is asked to send all he knows, but many of our readers know a good deal about some one thing connected with progressive mining and on that particular thing each is here individually asked to send a few practical points that will doubtless be of considerable value to others elsewhere who are in doubt on the very matter that he has successfully solved. Everybody is wiser than anybody, and in a technical paper like this much of its practical value is due to articles written by men who have in their own experience proved that what they are writing about is an accomplished fact.

The suggested description or discussion can be as long or as short as its writer may deem necessary. Sometimes 100 words will tell all that is needful; in other cases 2000 may be needed to properly explain the matter under discussion. Sketches, photographs, and, in fact, all manner of illustrations can be used (except "blue prints"), the engravings made therefrom embellishing and adding to the value of the communication.

Quite often the impulse exists, but a man is too busy or too tired. Yet nearly every intelligent miner has some time in his life done something in his line that he is proud of, or that he thinks or feels is about as good as any one else could have done under the circumstances; something hard, or unusual, that took all his wits to make a success, or at least not a failure. There are a thousand things in mining that deserve the notice and world-wide publicity accorded by publication in this paper, and any one, anywhere, who reads this will please consider it a special invitation to him to write down such an experience of his and send it to us. Here are about a hundred suggestive topics that occur to the mind of the writer during the time devoted to the writing of this article:

How to best save the fine gold when milling cemented gravel in drift mines; an example of successful co-operative mining; profitable working of a custom stamp mill; the building and operation of a wing dam; best arrangement for drop of stamps and why; experience with hydraulic elevators; improvement in arrangement of pipe lines and delivery of water through monitors; daily work of a small cyanide plant; leaching carbonate copper ore with sulphuric acid; results of this season's river mining; cost of mining and milling gold ore; practical method of mine examination; economical work in running a tunnel in hard ground; treatment of low-grade copper ore; relative value of electric and compressed air power, by one who has tried both; how a fire in a shaft was successfully handled; sampling lead ores; retorting amalgam; main requisites in a mining report; improvements in gold milling; use of liquid chlorine in chlorination process; proper contour of silver-lead furnaces; example of profitable treatment of mine tailings; how a leaser made his lease profitable; new points in mine timbering; successfully resisting a "claim jumper"; best location and arrangement for a gold mill; experiences of a prospector; overcoming of machinery transportation difficulties; system of fire protection in a mining camp; building a pipe line; satisfactory instance of "profit sharing"; wear and tear of shoes and dies; best disposition of smelter slag; record of unwatering a mine; building and maintaining reservoir dams; successful record of a California debris storage dam; timbering in drift mines; utilization of waste water; admission of visitors into a mine; relative value of zinc dust and zinc shavings in cyanide process; amalgamation tests; relief in case of mine accident resulting in personal injury; best arrangement of 10-stamp mill; successful securing of gold from black sands; to obviate loss in scorification assays; use of chuck-block in mortar; working with an arrastra; assaying concentrated sulphurets; slow vs. rapid-drop stamps; prospectors' drill; cam improvements; belting on concentrators; incline vs.

vertical shafts; river dredging; mining low-grade cinnabar ore; ditch and flume building; wooden vs. iron battery frames; lead dust accumulator; raw-hiding ore; flashlight photography; practical working of miners' unions; battery sizing boxes; sharpening drills; effective form of rolls; making valuable an abandoned mine; what a dry washer can do; proper duties of a mine foreman; removal of amalgam from copper plates; economic matting of sulphide ores; ore sampling in mill; organizing a joint stock mining company; one day in a mine manager's active duties; development of a "prospect" into a paying mine; successful drainage of a deep shaft; ventilating a drift mine; best weight for stamps; suitable arrangement of mill building on site; putting off large quantity of blasting powder; vertical vs. horizontal engine for stationary work; how "assessment work" is done; experience with iron riffles as a gold saver; timbering an incline shaft; changes in stamp practice; developing a prospect; selling a mine; operation of an amalgamator; details of cost of 6x8 tunnel; some ultimately successful mistakes; transmission of power; oil as fuel; spontaneous combustion; ore sorting; mine inspection; application of belts and pulleys; utilization of water power; cleaning up after a cave; good method of bank blasting; concentrator work; improvements in sluice building; ore amalgamation in the mortar; chlorination tailings as flux in smelting galena; best ore crushing for cyanide process; errors in mill construction.

The above 104 proposed topics are merely suggestive; as many more, probably better and equally practical, will readily occur to many of our readers, the idea being to illustrate the manner of mining work that could with common profit to the mining world be presented in this open forum. "My light is none the less for having lighted that of my neighbors," and in all ages the passing on of a light has symbolized the increase of knowledge in all the useful arts and sciences. Science is organized knowledge; art, its application; and in all the wide domain of arts and sciences none is more generally useful than the art and science of mining; no men are better fitted to give instruction therein than those who have successfully solved so many of its problems and worked them out in practical detail. It is from this class of men, scattered throughout this west half of America, that this journal cordially invites such communications, that their work may receive permanent record herein and be of value to so many others also at work in the development of this nation's great basic industry.

WITH peace comes promise of unusual activity in mining. Competition in other forms of business makes possible only slight interest, if any, on the shrewdest investments; the absence of ruinous competition and the unrivaled opportunity for co-operation must make mining a favorite form of investment. Mining was the pioneer industry throughout this region from the Rockies to the Pacific; it continues pre-eminent; it transcends all others in its commercial relations; it supplies solid, indestructible wealth, and upon its success rises or falls all other pursuits. It has been noted that the miner is not a competitor; a new farm or a new factory or a new store means more competition; a new mine means more consumers, more customers for all other industries without competition with any, and the miner is a good customer; he excels in the number of dependent industries he keeps in operation. Each miner affords employment for ten additional men—the merchant, the machinist, the manufacturer, the farmer, the stock raiser, the dairyman, smelters, mills, railroads, suppliers of every kind get generous share of the wealth he produces. He creates the best cash market, consuming the products of others without competing in their production.

THE seventy-fifth meeting of the American Institute of Mining Engineers will be held at Buffalo, N. Y., beginning Tuesday, October 18, 1898. The local committee of arrangements has been appointed from the Engineers' Society of Western New York, and communications may be addressed to Mr. W. C. Johnson, Niagara Falls, N. Y. An excursion, at reduced rates, to the Omaha Transmississippi and International Exposition is proposed.

Concentrates.

LONDON will hold a Mining Congress in 1899.

HEAT and silver seem to be once more resuming partnership.

ANY good miners claim that all gold is free in ore except allium ore.

ERS of advertising space in this paper get a larger circulation each week.

r the Trail, B. C., smelter, which blew in last week, over men are employed.

r Dawson City, N. W. T., to-day, the sun rises at 4:24 a. and sets at 7:30 p. m.

CORPORATION, a citizen, a woman or a minor may each have a valid mining location.

AT live paper, the Los Angeles, Cal., *Review*, has added word "Mining" to its title.

OLD is ordinarily absorbed by new copper plates at about one grain to each ton of ore milled.

ie Baker City, Or., *Democrat* estimates that 1000 men work in the mines in that vicinity.

UTCHER location of 160 acres by an association requires a survey of mineral on each twenty acres.

ie U. S. assay office at Spokane, Wash., handled over 90,000 in gold during the last two weeks.

HEX the printed and written part of a contract do not the written controls its interpretation.

HEZ mining machinery is now being sold in Baker Co., on, than at any time in the last five years.

ie resumption of work in the Moulton mine at Butte City, t., will give employment, it is said, to 600 men.

Glenwood Springs, Colo., Aug. 22d, a double-handed drilling contest will be held. The prize is \$700.

GRUBLENDE granite used to be called "syenite." A true ite has scarcely any quartz, and rarely more than 50%.

ie Denver, Colo., Mint, the first week in August took in 153.33, a gain of \$153,501.53 over the corresponding week of '97.

DATE Hale & Norcross has levied assessments aggregating \$5,800,000. Sierra Nevada assessments aggregate \$9,010.

ie refined gold product of the Selby Smelting & Lead Co., an Francisco for the year '97 was of the value of \$90,000.

ie Sutter Creek, Cal., *Record* states that there is no in- of a shortage of water in Amador county for the next months.

ie Lincoln Co., Nevada, gold ore of the value of \$6.50 per ton must clear itself; silver ore must have a value of \$19.50 on to pay expenses.

ie ten-cent stamp on a proxy used for voting at an elec- of officers in an incorporated company without regard to number of signatures.

ie meeting of mill and smelter men at Anaconda, Mon- on the 13th, a union was organized, the largest union of er men west of Chicago.

ie average price of quicksilver in 1883 was \$27.25 per flask; highest price on record in California was \$1.55 per lb. in the lowest 33 cents in 1879.

ie capacity of the reservoir recently completed for the ado-Creston M. Co. at Minas Prietas, Sonora, Mexico, is capacity of 34,000,000 gallons.

ie the Gila Valley, Globe & Northern Railway, Arizona, 300 re working in the construction gang. The most west- camp is twenty-one miles from Globe.

ie lack of water has seriously interfered with all kinds of ing operations in California this year, in many sections oc- ing an almost entire cessation of work.

ie is believed that M. W. Belshaw, who died at Antioch, last April, made at Cerro Gordo, Inyo Co., Cal., the first e the world of water jackets on furnaces.

ie buildings of the Montana State School of Mines in t., Montana, are completed. They will be opened to stu- as soon as sufficient funds have accrued.

ie association has been formed in New York City to bring er the men in the West who have mines to sell and the n the East who have money to so invest.

ie Apod test of the qualifications of an assayer is his ability ck with the smelters on their shipment pulps. In gen- cheap assaying" is not worth what it costs.

ie mixture of one ounce sulphate of copper, one-quarter of alum, one-half teaspoonful salt, a gill of vinegar and y drops of nitric acid will "cut a hole in steel."

ie Along the mineral exhibits of Montana at the Omaha, t Exposition is a specimen of silver-copper glance from eversweat mine at Butte that weighs four tons.

ie ERAL AUTHORIZATION can be given to sign a name to a l sale of a mining claim, but such a verbal power cannot en to execute a contract for the sale of real estate.

ie PRICE DRAKE of the Supreme Court of British Columbia id that limestone is a mineral and can be located under e mineral act where it is not mined for building purposes.

ie A RECEIPT for the payment of money does not require a ur, unless the receipt is used to circumvent the use of a eor draft which ordinarily would require such a stamp.

ie SOUTHERN CALIFORNIA suggests the establishment of a min- g lege at State expense, in addition to the Department ing and Metallurgy at the California State University.

ie AONT, Mont., correspondent says that at a drilling con- here July 4th the double-handed driving showed 32 b in fifteen minutes, which, if so, beats the world's ol.

ie In the White Crow mine at Sunshine, Colo., S. McGuire isled last week by the explosion of a charge of powder ie he was tamping; it is supposed he struck the fulminat- g sp.

ie The railroad is to be extended eighty miles westward from lld, Utah, to Stateline, over the old Union Pacific grade e years ago. Three hundred miles more will take it to w, Cal.

ie NING in the Sierra forest reserve regulations permit the tment or entry of agricultural lands subsequent to res- on. Provision is made, however, for the location and t of mineral lands therein.

ie MINING AGENTS throughout the States of Mexico have e requested by that Government to secure specimens and

samples of ore from the mineral districts which they repre- sent for Mexico's exhibit in Paris in 1900.

THE U. S. Mint pays for gold \$18 60 per ounce standard .9 fine. There is no charge for colnage where the bullion depos- ited is suitable therefor. The depositor gets 100 cents for every 23.22 grains Troy gold in his deposit.

It was in '91 that the MINING AND SCIENTIFIC PRESS began the advocacy of deep mining on the Comstock. To that date the forty-nine incorporated companies had levied assessments \$77,920,385, and had paid in dividends \$120,553,770.

OF any stream on public land and subject to appropriation, anyone may appropriate any of the water not already appropri- ated. A later appropriator cannot diminish or otherwise interfere with the full supply of a prior appropriator.

THE Denver Mining Record declares that "the silver miners of Colorado are certainly to be congratulated on the growing interest in the white metal. It is not improbable that it will be 80 cents or higher before the close of the season of 1898."

IF an agent, administrator, executor, trustee, or any other person acting in a fiduciary capacity deposits funds that come into his hands as a trust in a bank in his own name, and the money is lost by failure of the bank, he can be held personally liable.

WHILE officials in different States have held that assessed and unpaid taxes are a collectable lien on unpatented mining claims, it is believed that prospectors and locators are safe in exercising their individual judgment as to paying or refusing to pay such levy.

THE horse power of a water supply can be determined as follows: Multiply number of gallons flow per minute by pressure in pounds per square inch, and divide by 1500. The pressure in lbs. per sq. in. is the product of the number of feet fall multiplied by .433.

THE Mount Morgan, Australia, mine paid last month a dividend of \$20,166 13s 4d—7d per share. This property was opened in '86; it is a pulverized mass of finely comminuted particles, unique in its conditions, and was for several years noted as the "greatest gold mine in the world."

GILSONITE is used in the manufacture of water proof paint, for painting the bottoms of iron ships and seawalls. The gilsonite found at Middle Park, Colo., is said to contain from 93 to 95 per cent carbon, of which only 40 per cent is volatile. The Utah gilsonite contains 88 per cent carbon.

A STEAM PUMP dispenses with the usual long rods connecting the ram with the piston. One self-contained machine includes the steam cylinder and water ram. The steam that supplies the power is conveyed from the surface; the displacement is produced either by single or double-acting ram or piston.

A DETAILED statement of Sicilian sulphur exports shows that the shipments to the United States were 164,875 tons in 1897-98, against 115,535 tons for the preceding year. This is an increase of 49,340 tons, and this has all occurred during the last half-year—that is to say, during the first six months of 1898.

OWING to the extreme heat, the Old Dominion Copper Co. at Globe, Ariz., made a change in the working hours, greatly appreciated by the employees, nearly all of whom are employed on surface work preparing for improvements and additions to the plant. They go to work at 5 o'clock a. m. and quit at 2:30 p. m.

CRYSTALLIZED CARBOLIC ACID is made by distillation from coal tar products. It is liable to become colored by age and exposure, but is not materially injured thereby. The addition of 8 1/2 drachms (or 33 gm. by weight) of water to each 500 gm. of this acid will render it permanently liquid and ready for use.

THE new ore bin of the Silver Lake mine at Silverton, Colo., is 98 feet long, 49 feet wide and 72 feet high, and has a capacity of 16,000 tons. There are four floors in the building and eight ore bins. The new tramway connecting the mine and ore bin is 6000 feet long. The total length of the tram lines is 15,000 feet.

TO BE constantly quoted is a sure sign of good journalistic work, as it is an expression of favorable opinion from the best judge—the exchange editor. It is always gratefully appreciated, still, if some of our contemporaries will credit one-half or one-third of what they clip from this paper it will be of additional satisfaction.

A PLACER is not to be expected to be immediately productive and profitable as soon as water is put on the ground. A placer must be opened and put in shape before it can produce profits, equally as well as a lode mine, and putting water on it is only the first step in development. Usually it requires at least one season after water is on the ground to open a placer so it will pay profits.

ZIRCON in certain varieties is cut into gems, and as such exhibits more fire than any other known gem except the diamond. It is an adamantine, variously colored, transparent to opaque zirconium silicate (ZrSiO₄), crystallizing in the tetragonal system. It occurs in crystalline rocks, especially granular limestone, chloritic and other schists. The smoky zircon is found in Ceylon and the pale in Norway.

REGARDING the H. P. of a steam boiler, with feed water at 100° Fahr. and a steam pressure of 70 pounds by the gauge, 30 pounds of water evaporated per hour is a H. P. To determine the power developed, divide the total number of pounds of water evaporated per hour under these conditions by 30. With good natural draft, using a well set tubular boiler, 15 square feet of heating surface will furnish a H. P.

THE heaviest substance known is the metal osmium, whose specific gravity is 22.477, while that of gold is \$19.265, lead 11.367, iron 7.79, and lithium—the lightest solid—is only 0.594. Osmium is also the most infusible of the metals. It resists the oxyhydrogen flame of 3550° Fahr., in which platinum and iridium flow, and is even almost entirely unaffected by the electric arc, which readily melts the extremely refractory ruthenium. It was discovered by Tennant in 1803, and is found in iridosmine and platinum.

THE French Consul-General makes the following statement, of interest to lead exporters engaged in trade with France: "As Spain has decided that on and after July 1, 1898, an export duty of 5 per cent should be exacted from silver-bearing lead leaving the country, an Act of the French Legislature of March 3 makes it imperative that a countervailing duty of 30 per cent per 100 kilos (220 pounds) be exacted from Spanish lead not silver-bearing coming into France. Importers of lead not silver-bearing of any other country but Spain into France must, in order to avoid the countervailing taxation, show by a certificate of origin, to be delivered by French

consuls at the port of shipment, that the goods do not directly or indirectly come from Spain. No new duty has been collected since Aug. 1." Nearly 3,000,000 pounds of lead are yearly shipped from the United States to France.

THE disclosures of Hooley, the London promoter, continue to be interesting. Lord de La Warr, chairman of the board of directors, got \$25,000 for the use of his name, and Lord Almarie £25,000 more. The man who "fixed" the London financial papers got £10,000. Finch Hatton, brother of Lord Winchelsea, arranged with the little London papers "not to pull the company to pieces." On the counterfoil of many checks was found written: "For quieting papers generally on pneumatics." Among the papers "squared" were the *Pall Mall Gazette* and the *Financial Post*. The editor of the *Corporation of British Investors* got \$2000 to "stay quiet." Hooley paid Lord Deerhurst £2000 for introducing him to Lord Ashburton. He also paid Mr. Aliston Hay £1000 for introducing him to Lord Norbury. Ordinary dukes, knights and marquises were secured at low figures, but "Lords" came high.

INVESTIGATION by Dr. Le Neve Foster into an underground fire at the Snaefell lead mine, Isle of Man, has brought to notice some interesting facts concerning carbonic oxide poisoning. This gas, though occluded by certain rocks and minerals, is never a natural constituent of the atmosphere of mines, and Dr. Foster satisfied himself that the twenty victims of this fire were killed by carbonic oxide from the burning timber in the mine. A small fire was found to give dangerous properties to a startlingly large volume of air. The burning of a cubic foot of larch produced enough carbonic oxide to occupy 417 cubic feet of space, and enough noxious gas is contained in 25 cubic feet of timber to give 1 per cent—sufficient to cause quick insensibility and death—all through the mine. A valuable agent in restoring still living sufferers from carbonic oxide is oxygen, and it is recommended that cylinders of this gas be kept convenient for immediate use in case of necessity.

IN *Gillis vs. Downey*, 85 Fed. Reports, 489, U. S. Circuit Court of Appeals, the court decided that the filing for an application for a patent does not suspend the obligation to keep up the required annual work where, without paying the purchase money, the claimant permits his application to sleep for years; and upon such failure to comply with the conditions the claim is open to relocation in the same manner as if no location had ever been made. The fact that the sixty days prescribed by the laws of the United States (Revised Statutes, 1878, section 2325), for publication of a notice of application for a patent has expired before the application is addressed, does not preclude a contest of the applicant's right to a patent, where the adverse claim does not arise until after the expiration of the sixty days, and where the applicant has allowed his application to lie dormant for years without either paying the purchase money or doing the required work each year.

A CAR is often wanted in drifting, and in quartz mining in places where iron trucks and trimmings are not to be had, Philip Minor says, a wooden truck built as follows is better than none. Cut two round sticks 10 inches in diameter and 3 feet long. Find the center of the ends and saw around them, leaving bearings 2 inches long and 2 inches in diameter, dressing them true and smooth. Cut the flange 2 inches farther back, making the wheel as true as possible 8 inches in diameter, 2 inches tread, with flanges 1 inch high. Cut away the surplus wood in the middle of the sticks, leaving only enough for strength. Make a box frame of plank or split lagging 3 feet square, 8 inches high, and cut notches in two sides 2 inches deep for bearings, 2 feet apart, and rabbitt them with bacon rind. Lay a platform on top and set a tub or box on that, tipping it off to empty it. Lay a track of split poles, with the bark and knots trimmed off, 22 inches inside gauge, and it is ready for straight ahead work. By using only one roller and putting handles on the frame, a very handy truck is made, to carry twice the load of a wheelbarrow.

HAULAGE ropes are generally made of steel wire. According to a paper in the *Zeitschrift des Vereins Deutscher Ingenieure*, ropes of aloe fiber may still compete with steel, even for deep shafts. The aloe fiber is stronger and more elastic, but less flexible than Manila hemp; its chief advantage is that it becomes stronger in damp places. The ropes have to be tarred, but in spite of this circumstance the corresponding lengths of rope which would break by virtue of their own weight are 12,000 for aloe and 12,500 for steel. In Belgian mines haulage by means of aloe ropes is quite common; great lengths are made with decreasing thickness. A new style of rope is "the simplex," recommended for telpher lines, but not for haulage. These wires are tubular. All the wires being visible from outside and pressed against one another, breakages are said to be unlikely. Three wires of this type have been placed in a lake near Amsterdam. The laying is very quickly accomplished. The process only is indicated. Over a lead pipe, about 2 inches in diameter, 1-6 inch thick, an impregnated texture is first applied, and this then wound with 3/4 inch "fasson" wires. An outer layer of cloth, held by galvanized wires, is then added, as a protection against rusting. The finished pipe would have a diameter of 82 millimeters, 3.23 inches, weigh 20 kilogrammes per meter, and cost 16 marks—a high price.

At Magog, Quebec, Canada, air is automatically compressed by a column of water flowing down a pipe in a shaft. The water is received in a tank, from which a vertical pipe descends in a shaft. The air is carried down in this vertical pipe with the water, being drawn through a series of small pipes at the head and carried down in the water in the form of small globules and delivered in the compression tank at the bottom, the compression being produced by the presence of the back column of water, each 27 feet of shaft depth producing one pound of air pressure in the cylinder. The water absorbs from the air the moisture contained in it and delivers the air dryer than the atmosphere, and at the same temperature as the water. A local paper says: "In the plant described 150 air horse-power is produced, and an efficiency of 62 per cent is obtained. In other words, out of a given theoretic horse-power 62 per cent of actual air horse-power was delivered at the engines, and with slight modifications 70 to 75 per cent has been obtained." "Suppose," says J. T. Grayson of Toronto, "such a plant was used in the Comstock mines, for instance, where water is carried down in pipes 1600 feet. The result would be a pressure of fifty-nine pounds at the bottom. This used in a second and third compressor could give an air pressure of 2000 pounds, with which liquid air could be produced. With such a plant, liquid air would result in bringing the Comstock once more to the front as the greatest producer in the world."

Broad Arrow District, Western Australia.

TO THE EDITOR:—English capital has favored the Broad Arrow gold field more than any other district in Western Australia, but from this district it derived less profit than from any other. The aggregate capital of the mining companies operating in and about Broad Arrow is something like £6,000,000 (or \$30,000,000). There has been absolutely no return for the enormous expenditure made. Many other districts have a quota of poor mines, but the drear aspect of worthless and wanton mining speculation is relieved in most cases by the display of at least one payable mine. All the mines that have crushed in the Broad Arrow district have closed down immediately following the crushing. It may have been the misfortune of Broad Arrow that the poorest mines have been the first floated, but to my knowledge the last mine that crushes shows the poorest returns. So far they are all worse.

The principal companies operating in Broad Arrow are:

| Name— | Capital. |
|------------------------------|----------|
| Hit or Miss Proprietary..... | £180,000 |
| Black Flag Proprietary..... | 600,000 |
| Arrow Brownhill..... | 100,000 |
| Arrow Proprietary..... | 135,000 |
| Bardoc..... | 100,000 |
| Big Blow..... | 150,000 |
| Blackette..... | 60,000 |
| Black Flag Consols..... | 140,000 |
| Credo..... | 100,000 |
| Dixie..... | 85,000 |
| Gladiators..... | 120,000 |
| White Feather..... | 380,000 |
| White Flag..... | 130,000 |
| Talisman..... | 80,000 |
| Lady Bountiful..... | 50,000 |
| Hill End..... | 250,000 |
| Half Mile Reef..... | 150,000 |
| Two Golden Crowns..... | 200,000 |
| Golden Arrow..... | 200,000 |
| Paddington Consols..... | 175,000 |
| Paddington South..... | 175,000 |
| Duke..... | 175,000 |
| Reison's Reward..... | 75,000 |

The principal crushings have been 225 tons from the Hill End, before flotation, for 2482 ounces; 452 tons from Hit or Miss for 655 ounces; 917 tons from Half Mile Reef for 609 ounces; 119 tons from Golden Arrow for 75 ounces; 153 tons from Gladiators for 118 ounces; 300 tons from Arrow Proprietary for 47 ounces; 200 tons from Dixie (before the reef cut out) for 804 ounces; 800 tons from Talisman for 40 ounces. The Black Flag Proprietary crushed about 1000 tons per month for 4 dwt. per ton.

Reison's Reward, the first claim located on the Broad Arrow gold fields, is the most noteworthy here. Its discovery happened in an unlooked for way. Young Reison, who was on his way into the desert, prospecting, seeing rain coming on, decided to pitch his tent and hobble his camels. He was considering for some time whether he should stop on the rise where Reisons is located, or move on farther to the rise whereon the Hill End now stands, but the aspect of the clouds made him decide on Reisons. The rain came down very heavily during the night and the next morning, with a bright sun shining, Reison found the ground about him sprinkled with nuggets. In two hours he picked up over 200 ounces of gold, the largest piece weighing 69 ounces. He immediately went back to Coolgardie, applied for the claim and got back before anyone had found his tracks. In the following two months he took out over 2000 ounces and found a float leader of wonderful richness. When the leader was found the gold on the surface (alluvial) was about exhausted, and, as the boom was on, Reison determined to take out all he could without spoiling the flotation of the claim. He followed the leader—which was about 10 inches thick—90 feet, and in that distance it made only 10 feet towards the vertical. He gouged out all the payable ore except a shell, which he left along the drives, and, after having dollied out about £16,000 worth of gold, sold the claim on the strength of the leader for an additional £16,000. The purchase of the claim involved either great stupidity or dishonesty, for a single hole drilled and fired in the leader afterward proved the hollowness of the affair, while the subsequent flotation showed the purchasers in a bad light. The main shaft is now down 320 feet and has passed through three different lodes of an average width of 40 feet. In my opinion these "three different lodes" are but one lode, having three "breaks," occasioned by bars of diorite, which throw the lode back. However, there are not ten tons of payable ore in the lode, although there are patches of telluride of extraordinary richness.

The Hill End was the second claim located in Broad Arrow. Its mainstay is a body of quartz from 10 inches to 2 feet thick, proven to a considerable distance and to a depth of 200 feet. The original owners took out over £10,000 worth of gold from this reef by dollying, and sold it to Dr. Symon for £40,000. With a 3-head battery run by an oil engine Dr. Symon recovered his purchase money in three months. Since then, however, nothing has been gotten. A Krupp ball mill, with a capacity of thirty tons per day, has been erected, but has not as yet cleaned up, although the amalgam has been accumulating several months. From the developments I believe this mine should keep a 10-head battery running several years on 1-ounce stone. The people here, however, will never give in to an ounce

average. The Hill End is their chief mine for the time, and they will have it go 2 ounces or more. They can never realize that Broad Arrow is a first-class 10-dwt. district and has met a setback simply because it was floated on a 4-ounce proposition. It is very lucky, for the place, that the Hill End is controlled by a reliable company, who are satisfied with moderate profits and no not wish to make any on the share market.

The Duke mines comprise the largest acreage of any property in the Broad Arrow district. The mines are located two miles north of Broad Arrow and consist of the Duke, Duke Extended, Duke South and Aurora. The Duke main shaft is now 260 feet deep and is to be taken down to 500 feet without delay. Considerable work has been done on the principal body of ore, which was found at 120 feet. This ore occurs as a deposit and is the result of upheaval and subsidence. A more kindly quartz, or quartz more pregnant with the precious metal, is hard to find in any part of the world; but a reef, as some presume to call it, more erratic does not exist. The erratic nature of the Duke lode may be partly imagined from the fact that decomposed rock is found at 260 feet in the main shaft, while at the surface, and not 20 yards distant from this shaft, unaltered rocks outcrop. The lode, of course, has been found to be disturbed to the greatest extent in this decomposed zone near the unaltered outcropping rocks; but whether the decomposition of rocks is responsible for the disturbance of the "reef" remains to be proven. I consider the disturbance is due to slow motions during the more or less saturated condition of the decomposed material creeping downwards on an inclined plane of unaltered rock, as well as to collapse caused by loss of support of the former wall rocks. In other mines in this district similar conditions prevail as in the Duke, but in a less degree, notwithstanding which, however, the loss of the mineral contents of the reef is greater. As the Duke is the best example of the Broad Arrow lodes, it may be as well to describe it and to offer an explanation for the loss of mineral contents in other reefs through disturbance. The decomposition of rock as visible in the Duke was caused by the atmospheric waters, which, before reaching the earth, held in solution valuable quantities of carbonic acid, oxygen, nitrogen, ammonia and various nitrous compounds, and which, coming in contact with decomposing vegetable matter at and immediately beneath the earth's surface, dissolved therefrom phosphates, potassium, silica, manganese and calcium, together with certain organic acids, all of which are most effective agents in the decomposition of the crystalline silicated minerals and the redistribution of the soluble matter. The most important agent was carbonic acid derived, during the earlier geological periods, principally from the atmosphere, and latterly from vegetable oxidation at the earth's surface. By the power of this acid of dissolving and removing the alkaline and earthy silicates from crystalline rocks have resulted the stratified sedimentary slate which is the "country rock" in the Duke. Other important agents were the organic acids, which have such a strong affinity for oxygen that they will readily extract it from such insoluble products as the peroxide of iron and manganese, converting them into protoxides, which are readily soluble by carbonic acid or by an excess of organic acids themselves, which by this reaction become oxidized to carbonic acid and water. They also have the power of extracting oxygen from soluble metallic or earthy sulphates, converting the former into insoluble sulphides. By this means not only the greater part of the iron and manganese found as lodes and deposits in the stratified and altered rocks of the district have been derived originally from the decomposition of crystalline rocks brought into solution by circulating waters charged with carbonic or organic acids, and precipitated by oxygen as peroxides most readily at or near the surface, but to the reverse action much of the metallic sulphides found in deposits owe their origin. The rocks here are principally crystalline, composed of feldspar, consisting of the silicates of lime, soda or potash combined with the silicate of alumina, and hornblende, consisting essentially of silicate of lime and magnesia combined with the silicate of alumina, together with iron and manganese. The actions of the atmospheric waters on the minerals contained in these rocks would be as follows: The affinity of carbonic acid for lime, soda, potash and, at times, magnesia is so strong that this acid will attack and break up their combination with silica and many other combining acids. Owing to this powerful affinity of carbonic acid for the alkaline and calcium silicates contained in the feldspars, it is thus enabled to seize upon and remove lime, soda and potash as bicarbonates, dissolving them, together with the greater portion of the silica originally combined with them, leaving behind (where the leaching has been complete) the insoluble silicate of alumina, combined with a definite portion of water in a fixed state—known as kaolin. The basic minerals—hornblende, pyroxene, etc.—are similarly attacked by carbonic acid, changing the silicates of lime and magnesia to soluble bicarbonates, at the same time liberating the silica originally combined with them in a soluble form. In this way the composition of the minerals forming the crystalline rocks are not

only broken up by the action of carbonic acid converting their lime, soda, potash and magnesian silicates into bicarbonates, but, where the organic acids are also present in sufficient quantity and leaching has been completed, the whole of the iron and manganese ore are brought into solution. It is evident that, as a result of these reactions, where the flow of solution is sufficient to leach the soluble products of decomposition as soon as formed, the minerals, whether feldspathic or basic, so acted upon will eventually have been deprived of the whole of their lime, soda, potash and magnesian silicates, together with manganese, iron, etc., leaving behind little else than the hydrous silicate of alumina as kaolin. The conversion of such minerals to pure kaolin, however, is rare, occurring only among the most favorable conditions of mineral decomposition and leaching. In a dry climate such as this, with but slight drainage falls and insufficient solution to carry off the soluble salts, these must still remain to a large extent, mixed with the insoluble alumina and ferric and magnesian oxides. Kaolin occurs under such conditions only in connection with lines of freest percolation. Although the silicates of lime, soda, potash and magnesia are each converted into soluble bicarbonates by the action of carbonic acid, this acid exhibits a partiality towards certain salts. For instance, when in two adjoining rocks, the one containing potash feldspar, the other soda feldspar, the latter will be decomposed much more readily than the former, and by the removal of the decomposed material will eventually become a valley, and by receiving more than its share of the water from the higher ground may in time be very deeply decomposed, while the more resisting rock may be comparatively unaltered even near the surface. Should rocks of this class alternate at short intervals, deep channels of decomposed material may be found with walls, pillars or irregular bodies of unaltered rock between. In the lime-soda feldspar it is found that the lime is attacked more readily than the soda, while magnesia has such slight affinity for carbonic acid that it will readily exchange this acid for silica in the presence of silicate of lime and, often, soda. This selection of one base in preference to another by carbonic acid often results in the removal of, first, lime, then soda, from partly decomposed rocks of mixed composition, leaving the greater part of the potash and magnesian silicates in a state of comparative stability, but which must eventually yield to the slow but inevitable attacks of carbonic acid and be completely decomposed and changed to soluble bicarbonates and silica. This explanation may help to excuse the flotation of the Duke for £175,000, considering the fact that subsequent to flotation the extraction of 5000 tons of 4-ounce ore left the mine practically worked out.

The Paddington Consols was floated under the auspices of the London & Globe Corporation. The mine contains the only true vein in the district, but unfortunately, the vein contains no gold. A 20-head battery is on the mine and there is plenty of water to run it. At the 100-foot level the lode is 40 feet wide and the reef 7 feet. At this point the lode has been run on 1200 feet. The main shaft is down 200 feet. A large flow of water has prevented further sinking.

The Black Flag Proprietary is a glaring case of bad mining. Five hundred and twenty-five thousand pounds were paid for this mine, and with a 50-head mill running enough gold cannot be produced monthly to pay for wear of the stamps.

The Paddington South is situated on the Mon and Paddington Consols line of reef, and is one of the choicest wildcats on the line. Two years ago the reef was reported to carry 3 ounces gold per ton a through, but up to the present it has not produced enough gold to gild a nickel. Many managers have had to do with this property, and each successive manager has vied with his predecessor in extolling the praises of the mine, and none of these managers are ignorant of mining. When one looks at the white, hard, barren, horse-sickening quartz of the mine and hears its praises sung by the person in charge, one is convinced that it takes such a person to run a wildcat.

Other mines in this district which merit condemnation on the same scale as the preceding are the Golden Arrow, Hit or Miss Proprietary, Gold Crown, Arrow Proprietary, Credo and White Feather. Most of these were floated without justification. Of course, dishonest managers are to blame, but the iniquitous policy of London directors of appointing the accountant under the manager lessens the latter's responsibility. If the mine manager is not thought trustworthy he should never be employed, but when he is placed under the espionage of an inferior the directors are shown to be too suspicious to be trustworthy. In fact, the directors engage the accountant as a spy who must force the manager to dishonesty. The accountant is required to write out the manager's reports and to post them after obtaining the manager's signature. I know cases where pages of the manager's reports were withheld and others substituted, and cases where figures were changed after the manager had attached his signature. This work was attributed to the London directors who were manipulating the stock. Here, of course, this is a matter of our

ut under the Stars and Stripes, I am pretty sure, the persons concerned would be speedily utilized by the State. When I consider how extremely tricky the cute Yankee is made out to be by the English, as well as other Europeans, I can not refrain from remarking that if such outrageous operations as are performed on the London public by London directors were attempted in America those attempting would be swung up. For instance, the Nerrin was floated as a proved mine, with reef proved to 300 feet, of an average value of 9 ounces per ton and width of 3 feet. The first crushing was 400 tons of an average value of 34 dwts. per ton. The public now hold all the stock. Such a thing could not happen in America; but if it could, something else would happen afterward. At least it would be a case for the police.

In conclusion, it is pleasing to remark that some of these wildcats will some day be tamed and become real good low-grade mines, averaging 10 penny-

One of the World's Richest Mines.

Mining for copper was begun on the Keweenaw peninsula of northern Michigan in a small way in 1866, and has since continued uninterruptedly. In less than a third of a century the Calumet and Hecla mine has paid in dividends \$53,850,000, and has on hand in cash, bills receivable, copper, copper mineral and supplies, property which would realize \$5,000,000 more within a few weeks, this not including the millions of dollars worth of machinery or the mine itself, which on the basis of recent stock sales is worth \$55,000,000. To develop this mine assessments of \$1,200,000 were levied, which have been returned forty-fold. The mine pays quarterly dividends of \$1,000,000. This sum is below the net earnings of the mine, which with copper selling at 12 cents a pound is nearly \$6,000,000 a year. President Agas-

shareholder. There are several single shareholders who have millions invested in the stock of this one mine, while there are hundreds who have but a single share or two. Many of the employees of the mine have systematically invested their savings in the shares of the property for years, and, through the steady appreciation of the stock and the dividends returned, have grown independent. One man who began twenty-five years ago as a surface laborer at the mine, just over from Germany and without a dollar other than earned with his hands, now owns over 500 shares, worth \$250,000. Every dollar saved was invested, every dividend paid him was made to buy more stock. There are many old employees worth from \$10,000 to \$50,000 each, made in the same way.

Calumet, of which the Calumet and Hecla is the center and by far the largest mine, has 40,000 people, and is divided for government purposes into two villages—Red Jacket and Laurium—and two townships—Calumet and Osceola. Calumet is the largest



BITUMEN MINE, SAN LUIS OBISPO COUNTY, CAL.—See page 177.

weights of gold per ton for tens of thousands of tons.
JOHN DWYER.

A GERMAN exchange notes that on account of the vibrations due to engines and other machinery the ordinary cement floor has not been found entirely durable. An advantageous composition is made of lime, sand, cement and clinkers, which should be used in thicknesses of at least 10 inches. The best mixture is said to be: Portland cement, 1 part; unslaked lime, 1 part; sand, 3 parts, and sifted clinkers, free from ashes, from 7 to 8 parts. For a top dressing of finer mass the composition should be 1 part cement, 3 parts sand and 2 parts of finely ground and sifted clinkers, the dressing to be well rammed and rolled after laying. Floors constructed in this way are said to be practically indestructible.

THE process by which wood is rendered non-flammable in the navy is intricate, but effective. The timber is first placed in a cylinder and a vacuum is formed. Steam is then admitted to the cylinder, which causes the moisture in the wood to vaporize. The products of the vapor are removed and the vacuum is re-established. At this stage of the work the saturating liquid—the consumption of which is a secret—is forced into the cylinder and the wood is thoroughly impregnated. After the wood has been dried, it is found that it is absolutely incapable of either supporting or conveying flame.

THE right hand, which is more sensitive to the touch than the left, is less sensitive than the latter to the effect of the heat and cold.

siz reports the following statement of assets and liabilities for the year ending April 30th, 1898:

| | |
|---|--------------------|
| Cash at mine office..... | \$172,968 |
| Cash at New York office..... | 15,000 |
| Cash at Boston office, exchange, copper at 84c. per lb., and mineral at 4c. per lb..... | 6,914,696 |
| Bills receivable at Boston and mine..... | 543,336 |
| Insurance fund..... | 205,651 |
| Total assets..... | \$7,851,651 |
| Drafts in transit..... | \$165,844 |
| Employees' aid fund..... | 14,261 |
| Bills payable at Boston and mine..... | 258,090 |
| Machinery contracts, coal docks, dredging and houses..... | 855,000 |
| | 1,293,194 |
| Balance of assets..... | \$6,558,456 |

The Calumet and Hecla owns mines, stamp mills, smelters, railroads, docks, steamer, water works, sawmill, farms, forests, a ship canal and cities built on its own land. Standing on its property are nearly thirty churches in which the Gospel is preached in English, French, German, Italian, Swedish, Norwegian, Finnish, Slavonian and other languages. Each of these churches the Calumet and Hecla has furnished a free site for, as well as ground for a parsonage, and has helped to build by a cash donation which has invariably been the greatest in amount of any received for the purpose. Twenty thousand persons are dependent directly upon this corporation for their bread and butter, earned by the more than 4000 workmen whose names are on the payrolls. The wages are the highest paid in the copper district. The sums paid for labor and the annual dividends are about equal. A report furnished the MINING AND SCIENTIFIC PRESS shows that there are 2462 shareholders, who divide among them \$4,000,000 annually—an average of \$1625 for each

town in the country without a city form of government.

The stamp mills are four miles from the mines, on the shores of Torch lake; the rock from the mines is hauled to the mills in cars over a standard gauge railroad, well ballasted, equipped and manned. The stamp mills are two in number, the Calumet and the Hecla, each having eleven steam stamps. The gold-bearing quartz is crushed by gravity stamps; the conglomerate carrying the copper is pulverized by ball stamps, where an 18-inch piston is propelled by steam at high pressure to strike blows which make the earth quiver for a quarter of a mile about the mills.

The process of extracting the copper from the rock is simple in principle. The rock, which has already passed through crushers at the shafts, is fed into hoppers which deliver it under the stamp. From the mortar box, where it is crushed by the steam stamp, the rock passes through jigs and vanners, where an ever-continuous gentle motion, assisted by innumerable sprays of water, separates the coarser particles of copper from the rock, the greater weight of the copper causing it to fall into receptacles calculated for its retention, while the water carries the lighter sand from the crushed rock to further siftings. This process of selection is carried on from one machine to another, under ever-present jets of water, until the very finest jets of copper have been saved and only the worthless sand remains from what was rock carrying 3 to 10 per cent copper when it entered the big bins on the top floor of the mill. Nearly 4000 tons of copper-bearing conglomerate rock are fed into these two mills daily, all of which must be crushed into sand. The waste from the

mills would bury the machines in twenty-four hours if it were not removed. The process of removal is simple, the only agents being wooden launders and plenty of running water. Small launders run from the side of each machine, carrying the sand in solution. As these runlets join the size of the launder grows, until as the streams emerge from the mills there are a dozen rushing torrents of brick-red water. These are carried to a big cistern, not far distant, where a wheel 100 feet in diameter turns, its big buckets on its inner periphery scooping up the water from the cistern and dumping it nearly 100 feet above into a wooden launder which is elevated high in the air on trestles, and which carries the rapidly running sand and water a quarter of a mile into the lake, where a reddish Niagara spouts unceasingly from the wooden trough during the working hours of the mill. At first the water which carried the sand ran into the lake, near which the mills were placed, but the lake was filled and it became necessary to resort to the elevation of the water by the big sand wheels, to secure the necessary fall to permit the water to sweep the sand freely along with it. Millions of tons of sand have been poured into the lake, and hundreds of acres of dry ground now appear where there were once from 10 to 50 feet of water.

Not the least noticeable thing about the Lake Linden works of the Calumet and Hecla is the pump which furnishes water for the twin mills. This is claimed to be "the greatest pump in the world" and is housed in a tall building by itself. It stands 30 feet in height, and at each stroke forces nearly 500 gallons of water to the top of the mills. It feeds from a cement cistern having free connection with the near-by lake, and every minute of the working day raises from 30,000 to 40,000 gallons of water, having a capacity of 60,000,000 gallons a day. Its nearest neighbor in capacity in America is the 24,000,000-gallon pump in the Philadelphia water works.

Dredges and Amalgamators.

There are three distinct types of dredges used in river, harbor and placer work, viz., the ladder, dipper and suction. The ladder, or chain-bucket type, is probably the oldest and was originally designed in Holland, where it has been extensively used in canal and harbor work. In later years it has been largely in use in New Zealand in placer mining, where the material to be handled is lighter than in most placer beds in the United States. This style of dredge has its advantages. It is usually constructed of lighter material than the dipper type, works rapidly and the first cost is generally lower than that of the latter, both of a given capacity. But when it comes to handling the heavier material generally encountered in river beds, banks and bars, it is doubtful whether the ladder or chain-bucket dredge can equal the dipper dredge in strength or thoroughness.

The dipper dredge, originally covered by the Osgood patents, long since expired, has been used in this country in harbor and canal work for fifty years and was a factor in the construction of the Suez canal and the great Chicago drainage canal. In fact, the heavy dredging work of the world has been done by the dipper dredge. The older makes of this dredge were able to dip up the material and deliver it only to a point at right angles with the car body; but a later pattern, covered by E. S. Bennett's patents, is so constructed as to swing the loaded dipper around and deliver the gravel on the rear of its own platform, then completing the circle before reloading. In this case the dipper is made to open and close automatically.

The suction dredge is so made as to produce a vacuum in a submerged pipe, as a result of which there is a violent rush of water, sand and gravel to the surface. This suction is capable of carrying up quite heavy material, but cannot loosen the gold particles which are often imbedded and cemented in the crevices. The capacity is ample in this style of dredge and its work is effective in sub-aqueous sand and silt. It has been in use to some extent in North Carolina, and one was built to operate near Elizabethtown, New Mexico.

Until recent years all types of dredges were operated by steam, but successful attempts have lately been made to operate them by electricity. In the economic use of steam on the dipper and ladder dredges, the advantage seems to have been with the former. S. Y. Schermerhorn of the American Dredging Co., Philadelphia, in December, '93, says: "Recent English experiments have demonstrated that ladder dredges consume 60% of engine power in moving buckets and engine without working load." This would tend to show a greater loss of power in operating the ladder dredge than the dipper, on account of the greater friction in running the buckets than in operating the dipper. By the application of electric power to either dredge, the mechanism is simplified and much friction eliminated, because a motor can be attached direct to the work to be performed. An electric power plant is being put in at Boise basin, Idaho, for the purpose of operating dredges of the ladder type.

The amalgamator feature of the gold-dredging plant is always an application of some form of device

for saving the gold by gravitation. Where mercury-filled riffles are used, it is still a matter of saving the gilt particles by gravity. But the application of this principle is often so interfered with that only a small percentage of the free gold is saved. In many cases all the lighter and finer particles are lost and ignored, and it is believed by good authorities that this very fine gold constitutes 90% of the gold values in alluvial deposits. Much of this is so fine that it is incapable of being saved in swift currents of water; but it is known to gravitate better in still water. In the saving some time ago made by a Colorado amalgamator 70% of the saving was of the flour gold, which would certainly have been lost by the usual gold-saving method. The world has been enriched by the saving of the 5% or 10%, constituting the coarse free gold in gravel beds, but when some device shall be so perfect as to allow the principle of gravitation to act perfectly, we shall appreciate the value of the 90% which was lost.

Denver, Colo., Aug. 4th, '98.

WASCOTT.

Should Not Be Removed.

TO THE EDITOR:—The removal of the State Mining Bureau from its present central location to the Ferry building is the most move of any State department in years. The State of California can be justly proud of its collection of minerals, embracing as it does the finest collection of its class in the world—the result of the enterprise and liberality of our earlier mineralogists, aided by liberal donations of miners and appropriations of the State to keep up and diffuse information and awaken interest in the leading industry of the State, which has made it what it is. No better location than the present one can be had—central, easy of access, near all the hotels. Every mining man or those interested, whether to consult authorities in the library or glean from the interior mining papers the weekly news, or by those who desire to inspect the valuable collection of minerals on exhibition, both students and curiosity seekers—all will go, while the ferry depot will not have one in ten visit it. Upon inquiry I find that the present quarters have 16,000 square feet as against less than 10,000 at the ferry, and while they are all light throughout, the proposed ones are on a dull day dark enough to require lights. The excuse offered for removal is that the rent will be only \$150 per month as against \$250. Well, which is the cheaper: to go where the usefulness of the institution will be destroyed or remain where it will benefit those for whom it is designed? The last Legislature endeavored to abolish the Bureau. Is this the preliminary stroke to enforce the same? It really looks to me as if every valuable State institution must be governed by politics or be crushed out, and this seems

to be one of them, as it affords too few places for incompetents. Thus, lack of appropriations finally takes out of the field work men who have and can gather the most valuable information and practical hints on mining, until now the annual report is nothing but a mass of statistics, dry and uninteresting, except as to those immediately concerned. The removal of any of our large commercial houses from the lower part of the city out to the park would be just about as reasonable, because they could secure a lower rent, although losing their trade, as the removal of the Mining Bureau will be for any benefits that will accrue to the miners.

San Francisco, August 15th, '98.

Good Mill Work at Pony, Montana.

TO THE EDITOR:—I send you herewith a copy of a weekly mill report that I find quite convenient for preserving a record of mill work. Attention is called to the amalgamation test. The gold here is in such fine particles that battery amalgamation was supposed to be the best for close saving. Inside plates were formerly used, but were removed; battery amalgamation was continued; the clean-ups showed no gold in the mortars. The loss of quicksilver was three pounds per 100 tons of ore crushed. Two weeks' test was then made as indicated. Two batteries run with quicksilver fed with the ore, and two with none inside, all being fed onto the lip and apron plates. The results were so favorable that outside amalgamation is used exclusively; the run on "lead ore"—ore carrying 9 per cent of concentrates of 50 per cent lead value, yielding \$3.75 per ton on the plates with a loss of one and a quarter pounds of quicksilver per 100 tons of ore. The screens are 30-mesh steel wire, with narrow, steel-lined mortars; 950-pound stamps, hammered steel shoes and dies, steel cams and tappets. An average of fifty tons per day is put through. The pulp passes over lip, apron, terrace and sluice plates and riffles, through two sets of hydrometric sizers to six Frue vanners—two 4-foot Morse belts and four 6-foot plain belt machines speeded to handle sized stuff. A 4-foot Pelton wheel under 160-foot head furnishes power for the stamps and Blake crushers, while a No. 3 motor runs the vanners. The mill, located two miles west of Pony, Mont., is conveniently arranged and substantially built, having a seven months' water season at this altitude, 6000 feet. The output of ore this season is partly oxidized, giving a lower percentage of saving than from the lowest level. The ore is quartz, mixed with porphyry, carrying about 4 per cent of iron, lead and copper sulphides. The mine now being worked—the Galena—is one of eleven patented claims and shows a ledge from 4 to 30 feet wide of milling ore. It is opened through two tunnels, the

DAILY RUN FOR WEEK ENDING JULY 31—MIDNIGHT.

| DATE. 1898. | BATTERY NO. 1. | | BATTERY NO. 2. | | BATTERY NO. 3. | | BATTERY NO. 4. | | RUNNING NOTES | REMARKS. |
|----------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|-------------|--|---|
| | STAMPS. | | STAMPS. | | STAMPS. | | STAMPS. | | | |
| | Dropped. | Hung Up. | Dropped. | Hung Up. | Dropped. | Hung Up. | Dropped. | Hung Up. | | |
| July 15 | 12:35 A. M. | 12:30 A. M. | | | | | 6:00 A. M. | | Changed screen. | Team took 52 sacks concentrates. |
| | 6:45 A. M. | 6:35 A. M. | | | 6:05 A. M. | | | | Changed screen. | |
| | | 6:40 P. M. | 12:10 P. M. | 12:05 P. M. | | | 6:40 P. M. | 6:40 P. M. | Shoe off. | |
| | | | | | | | | | Changed screen. | |
| | 7:00 P. M. | | 7:00 P. M. | | 7:00 P. M. | | 7:00 P. M. | | Fixed lining on 1 and 2 drive belt, and main belt. | |
| July 16 | | | | 1:20 A. M. | | | | 2:25 P. M. | New screen. | Team took 112 sacks concentrates. |
| | | | | 1:30 A. M. | | | | 2:35 P. M. | Fix feeder. | |
| | | | | 6:30 P. M. | | | | | New screen (battery lining worked loose) | |
| | | | | 6:35 P. M. | | | | | | |
| July 17 | | | | | 12:45 A. M. | 12:40 A. M. | | | Changed screen. | Amalgamation test for run: 1 and 2 inside. 3 and 4 outside. |
| | | 9:45 A. M. | | 9:45 A. M. | 10:30 A. M. | 10:30 A. M. | | 10:30 A. M. | Cleanup. | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| July 18 | 4:45 P. M. | | 4:45 P. M. | | 4:45 P. M. | | 4:45 P. M. | | Breaker on 8 to 12 A. M. Started up on lead ore. | 494 lb. thin amalgam. |
| | | | | | | | | | 40-mesh screen on 3 and 4. | 414 lb. quicksilver from retort. |
| | | | | | | | | | | 100 oz. (Troy) bullion. |
| | | | | | | | | | | Team took 65 sacks concentrates. |
| July 19 | | | | | 1:00 A. M. | 12:40 A. M. | 1:00 A. M. | 12:40 A. M. | Put 30-mesh screens in | Concentrates on hand, 59 sacks. |
| | | | | | | | 10:40 A. M. | 10:30 A. M. | Fix feeder. | Assays tailings this run: 30-mesh, \$1.00; |
| | | | | | | | | 1:30 P. M. | Changed screen. | 40-mesh, \$1.20. |
| | | | | | | | 1:35 P. M. | | | |
| July 20 | | 10:00 P. M. | | | | | | | New screen. | Assays of last run: Battery, \$5.20; tailings, 80c. |
| | 10:05 P. M. | | | | | | | | | |
| | | | | | | | | | | |
| July 21 | | | | | 8:25 A. M. | 8:30 A. M. | | 4:00 P. M. | Changed screen. | 2 days 9 hours net this week for 20 stamps on last run. |
| | | | | | | | 4:05 P. M. | | New screen. | |
| | | | | | | | | | | |

3 days 6 hours net for 20 stamps this week on new run.

E. L. BALLOU, Superintendent.

lower being 600 feet above and 800 feet distant from the mill. The lower tunnel opens the vein 250 feet below the surface, showing so far two main ore chimneys, one carrying a good percentage of lead, the other less lead with some copper. A gravity tramway delivers the ore to the mill at a cost of less than 5 cents per ton, the total cost of delivery and milling being under 60 cents per ton. This property belongs to the Garnet G. M. Co. of St. Louis, Mo.; F. C. Wood president, J. M. Durdy secretary, and C. H. Wood resident manager. The mine and mill give employment to thirty men.

E. L. BALLOU.

Pony, Montana, August 8th, '98.

Coast Industrial Notes.

—Pasadena, Cal., satisfactorily sprinkles its streets with petroleum.

—In a field fire at Pendleton, Oregon, 11,550 bushels of wheat were recently destroyed.

—Seventy-five carloads of sheep passed through Sacramento, Cal., last Monday for Chicago.

—Joseph Rising cut 140,000 shingles in ten hours at an Everett, Wash., shingle factory recently.

—The Los Angeles Express estimates this season's walnut crop of southern California at 4500 tons.

—Ninety carloads of fruit were shipped East last Saturday and Sunday from Sacramento, Cal.

—New Zealand favors the Pacific cable, and would adhere to the Pacific rather than the Cape route.

—Latest reports at Vancouver, B. C., are that the northern salmon pack amounts to 193,300 cases.

—Whittier, Cal., proposes to issue twenty-year bonds for \$40,000, to build municipal water works.

—At Huntington, Oregon, O. W. Porter last week sold 150,000 pounds of wool at 13 cents a pound.

—The Shasta Lumber Co. at Buena Vista, Cal., is outputting 120,000 feet of lumber daily and employing 300 men.

—At Heppner, Oregon, 425,000 pounds of wool were sold last week at prices ranging from 9½ to 13½ cents a pound.

—The Northern Pacific is pushing work on the Hoquiam extension and will have trains running to Hoquiam by Sept. 1st.

—The Lakeside ranch near Bakersfield, Cal., is said to have produced this year 50,000 sacks of barley and 45,000 of wheat.

—The extent of the drouth in California is indicated by the likelihood of the Truckee river going dry next month, an unheard of event.

—The Ogallala Cattle Company, Casper, Wyo., has sold its cattle, 20,000 head, to C. J. Hysham & Co. of Red Oak, Ia., at an average price of \$30 a head.

—Mackenzie & Mann, building the Columbia & Western extension into the Boundary country, B. C., have secured 1000 men in Boston; wages, \$2 per day.

—At Chino, Cal., the sugar factory has begun grinding beets. The crop on the Chino ranch amounts to 2800 acres. About 7000 tons are expected from Anaheim.

—The Quaker City National Bank of Philadelphia has brought suit against the city of Tacoma, Wash., for the payment of old city warrants aggregating \$100,000.

—San Diego, Cal., reports a good Eastern demand for lemons and at satisfactory prices, but the fruit is scarce in that section. Five carloads were shipped last week.

—The canal known as the Big Ditch in Hood River valley, Oregon, built for the benefit of fruit growers at a cost of \$28,000, was paid for out of this season's crop of berries.

—The Red Cross Society of San Diego, Cal., furnished a carload of lemons for the U. S. soldiers at Santiago. Miss H. M. Gould of New York paid the transportation charges.

—Pres. J. J. Hill of the Great Northern Railroad says that he will at once begin work on improvements in the northern part of Seattle, Wash., that will cost nearly a million dollars.

—At Sanger, Cal., the American Lead Pen-ll Co., a branch of the Hoboken, N. J., factory, uses five cords of redwood bolts per day. A carload of bolts is shipped to the Eastern factory every week.

—The U. S. Land Office at La Grande, Oregon, shows that in the district composed of Baker, Grant, Morrow, Umatilla, Union and Yallowa counties there is an area of 5,804,744 acres of unappropriated and unreserved lands.

—A fire at Fresno, Cal., last Saturday, destroyed property valued at nearly \$400,000. It rained packing plants of the Forsyth and henix companies, the Union and National Ice companies' warehouses and other buildings are consumed.

—The Oregon Railroad and Navigation Co. reports actual earnings: For June, gross, \$49,807; net, \$23,451; increase, \$70,351. For the year ended June 30th: Gross, \$6,895,393; net, \$2,941,973, an increase of \$1,043,088; surplus over all charges, \$663,955.

—J. Carroll has been appointed receiver of the Boston and Alaska Transportation Company of Seattle, Wash. In the application for receiver it is stated that the indebtedness of the company amounts to \$94,000. It is also stated there is due the company from the Ca-

Other accounts due amount to \$14,000. Among the assets of the company are the ocean steamers Brixham, Lareda and South Portland.

—The Canadian Dominion Customs Department reports that \$300,000 was collected in duties during the fiscal year just closed upon miners' outfits at the boundary line in the White and Chilkoot passes leading into the Yukon territory. The collections were chiefly made from Americans.

—In Oakland, Cal., the Southern Pacific Railroad Co. is credited with intention to substitute electricity for steam as a motive power on its entire local system. The change, it is said, will include the broad and narrow gauge Alameda locals, the Seventh street, Webster street and Berkeley locals and the San Pablo avenue cable system.

—Ten months ago work was shut down on the Alcatraz Co.'s asphalt mines, known as Rincon mines, near Santa Barbara, Cal., but work has resumed and will be extended as fast as conditions will allow. For five weeks men have been repairing the buildings and machinery and unwatering the mine, which is 200 feet deep. There are thirty men at work.

—In the book issued by the U. S. Government for 1897 it is shown that the flax fiber in the Puget Sound region equals the best products of Europe. Straw sent to Ireland for treatment by skilled labor produced scutched flax valued at \$350 a ton, and hatched flax worth \$300 a ton, with the use of only one and a half bushels of seed to the acre.

—The Chihuahua, Mexico, Enterprise says that an English corporation headed by W. A. Moffat, promoters of the Durango Western and Pacific railway, have in the Bank of London \$15,000,000 Mexican money, subscribed to build the road. Work will begin next month at Durango and Culiacan. The company has a subsidy from the Mexican Government of \$12,000 a kilometer for the mountain road and \$7000 a kilometer across the table land.

—The decision of the directors of the San Francisco Mechanics' Institute not to hold their annual exposition this year is an additional reason why manufacturers and merchants would do well to exhibit at the California State Fair, which begins at Sacramento Sept. 5th. Liberal inducements are made as to space and transportation, and Sec'y Smith should be at once consulted by those realizing the commercial value of such an exhibit before the people of the State.

—The recent fire at Susanville, Cal., destroyed the land office of the unfortunate town and all of the land records. This will make it necessary to furnish certified copies of all the records and plats and other data relating to the lands in the northeastern part of the State. Certified copies of the land entries will have to be obtained from Washington. U. S. Surveyor-General Gleaves believes that he will have to increase his force, and that it will take six months to finish the extra work caused by the destruction of the Susanville records.

—Pacific coast ports show a gain both in exports and imports. San Francisco exported in '98 3.34 per cent of the total exports of the country, against 3.08 per cent in '95, 2.79 per cent in '94, 3.96 per cent in '92, and 4.24 per cent in '90. Her percentage of the imports was in '98 6.98 per cent, in '97 4.50 per cent, in '95 4.95 per cent, and in '90 6.13 per cent. The Puget sound customs district galued materially in her share of the commerce of the country, her exports in '98 being 1.45 per cent of the total, against 1.13 per cent in '97, .78 per cent in '96, .55 per cent in '93, and .39 per cent in '90, while the imports of the year, although slightly less than those of '97, were much greater than those of any prior year.

—The Western Australian International Mining and Industrial Exhibition will begin at Coolgardie March 21st, '99. It is under the patronage of the Western Australian government and granted the privilege of free railage to the exhibition and free bond except where the exhibits are sold. The United States government will be asked to officially recognize the exhibition and to appoint official commissioners to represent this country at the exhibition. The exhibition presents an opportunity of pushing our products to the front, particularly to points on the Pacific ocean, destined to be the field of the great commercial contest looming up in the near future and in the direction of our newly acquired colonies in the Philippine islands.

—Pacific coast salmon packing is now far enough advanced to make estimates, which indicate a shortage of 900,000 cases, as follows:

| | |
|---------------------------------|---------|
| Shortage on Columbia river | 100,000 |
| Shortage on Fraser river, B. C. | 500,000 |
| Shortage on Puget sound | 250,000 |
| Shortage in other localities | 50,000 |
| Total | 900,000 |

With increasing consumption every year and the Government use of canned salmon as army rations, the matter of price is now in the hands of the Alaska Packers' Association, which has already advanced the price on its stock of red fish left over from '97 to \$1 per dozen f. o. b. Pacific coast. This is equivalent to about \$1.13 on the Atlantic coast. The association leaves the trade to draw its own inferences as to the opening price to be made on the new pack. The opening price last year was 90 cents per dozen for red fish.

—On July 7th, '98, the concession granted by the Government to the State of Coahuila in the year '95, for a railroad from Saltillo to a point on the Mexican International, was modified so that it now covers a road to be built from Saltillo to either Trevino or Paredon, on the Monterey & Gulf road. The State government is granted authority to organize one or more companies for the construction of the roads, surveys for which must commence within one year, while construction must

of the presidential decree. During the first year after commencement of construction not less than twenty kilometers must be built, forty kilometers every two years thereafter, and the whole line must be completed within seven years. After ninety-nine years the road is to become national property and must be free from all incumbrance.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING AUGUST 9, 1898.

608,746—TYPE AND HOLDER—J. F. Ames, Portland, Or.
608,747—TUMBLER OR JUG—L. Christiansen, Seattle, Or.
608,748—PROPELLER—A. J. Culbertson, Corvallis, Ore.
608,749—SEPARATOR—W. A. Darling, Condon, Or.
608,750—AIR BRAKE—F. L. Guillemet, S. F.
608,751—AIR BRAKE—F. L. Guillemet, S. F.
608,752—HUBBLE BLOWER—P. D. Horton, Oakland, Cal.
608,753—FEED WATER SUPPLY—E. S. Hough, Oakland, Cal.
608,754—NUT LOCK—J. O. & C. D. Kafader, Ft. Bidwell, Cal.
608,755—BOTTLE—A. M. Legrand, Milwaukee, Or.
608,756—FURNACE—Lorenz & Chikins, Los Angeles, Cal.
608,757—GANG PLOW—W. C. Matteson, Stockton, Cal.
608,758—GATE OPENER—W. J. Moore, The Dalles, Or.
608,759—FORM PLATE BENDER—J. W. Osborne, San Jose, Cal.
608,760—MUSIC HOLDER—A. A. Patterson, Wilbur, Wash.
608,761—HAT SWEAT BAND—C. Stader, S. F.
608,762—FLOWER STEM CUTTER, Etc.—D. Tilden, Oakland, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TYPE AND TYPE-HOLDER FOR BOX-PRINTING.—John F. Ames, Portland, Or. No. 608,746. Dated Aug. 9, 1898. This invention relates to the construction of movable type and a chase or holder therefor, by which they are adapted to be employed in conjunction with a cylinder upon which the holder is mounted, for the purpose of printing upon wooden boxes and like surfaces. The object of the invention is to provide hard-surfaced type, which are especially adapted for printing upon wooden surfaces and so forming the faces of these types that they will readily take the ink over the whole surface and correspondingly imprint it upon the surface to which they are afterwards applied. The type are made with convex printing faces and concave rear surfaces. The ends are beveled and the sides are converging radially, so that the type may be fitted from the rear into the channels in the holder, which channels are cut out with the same beveled or inclined sides and ends. When the type have been thus introduced, they are held in place by a concavo-convex plate which fits behind the type and into the rear face of the holder, which thus retains them in place, at the same time it is easily removable so that the type may be changed at pleasure.

FRUIT OR FLOWER STEM CUTTER AND HOLDING ARRANGEMENT.—Douglas Tilden, Oakland, Cal. No. 608,807. Dated Aug. 9, 1898. The object of this invention is to provide a convenient and effective means to grasp the stem of flowers or fruit, so as to prevent their falling while being gathered, and in such positions that it is not possible or convenient for the gatherer to use one hand to hold the article while the other is engaged in applying the shears to cut the stem. It frequently happens that the gatherer has to mount a ladder or other elevation to pick the fruit or flowers growing upon the wall of a house or trellis, and when so situated it is often impossible to use more than one hand for the work. The device as constructed consists of a pair of separable metal plates which are fixed to the shear blades and project outwardly therefrom, then extending approximately with the jaws of the shears, they return upon themselves and form resilient fingers, which are adapted to hold the article to be cut, so that when the device is closed the stem is first grasped by these fingers and the part passing through the blades of the shears is afterwards severed.

Recently Declared Mining Dividends.

Portland, Colorado, extra, 30 cents per share; payable immediately.

Sacramento, Utah, \$5000; payable Aug. 25.

South Swansea, Utah, \$7500; payable Aug. 25.

Bullion Beck, Utah, 10 cents per share, \$10,000; payable immediately.

Elkton, Colo., 2 cents per share, \$20,000; Aug. 20.

Victor, Colo., \$30,000 regular and \$70,000 special; payable Sept. 1.

Florence, Montana, 1 cent per share, \$25,000; payable immediately.

Anchorage-Leland, Colorado, 1 cent per share, \$1000; Aug. 15.

Empire State M. Co., Idaho, 10 cents per

Personal.

T. T. LANE, Supt. Lane mines, Ely, Nev., is in San Francisco.

J. M. LEAHY becomes Mgr. Montezuma mines, Ashcroft, Colo.

S. S. GANNETT of the U. S. Geological Service is in Baker City, Or.

W. MAITLAND, Supt. Nash mine, Abrams, Cal., is in San Francisco.

M. B. KERR becomes Gen. Mgr. Nashville G. M. Co., Nashville, Cal.

Wm. KNEALE has been reappointed Supt. Creole mine, Park City, Utah.

F. R. WEHE, mining attorney of Downieville, Cal., has returned home.

J. F. WERN of the Pocahontas mine, Placerville, Cal., is in San Francisco.

B. F. HARTLEY, Supt. Zentgraf mine, Newcastle, Cal., is in San Francisco.

J. WEISSREIN, Mgr. W. Y. O. D. mine, Grass Valley, Cal., is in San Francisco.

J. W. BOUSE is appointed Supt. Twin Springs M. Co., Idaho City, Idaho.

F. S. ROUMAGE has resigned as Supt. Horse-shoe Bar mine, Michigan Bluff, Cal.

D. FRICOT of Grass Valley is visiting his mining properties at San Antonio, Cal.

Wm. MEYERS, a mine owner, Placerville, Cal., has returned from San Francisco.

A. H. TICKELL, part owner Phoenix mine, Nevada City, Cal., is in San Francisco.

D. KEITH, Mgr. Silver King mine, Park City, Utah, is at Yellowstone Park, Wyo.

G. A. FREEMAN, Mgr. Templeton mine, Silverton, Colo., has returned from Buffalo, N. Y.

C. B. WINGATE, managing owner Chloride-Bailley mine, Dedrick, Cal., is in San Francisco.

W. L. MONTGOMERY, Supt. Utica mines, Angels, Cal., has returned from San Francisco.

C. WATERHOUSE, owner Big Dipper mine, Iowa Hill, Cal., has returned from San Francisco.

J. J. DALY of the Daly mine, at Park City, Utah, is visiting his Daly mine at Bullion, Idaho.

F. W. PAGE, Gen. Mgr. South Fork gravel mines, Forest, Cal., has returned from San Francisco.

J. C. DIAMOND, managing owner Limpensel mine, Placerville, Cal., has returned from San Francisco.

LEO VON ROSENBERG has returned to San Francisco from a professional visit to Riverside Co., Cal.

J. BAMBERGER, part owner of the Bellevue mine at Baker City, Oregon, has returned to Salt Lake City, Utah.

A. J. BETTLES, Supt. Highland Boy mine, Blugham, Utah, is examining mining properties in British Columbia.

DR. HAINES of Harvard University and G. W. Pelton of Boston are examining placer grounds in Itasca Co., Minn.

J. A. VANCE, Supt. Starlight mine, El Dorado, Cal., has returned from his bridal trip through southern California.

GEO. E. PRICE has left Helena, Mont., to take a position with a French mining company operating in northern Africa.

E. W. CHAPMAN, managing owner Gold Note and Philadelphia mines, Omo Ranch, Cal., has returned from San Francisco.

EDWARD L. BRAYTON of the Pelton Water Wheel Co. has returned from a three months' trip to New York and abroad.

WALDEMAR LINDGREN of the U. S. Geological Survey is in Hailey, Idaho, to examine the rock structure of Wood river.

W. S. BROWN, Mgr. North Mountain M. Co., Cherry Creek, Nevada, left Salt Lake City, Utah, to spend two weeks at the mine.

C. A. ARMSTRONG, part owner Batchelor mine, Ouray, Colo., is at Mercur, Utah, to arrive at a plan for starting the mill of La Cigale mine, in which he is a principal stockholder.

R. H. MCKEE of the U. S. Geological Survey Corps, Washington, D. C., and ten men have reached Baker City, Or. Their present territory comprises 9000 square miles, of which Baker City is the center.

G. BAYHA, representing Cologne, Dusseldorf, and Berlin, Germany, capitalists, and who for five months has had men employed in the development of copper properties near Redding, Cal., is in San Francisco, en route home, to consult with his people on plans for the erection of a smelter of 500 to 1000 tons daily capacity. Mr. Bayha expects to return to California within three months.

Recent California Mining Incorporations.

Jubilee M. Co., San Francisco; capital stock, \$100,000; subscribed, \$30,000; R. Rangely, L. B. Doe, C. L. Benton, J. C. Young, W. B. Moore.

Tuolumne G. M. Co., San Francisco; capital stock, \$100,000; subscribed, \$70,000; W. Christie, F. J. Juchter, F. L. Fine, J. H. Middleton, N. W. Kleyn.

Sheepherder G. M. Co., San Francisco; capital stock, \$150,000; F. Wilkie, S. W. Forman, D. S. Greger, W. F. Rudolph, A. F. Green.

Nashville G. M. Co., San Francisco; capital stock, \$115,000; J. F. Parks, M. B. Kerr, C. W. Howard, Jr., E. C. Voorhels, J. Ross, Jr., F. E. Thomas.

West Dredging and Amalgamating Co., San Francisco; capital stock \$100,000, subscribed \$500; C. Baker, H. S. Malone, C. H. Swain, F. D. Brandon, J. T. Bradley.

Consolidated York M. Co., Brownsville; capital stock, \$100,000; subscribed \$20,035; J. W. Albert, J. Elliott, T. J. Duncan, G. L. Albert,

That Prehistoric Skull.

TO THE EDITOR:—In the days of '49 there lived at Angels a merchant named J. C. Scribner, generally called "Scrib," at Murphys a doctor, Wm. Jones. "Scrib" was famous as a "josh." Nothing delighted him more than to get hold of a tenderfoot and fill him up with an impossible yarn and have the tenderfoot repeat it. Many of Bret Harte's best things were of "Scrib's" inventing. Placer miners ground-slued out the skull of some forgotten miner from a piece of ground near Angels on what was then known as Washington Flat. This was not an unusual event, as two skeletons were sluiced out in the same way at Murphys at about the same time. The skull from Washington Flat was taken to a carpenter's shop; it lay around there for some time and was finally kicked out and into an old shaft back of the shop. Some time afterward the shaft was cleaned out by Jimmie Mattesson and the skull found. Its past history was well known. The shaft was not 100 feet deep; no shafts in that section were.

The skull was given to "Scrib," who at once saw the material for a good josh in it and soon gave it a history. Dr. Jones was numbered as one of his victims. The doctor was so impressed with the importance of the find that he called Prof. Whitney's attention to it when he was exploring the county. Whitney at once took the matter up and forwarded the skull East. The joke had now grown to such proportions that "Scrib" feared to have the truth known and "stuck to his nut-ton" at all times. Bret Harte was evidently let into the josh, as he writes of it as the skull of some old Missourian that came across the plains. The county was fathered with the josh by being called Calaveras, or "skull." With these facts before the reader, the following, just published by the Peabody Museum of American Archaeology, forms most amusing reading:

"The Calaveras Skull.—The recent gift to the Peabody Museum of American Archaeology and Ethnology of the famous 'Calaveras skull' reawakens interest in the remarkable relic of antique man. The skull was found in 1866 imbedded in gold-bearing gravel in Calaveras county, Cal., at a depth of 127 feet. Above it were four beds of lava that had flowed from a now extinct volcanic vent. The late Prof. J. D. Whitney (whose sister made the gift to the museum) was convinced of the genuineness of the discovery. The owner of the skull is supposed to have lived in the Pliocene epoch—a period so remote that the most ancient dates of history seem quite recent in comparison."

And all the while "He came from old Missouri—yes, all the way from Pike,"
E. H. SCHAEFFLE.

Murphys, Cal., Aug. 9th, '98.

THE repair ship Vulcan, recently described herein, was one of the naval successes of the late war. That she has fulfilled the promise of her originator is shown by the fact that for further service our ships are not coming home except to be docked. The great fleet of Sampson lies in the land-locked Cuban harbor, with the Vulcan close at hand, prepared in every essential way for the duty which the Navy Department may prescribe, and this after many of these vessels have been months away from a northern machine shop and nearly a year from a dock yard. The character of the work now being done by the repair ship is shown to some extent in a letter from one of her officers who, writing from Guantanamo bay, says, in regard to this vessel and its utility: "I can only say that we are busy night and day. Our brass furnace is going every day, there being unexpected calls for brass castings of all kinds and sizes. It seemed that every vessel in the fleet—colliers, transports, supply and warships—has either a winch, a blower engine or a dynamo broken down. New eccentric straps and rods galore are required, with brasses, gun castings, etc. We have supplied also an enormous quantity of stores to the different ships. We are

busy all the time, and there is no vessel in the fleet but has had something done to it."

New Carbon Dioxide Engine.

At a recent meeting of the Franklin Institute, Philadelphia, the operations of a new carbon dioxide engine were explained by Wm. F. Roberts. This engine is actuated by carbon dioxides, used expansively upon the piston of the engine in a manner similar to that employed in steam engines, but with the piston area reduced proportionately to the amount of power, as compared with steam. The speaker exhibited two engines, one horizontal and the other vertical, each supplied with 2x2-inch cylinders, and each capable of developing 25 H. P. The carbon dioxide gas for use in the engine is stored in liquid form in a cylinder prepared for the purpose. From this it is led in small tubes through a heating apparatus, where it is brought to a temperature of about 150° to 200° F., at which temperature it is introduced into the engine. By means of a unique system of valves, the gas at this high temperature and pressure is passed into the cylinders of the engine and then withdrawn from the engine at a temperature below 32° F. In this way, the speaker said, the gas is made simply a vehicle for carrying heat energy to the engine by means of which it is transformed into energy in such a form that it can be readily utilized as power. The gas in a liquid form is relatively cheap, it being possible to secure it for \$3 per ton, while some firms agree to furnish it as low as \$1 per ton. The gas is a waste product in many lines of manufacturing, and it is said to be less expensive to liquefy it than it is for manufacturers to rid themselves of it in many plants where it is produced in the process of manufacturing other products. It is claimed for the carbon dioxide engine that, being compact, powerful, and economical of operation, it can be adopted with success in many places where steam and electricity are now used.

Points in Annealing Steel.

Prof. H. E. Smith, in a paper before the Engineers' Club of Minneapolis, calls attention to several points on the working of steel that are of interest:

"In cases of special forgings, as in the heads of eye bars, it would seem to be wise to anneal the end, so as to remove the stresses which must exist between the unheated part and the part that was heated and forged. In the manufacture of wire frequent annealing is rendered imperative by the internal stresses and hardening effect caused by the working of the wire in the die plates. The usual method of annealing is to heat the piece, after it has cooled, to the full red or to a medium orange color, and to allow the piece to cool slowly and uniformly."

"On account of the tendency of steel to crystallize above the full red heat, and also while the temperature is falling to the dark red, the proper heat for annealing is the full red, followed by quickly cooling to the dark red and then slowly cooling through the remaining range of temperature. Cherrioff gives the following as the result from three samples cut from the same bar of steel. After equally forging, the samples were treated as follows: A was slowly cooled. B was reheated to a full red and then slowly cooled. C was reheated to a full red, quenched to a dark red, and then slowly cooled. A broke under a single hammer blow. B required five such blows. C could only be broken by a blow of a five-ton steam hammer."

"Rapid cooling produces hardness in steel, and the more rapid the cooling the greater is the effect. There seems to be an apparent exception to this rule in the so-called 'water annealing' practiced by some forge men when doing a rush job. They heat the piece uniformly up to the point where it will just show red in a darkened place, and then quench it. By this means the hardening effect due to

forging is only in part removed, in that the hardening effect of sudden cooling from this temperature is less than the softening effect after forging by the reheating. The piece is by no means in as good condition as it would have been had the usual method been applied to it. It will also be found, on applying tests for hardness to the pieces of our experimental bar, that, beyond the point where the crystalline structure changes suddenly, the steel has become extremely hard, and especially very brittle toward the end that was exposed to the highest heat."

A Unique Railroad in Oregon.

Near Bridal Veil, Oregon, is a railroad over which passes an enormous traffic although the line does not possess a single car. It is upon one of the highest elevations of the west slope of the Cascade mountains, in the heart of what has been until recently an almost inaccessible region. Its length is five miles, and it circles and twists until it resembles the trail of a mammoth serpent. It represents the most difficult achievement of the lumbermen of Oregon. The only feature of the road except the line itself that resembles the ordinary narrow gauge railroad, is the eighteen-ton locomotive. The freight is logs which average a size equal to that of the engine boiler. The logs are felled by the lumbermen in the employ of the Bridal Veil Lumber Company. They are rolled to the nearest point on the railroad, then arranged in a line with huge staples, forming a train of logs. The foremost is chained to the engine which hauls it and its companions upon the roadbed of the line. The railroad is narrow gauge, 3 feet, constructed on the same principle adopted by the regulation roads over which cars pass, with one exception. Stout plank is nailed to the ties and upon this foundation the logs rest as the engine pulls them along. The rails act as guards to prevent the logs leaving the track. In this manner, the timber is conveyed from the point at which the engine takes it in charge to the beginning of a two mile flume that leads from the end of the first section of the road to the chute pond near the mill where the logs are turned into lumber.

That the logs may slip easily along the roadbed, the plank nailed to the ties is kept greased except at sharp grades, where the momentum of the logs is sufficient to cause them to slide easily. As the road is on a mountain side, where the grade is often so great as to make straight descent of the line impossible for the reason that if they were tried, the logs would slide forward on the engine, the road has been constructed largely on the plan of that by which the tourist ascends Pike's Peak in Colorado. The curves are in many instances so abrupt that it seems as if the logs must slide over the rails to the ground, but disaster of this sort is avoided by the logs being chained together. Fastening them in this style gives the timber train that same general solidity which the vestibule imparts to a train of passenger cars.

The roadbed, or rather its foundation, is not of course like that of the great lines over which passenger and freight cars roll, but although roughly constructed it has surprising strength.

When the flume is reached, the engine is detached from the log train and the logs from which all chains are removed are diverted into the mouth of the flume. Once started, it takes but a small fraction of time to make its way to the lower pond. Here the process of forming the big tree trunks into trains is repeated in the same fashion as at the upper pond. The process of getting them on the track, however, is much easier. At this point the track runs in such a way that logs and road are almost side by side, so the engine has little difficulty in transferring the freight from the water to the roadbed. The logs now begin the conclusion of their journey, for from the lower pond the line or road runs without a break to the mill, where the logs are turned over to the sawyers.

After the process of turning the felled trees into boards is complete, the

lumber is shot into a flume like the one previously referred to, which leads from the sawmill to the planing mill two miles below. It is claimed by the lumber company that nowhere else is a log felled, transported and converted into lumber in so short a space of time, considering the distance from the point where the tree grew to the planing mill where the log reappears in the guise of finished lumber.

Of the \$125,000,000 produced by the mines of the West last year, 10 per cent, it is estimated, went to pay transportation, 37 per cent to mine owners and 15 per cent to smelting works, the remaining 38 per cent having been paid out for labor. It would be difficult to find any other industry that returned during the year 37 per cent to the investors. Aside from these large profits to the smelters and investors, these revenues to railroads and wages paid workmen, the aid mining extends to other industries of the country must be considered, and in this respect it is hardly of secondary importance. It is a universal helper. As a civilizer and populizer of the imperial West, mining has not been awarded its full share of merit, if, indeed, it has met with proper appreciation at the hands of our countrymen, to say nothing of the outside world. The great West owes its wonderful fecundity mainly to its mines.

The teak wood of Hindoostan is almost indestructible. The tree reaches a girth of from 10 to 15 feet, and has a clear trunk of 70 to 80 feet to the first limb. The timber retains its fragrance to a great age. It is a wonderfully hard wood, durable and strong, and once seasoned does not split, crack, warp, shrink or alter in shape. In certain portions of Burmah there is teak 2000 years old. It weighs forty pounds per cubic foot. Teak is used in India for construction, bridge making, sleepers and furniture. It is exported to Europe chiefly for building railway carriages, shipbuilding or making decks and lower masts and for the backing of armor plates on ironclads. It is peculiarly useful for the latter purpose, owing to the resinous matter which it contains and which acts as a preventive of rust, the wood neither affecting the iron nor being affected by it.—Philadelphia Record.

ACETYLENE GAS can be made to yield from three to four times as much soot as is obtained from the same quantity of mineral oil, and the product is much superior to ordinary lampblack, being free from tarry and other objectionable substances. Acetylene black is very bulky and especially adapted for India ink, as well as for inks for printers and lithographers. In one of three methods of manufacture patented in France by M. E. Hubon, the gas is kept in a steel cylinder under a pressure of two atmospheres and ignited by an electric spark or glowing platinum wire, the pressure of the resulting hydrogen which the cylinders must resist being not more than twelve atmospheres. This method gives the theoretical yield of carbon.

IS GOLD MINING stimulated because of general good times? Capitalists who are putting their money into gold mines do not say so. A man working for the Twin Springs Co., on Boise river, Idaho, tells the *World* that he was informed by one of the wealthy men of that company that they would be satisfied with two or three per cent on their investment—that there was so little profit in investments in all kinds of business that moneyed men were investing in gold properties and would be satisfied with small profits.

The plan of Carl Wegner for avoiding smoke consists in the use of pulverized coal and a special feeder which sifts the dust over the entire fire, causing it to be at once inflamed without smoke and with very little ash. This also effects a considerable saving of fuel, and opens a way for utilizing the waste coal dust of mines and storage places; but, on the other hand, it makes grinding necessary when dust from other sources fails.

Mining Summary.

CALIFORNIA.

Amador.

Dispatch: At Plymouth work is progressing at the Wheeler mine. The company is erecting a mill and will have it running as soon as water is available. The Thomas mine is said to be paying. The Pocahontas mine is to have a new mill.

Ledger: The Oneida has delivered over 100 tons of ore to the Zelle mill for crushing. The mine work is being pushed by Supt. Truscott, and is encouraging. The Keystone Co., at Amador City, has shut down twenty stamps on account of the shortage of water.

Record: A crushing of ore is being hauled from the Potazuba mine to the Zelle mill. At the Ballou mine Supt. Porter is crosscutting on the 200 level. The crosscut is in about 100 feet. J. Bernards is taking out good quartz in the Ballou district.

Butte.

Van Light, at the Kellogg mine, near Buck's Ranch, is putting in a Bryan mill. His lowest tunnel taps the ledge at 250 feet.

Work on the new ditch for the Banner mine near Oroville is being pushed. Mgr. Evans expects to complete the work in four months. About forty men are employed. The big pipe formerly used to convey water from the Miocene ditch to the Golden Feather mine will be used in the new line a distance of 3000 feet or more. When this ditch is completed the new mill will be run by electricity generated by water power. Development work continues in the mine.

Register: A contract has been let for a 500-foot tunnel on the Big Betsy ledge. Men have begun work on it. At the Carlisle mine sinking is in progress. H. P. Stow, it is stated, has bought the Shakespeare ledge and will extend the tunnel, now in 2000 feet, 2000 feet farther. So far the tunnel has cost \$12 a foot. When the tunnel is extended under the Shakespeare the face will be about 2400 feet under the croppings. The Denver mine has leased the chlorination works of the Shakespeare mine and will work 150 tons of sulphurets. The Bank of England Con. mine, C. C. Antrim, Supt., has sixteen men employed.

Calaveras.

The old Copenhagen gravel claim at Chili Gulch is to be reopened by McSorley Bros., who have a bond on the property.

El Dorado.

(Special Correspondence).—A strong company has been organized to unwater and test the old Havilah mine. The shaft is something over 600 feet deep. The property has been closed down nearly three years. It is owned by the Joshua Heady Machine Works. The property is 600x1500 feet and is on the mother lode. Up to 1894 the mine had been idle for eight years, after which it was worked a short time by an English company. It is stated that at 200 feet depth the black gouge of the vein is 12 feet wide. It was last worked by A. Harpending. There is a 20-stamp mill on the mine. The property is about three miles from El Dorado, the nearest railway station, at Nashville postoffice. The company is composed of E. C. Voorheis, F. F. Thomas, J. F. Parks, J. Ross Jr. and M. B. Kerr. C. W. Howard Jr. will be secretary. If exploiting proves satisfactory, the Park canal water power will be extended to the mine and perhaps electric power will be introduced. For present purposes steam power will be used. The Havilah mine has a good record as a producer, though systematic work in the latter part of its history was not a characteristic feature. The new company will be known as the Nashville G. M. Co. Placerville, Aug. 10th, '98.

Supplementary to the information given by our correspondent, it may be stated that the Nashville G. M. Co. has, since his writing, been incorporated. The company has bonded the property for four years for \$50,000, without any payments or conditions except that the mine be worked in a systematic manner; and should a sufficient quantity and quality of ore for milling be developed, then, after paying the actual expenses of mining and milling, one-half of the net profits are to be applied on the purchase price of the property. The company has also bonded, from the same owner, the South Extension for five years for \$20,000. M. B. Kerr will be Gen. Mgr. and C. W. Howard will be Asst. Mgr. and Sec. with offices at Nashville. The company proposes, after the preliminary work has been done, to remodel the hoisting machinery, construct a ditch which will give 600 feet head and sink the shaft to 1000 feet depth.

Seventy men are at work on the American river near Placerville and as many more near Coloma. The Levithian mine on the American river is opened and the water running in the wing dam, which is 450 feet long; the main dam is 150 feet.

Inyo.

Bradford & Harris propose operation of the borax marsh at Salt Lake valley. A plant with a monthly capacity of 100 tons refined borax will be built.

The Inyo Development Co.'s smelter on the Sobra-Lane mine, near Darwin, is daily reducing twenty tons of ore.

Inyo Register: The first shipment of bullion, amounting to over twenty tons, from the Darwin smelter was shipped last week. The smelter is running steadily.

Kern.

(Special Correspondence).—G. A. Robrick of this place has bought from J. M. Wangaman the Mayflower group of mines, including the Mayflower, Rose and Plymouth mines, with the 5-stamp mill and other machinery, for which he paid \$45,000.

Bakersfield, Cal., Aug. 10th, '98.

Randsburg Miner: M. Singleton has put men to work sinking in the Windy mine at Johannesburg, from which \$1200 was taken

from nine tons of ore near the surface. After six months of idleness work is to be resumed on the Val Verde mine under the direction of Greggs & Fisher. The output of gold in the Rand district for July was about \$90,000. The total output thus far for '98 is close to \$490,000. July made an advance of \$25,000 over the previous month. Lewellyn & Porter are putting up a cyanide process at Garlock to work tailings. It is estimated there are 10,000 tons. The capacity will be sixty tons per day. Work has resumed on the Little Butte mine. Work on the water tank at the wells of the Yellow Aster M. Co. is progressing. The tank is square, all the front timbers being 6x6 Oregon pine bolted together. The planks are 3-inch redwood. The tank will be ready as soon as the big pump and engine are in place. The Eureka mill people have their cyanide building completed. The capacity of the plant is ten tons per day. At Johannesburg the Red Dog mill is running on ore from the Butte and Minnehaha mines. The Johannesburg Water Co. contemplate enlarging their reservoir to double its present capacity.

Lake.

The Standard Q. M. Co. has levied an assessment of 50 cents per share, delinquent September 12th.

Lassen.

Sloan & Haskell have this season taken out thus far \$22,000 from the old Elk Creek placers. The Badger group are being extensively prospected and a foundation is completed for a 10-stamp mill. The country is overrun with prospectors, and it is locally stated that "not less than 300 miners will be at work in that section next season."

A dredging company is at work close to Susanville, on the gravel and sand beds of the main river. It is impossible to either prospect or work that gravel by any other method than a dredging machine.

Mariposa.

At Hornitos the Campodonico mine has closed down for want of funds to continue development work.

Nevada.

Extensive repairs are being made at the W. Y. O. D. mine, Grass Valley. The shaft will be retimbered and a complete overhauling of the mill will be made.

A ledge of good value has been struck in the Old Home Con. near Blue Tent.

The mill on the Mineral Hill mine near Moores Flat has started and the ore is giving satisfactory results. At the St. Gothard mine, Columbia Hill, development and work on the new 20-stamp mill are pushed. The ore body, though low grade, is of large proportions.

Transcript: The bedrock tunnel being run in the Malakoff mine, at North Bloomfield, with the intention of converting that old hydraulic mine into a drift mine, has reached 380 feet and is in hard ground. When it has been driven 800 feet drifting will begin. Supt. Myers says the company will probably procure a power drill with which to hurry the tunnel along. Thirty-seven men are employed at the Reddik gravel mine, near Nevada City.

Union: La Suerte Co., Nevada City, has resumed work. They are sinking a new shaft on the Klondike claim. W. W. Kirkham is in charge and the ledge will be thoroughly prospected. The shaft on the old Kirkham will be unwatered and driven considerably deeper.

Plumas.

The Bean Hill mine, Spanish Ranch, the past short season yielded well and the company have a force making extensive improvements for future operation. At the Centennial a gravel has been found which is said to yield well. The company operating on Bear creek are making favorable progress sinking their shaft.

Independent: Work on the Lucky S. quartz mine, near Quincy, has resumed. Six men are at work. At the Dunn Bros. quartz mine, Butte valley, the mill is working on good rock. White & Bennett are working their river claim and have several men employed.

Riverside.

The Good Hope mine near Perris is worked by contracts, and no man will be employed excepting those who work in the mill and shaft house.

San Diego.

San Diego Union: Receiver Pauly reports the Golden Cross group clean-up of bullion for July \$50,000. When Mr. Pauly took charge of the mines a year ago there was an indebtedness of \$295,000. This has been reduced 50 per cent. In the thirteen months of his management the mines have produced \$550,000. Besides paying part of the indebtedness every month, he retains a sufficient sum from the proceeds to carry on operations and provide for possible contingencies. The mines at present producing are the Cross, Queen and Crown. The Cross is producing more ore than the others. The Cross and Queen each have a 700-foot shaft. About 250 men are employed.

Shasta.

In a recent cleanup in his mine near French Gulch, P. Schnitzer found one nugget weighing \$90 and another \$200.

The Menzel and Pugh claims near Shasta have a tunnel 150 feet in length. The ore vein is from 8 to 22 inches in width and carries free gold, but the greatest values are in the sulphurets. Extensive improvements are in progress at the Mammoth-Garfield mine at Whitehouse. The mine is owned by S. W. Cheney. He has a contract with the Mountain Copper Co. at Keswick to furnish flux ores for the smelters. The ore is conveyed by a Hallidie ropeway about one mile to the railway, then shipped by rail. An air compressor is being installed.

In the Minnesota mine, near Stella, a ledge has been found that is 7½ feet wide and is said to mill \$40 per ton.

Near Whiskeytown, J. P. Davis has a tunnel 368 feet long, in which he cut a ledge 15 feet

wide that is said to produce from 40 to 90 per cent copper, carrying some silver and gold. Desmond Bros. are taking out a fair-grade milling ore.

Free Press: Hicks, Cooney & Co. have completed their cyanide plant at Castle Garden and have begun operations. They are working a 4-foot ledge. J. Hoadley purchased of R. Bennett a placer claim and a set of sluice boxes on Clear creek for \$3. His first week's labor on the claim netted him a nugget of \$100, besides smaller ones ranging from \$1 to \$5.

Sierra.

The Happy Hollow mine near Downieville is employing four men under D. McKenzie, Supt., who is pushing the tunnel to open new ground.

Siskiyou.

Brown & Reeder have adjusted their partnership dispute in the quartz ledge on Shasta river, the receiver has been dismissed, and the claim is being worked as before.

Journal: Chestnut & Co., who purchased the old Commodore quartz mine on Barkhouse creek, Klamath river, will open this mine on an extensive scale. The company has started a tunnel to tap the ledge and also a tunnel to secure water for power. The Greenhorn Blue Gravel mine is reported paying well. The company gets a good supply of water by pumping the bedrock water and returning it to a tank for second use.

Tulumne.

Good gravel was struck this week in Banner & Co.'s mine, near Columbia. The shaft is down 145 feet. R. C. Davis, in the Sonnet mine, has opened a 3-foot ledge of good value.

Union-Democrat: The Densmore mine, near Columbia, has reached 120 feet depth. The vein is 4 feet wide. Drifts have been run, and the ore throughout is good; indiscriminate milling tests have proven satisfactory.

At the Hope mine, near Sonora, everything is progressing. The tunnel is in 260 feet. The ledge was tapped at 190 feet.

At the Buchanan preparatory work is being done by unwatering the shaft, which is 450 feet deep. Sinking will be resumed. In the Bonanza the incline shaft is down 1800 feet and the vein, from 18 inches to 3 feet wide, has developed into a free-milling property. The company is putting up a mill with a reduction capacity of twenty tons each twenty-four hours. All the machinery for the plant is on the ground and will be running within thirty days. For the present all will be operated by steam, but this will soon be superseded by electricity. The Horseshoe Bend & Tulumne M. & D. Co. are driving a tunnel 175 feet. It is probable that the Sell will be unable to resume operations until the rainy season sets in.

Yuba.

Twenty men are employed by the Government at The Narrows. Open cuts are being made on both sides of the canyon for foundations, the debris being removed by ground sluicing.

NEVADA.

Near Wells the Salmon M. & S. Co. is expending \$3000 in discovery work, sinking shafts to ascertain the extent of the ledges and if there is any sulphate ore at the water level.

Numerous mining locations have recently been made on the western slope of Mt. Davidson, presumably on the probability of the extension of the Suto tunnel westward. If the ore veins indicated by the outcroppings extend downward, the extension of the tunnel will cut them at a depth of from 2500 to 2800 feet below the surface.

W. J. Sutherland thinks that by Oct. 1st, forty of fifty miners will be employed at Candalaria under the superintendency of D. H. Jackson.

At the sulphur mines in Humboldt county eighty men are at work. Ten twelve-mile teams are hauling sulphur to the Humboldt House and delivering twelve to fifteen tons per day. It takes four days for teams to make the round trip from the works. About \$5000 a month is being distributed for labor and supplies. It is said that there are still large reserve bodies of sulphur in the mines, and that operations are being planned on a more extensive scale. The ore now being taken out carries about 45 per cent sulphur.

Work has resumed on the North Star mine, near Coryville. W. L. Bliss is Supt. Near Virginia City electricity is being installed on the electro-peroxygen plant by which the owners propose to handle ninety tons of slimes a day. The Peck cyanide plant was sold for taxes at Dayton to Evan Williams. H. N. Morse of San Francisco, owner of the Gold Park mines and mill, near Austin, has given an indefinite lease on the property to E. B. Hocking and the Goodwin Bros. A portion of the July earnings of the Dexter mines at Tuscarora consisted of a gold brick that weighed \$8800, also cyanides of \$6000 and an ore shipment that yielded \$9000.

At the Ross mine, near Deer Lodge, work has resumed, and building the mill will begin soon. Dr. Nelson will be Gen. Mgr. The Glasgow & Western M. Co. of Scotland, operating at Cherry Creek and Golconda, will immediately build a concentrating mill at Cherry Creek mine, to be in operation before the first of the year, the capacity of the works to be at least 100 tons daily. The Demijohn mine, near Pioche, is turning out silver-lead ore. The mine is under bond to the present lessees. There is a large ledge there, but former owners failed to find it. The ore is being concentrated at the Wheeler mill and two shipments of concentrates have been made.

The Lyon County Times says it is locally reported that the Douglas tailings have been sold to a Montana company that is soon to erect a leaching plant of 400 tons per day capacity, either near the Douglas mill at Dayton or near the tailings reservoir.

OREGON.

English Bros., at the Golconda, at Fruit Creek, Cracker Creek district, near Baker

City, have let a contract for a plant capable of treating 125 tons per day by the chlorine-bromine process. The ore will be crushed in a rock crusher and fall into the bins below, from which it is to be fed automatically into dryers, where, relieved of its moisture, it will be charged automatically into a series of cornish rolls, which crush it to the required degree of fineness. From the rolls the dry pulp is elevated to storage bins, from which it is drawn and fed automatically to the furnaces. The furnaces are connected with dust chambers, in which the gases are condensed. In passing through the furnace the ore is mixed with salt, and the sulphur, arsenic and other volatile bases are driven off into the dust chambers and condensed by a spray of water, giving hydrochloric and sulphuric acid as by-products. The roasted ore, after being cooled, is charged into vats provided with filter bottoms, the acids obtained from the dust chambers allowed to percolate through the pulp, dissolving the copper which may be contained in the ore. The solution is then passed into tanks, where the copper is precipitated by scrap iron in the usual manner. Following the acid leaching, a solution of chlorine and bromine is run through the pulp until the gold is extracted, when the solution containing the gold is run into tanks and the gold electrolytically precipitated upon lead cathodes, which are from time to time withdrawn, and the gold obtained by cupellation. The spent solution, as it passes from the precipitating tanks, is run into potterly cells, in which the chlorine is regenerated by electricity.

Browning & Hannum near Ashland cleaned up \$3700 from thirty-two tons of rock. The Elkhorn M. & M. Co. is running a 1500-foot tunnel on its property at Elkhorn mountain. A. M. Jordan has bonded the Homestake mine near Woodville and will put twenty men at work. La Bellevue mine at Baker City shipped eight carloads of concentrates.

Montreal, Canada, capitalists have purchased the King Solomon mine near Baker City. They propose to spend \$30,000 in developing the property and have already a force at work. If developments warrant a big milling plant will be erected at the King Solomon. The Golconda gold mine is building a chlorine mill with a daily capacity of seventy-five tons. The company employs seventy men.

The Grant's Pass Journal says that good ore has been uncovered in the old Reno & O'Farrell mine, near Grants Pass. Near Jacksonville the Seattle M. Co. is pipping in Watkins district, but will commence cleaning up soon.

A. M. Jordan has bonded the Homestake mine, in Woodville district, and will soon develop the property on a large scale. R. Cook has a force drifting in the Sterling M. Co.'s property and doing well. A carload of concentrates was shipped from the Shorty Hope mine to the smelter a few days ago. Beekman & Huffer have a force running a tunnel to strike the ledge, which has paid well.

Democrat: The Red Boy 20-stamp mill, near Baker City, is almost complete, and the property paid for it before the mill was begun. They have ore on the dump that will pay well. The Golconda is building a fifty-ton chlorine-bromine plant. The Columbia mine has produced since the company took hold some two years ago. The North Pole mine is shipping high-grade ore. The company is controlled by the Baring Bros. of London. Bonanza people brought in a \$20,000 brick at the last clean-up. The California mine, at Cable Cove, has recently put in concentrators and has attained a saving of 80 per cent. J. C. Young, in the Imperial mine, has begun shipment of high-grade ore to the smelters. Near Grant's Pass, J. Sowell in a 140-foot tunnel struck a ledge of copper sulphides carrying a fair percentage of gold.

WASHINGTON.

The Northport smelter has resumed work again after a shut down of several weeks.

The Republic mine produced about \$63,000 worth of ore in July. The shipments to the smelter were 293 tons, averaging \$174 to the ton, making about \$50,900, and the product of the mill was \$12,000. The shipments were limited only by the number of available teams.

BRITISH COLUMBIA.

(Special Correspondence).—The North Star mine was located in '93 and purchased by D. D. Mann and others a year later. In some cases where rich deposits of carbonates were taken out from within the main body of galena the chambers are from 20 to 36 feet wide, 10 feet high and from 100 to 150 feet long. The company has so far not been able to determine the extent of this deposit. The greatest depth attained in the mine is about 110 feet. The value of the ore is from \$50 to \$300 per ton in lead, silver and gold. The company has built a wagon road at a cost of \$15,000 to the Kootenay river, over which the ore is hauled. From the landing the ore is shipped by boats 130 miles to Jennings, Mont., and from there to Great Falls, Mont., by rail to the smelter. Every ton of ore costs \$40 to get it to the smelter. The company declared a 10% dividend July 1st, '98, on a capitalization of \$1,000,000. The Crow's Nest Pass Railway is completed to the Kootenay river, and in another two months will be completed to the Kootenay lake. The Crow's Nest Pass Railway Co. has surveyors in the field locating a branch from the main line to Kimberley, the nearest town, and adjacent to the North Star and Sullivan mines. The North Star M. Co. intends to build a tramway from the mine to Kimberley as soon as the branch line is completed.

Fort Steele, Aug. 10th, '98.

A controlling interest in the Commander mine at Rossland has been sold to a Toronto corporation on the basis of 20 cents per share. The terms were \$35,000 down and the balance in three months. The Commander mine is stocked for half a million. The property has not been worked for six months, but there is \$10,000 worth of machinery on the ground and a shaft has been sunk over 200 feet.

W. D. Turner and Senator Turner have

sued the leaders of the Peyton faction of the Le Roi and the officials of the B. A. C. for \$750,000 for damages alleged to have been caused by the fraudulent conspiring of the parties defendant, which depreciated the value of their stock to that extent.

The Ruth mine near Sandon shipped the past year 5000 tons of ore which netted \$75,000. The galena is said to average 120 ounces silver, 65 per cent lead, and the carbonates run 60 per cent silver and 30 per cent lead. The company employs seventy-five men. There are four tunnels in the mine that aggregate 3000 feet in length, all connected by upraises.

At Roseland the Turner interests in the Le Roi mine has filed a motion in the Supreme Court asking that Judge Spinks' order appointing W. A. Carlyle receiver be set aside.

The Center Star mine near Roseland is reported sold for \$2,000,000 cash to the Gooderham-Blackstock syndicate of Toronto, who own the controlling interest in the War Eagle Company. Of the 500,000 shares of capital stock, O. Durant of Spokane and A. Tarbet of Salt Lake owned 300,000 shares, Sir Chas. Ross owned 30,000 shares and the Patrick Larey estate of Butte most of the remaining 100,000 shares.

Eastern capitalists have purchased the Golden Treasure, White Iron and Vesuvius, near Ymir, for \$10,000. Assays from the surface of this property show values ranging from \$5 to \$75. The development work will commence at once.

At Grand Forks, A. Woodhouse, M. E., has been instrumental in closing a deal whereby a 500-ton smelter may be built at Grand Forks in the near future. The new company is a London corporation. Ex-Mayor Manly has donated 1000 acres of land to the company. The smelter company has put up a guarantee of \$1000 in cash that it will carry out its agreement.—There are 140 men working at the Payne mine, near Roseland. Five feet of ore came into the lower tunnel a few days ago.—The last strike in the Sovereign is 3 feet of ore, assaying 110 ounces of silver to the ton and 78 per cent lead. The strike was made at a depth of 300 feet.

The ore shipments from Sandon for the year ending July 31st were 27,352½ tons. The Payne shipped 13,000, the Ruth about 6000 and the Star 4000 tons. A large proportion of this is concentrates.—In the Elsie mine in the Ymir district good ore has been taken from a 3-foot seam which assays \$32.40 in gold and \$22.16 in silver. The tunnel is in 307 feet.—Sinking the shaft to the 800-foot level in the Le Roi at Roseland has begun and twenty-eight machines are employed underground. It is expected that the shipments for August will amount to 300 tons per day. The capacity of the hoisting plant is 500 tons per day.—The Silver Cup mine owners in the Trout Lake district have received a check for a shipment of ore of eighty-two tons to the Selby Co.'s smelter at San Francisco over and above all charges for freight and treatment for \$8473.03, considerably over \$100 a ton.—In the Center Star at Roseland the shaft, which is down 500 feet, is to be continued and work resumed in the drifts at the 500 level. Shipments from the Center Star last week amounted to 306 tons.—In the Nickel Plate the shaft is down 200 feet and will be sunk 100 feet farther and the property opened at the new level. The yield is 300 tons daily.—In the Slocan the Twin mine has 500 tons of ore on the several dumps. Most of it is concentrating, but some is of shipping grade. The ore runs 70 per cent lead and fifty ounces silver per ton.—The recent strike on the Last Chance shows 2 feet of ore at a depth of 500 feet. A tram is to be put in at this mine.

Dredging for gold has begun on the Fraser river by the Dominion G. D. & P. M. Co. opposite Lilloet. The dredge works with a dipper, the sluice boxes along the sides extending behind, so as to dump the tailings as far as possible from the scow. It is 60x30 feet. Another dredge is being operated by the Northwest G. M. Co. on the Quesnelle river, thirteen miles above Quesnelle. It is run on the bucket system, sixty buckets, every other one being armed with teeth, to tear up the bank, the next being smooth rim. The gravel is raised and dumped into the sluices.

ALASKA.

Richard Lowe is regarded as the Bonanza King of Bonanza creek. His mine differs from others in respect to the manner in which it is worked. The Lowe mine is an open cut and the gravel is shoveled straight into the boxes without having to thaw the ground out as is done in most cases. Local reports say: "He made one cleanup from the boxes of \$41,000 in thirty-seven hours."

A Vancouver, B. C., dispatch reports the arrival of the Coquitlam, the latest boat from the north. The captain "confirms the news of the big strike on Pike creek. He says the stories of the rush to Tagish lake have not been exaggerated. Miners at Skaguay have simply gone crazy. The finds are represented to be something stupendous. People are throwing everything aside and stampeding for the scene of the latest excitement." Skaguay, Dyea, Juneau and Wrangell are partially deserted. J. Kelley, a druggist at Skaguay, showed a letter to Purser Smyth from his partner, who has been at Pike's creek since the first strike. He says:

"Drop everything, no matter at what sacrifice. Come quick. Enormous strike here. Probably the richest placers in the world. Pike's creek is staked for sixteen miles on either side, but there are two other creeks here within twelve miles which are thought to be just as rich. Gold commences at grass roots, and is of uniform richness 5 feet down to bedrock, running from \$2 to \$10 a pan. There must be 8000 people here in tents."

All the returning Klondikers are going back on the double-quick to Pike's creek, taking a week's provisions. All the prominent Canadian officials reached the scene of the strike several days ago. They have written back to the coast that the strike is the richest yet

discovered. They put the average pan at about \$2.

That kind of talk a little earlier in the season would have started a good many from California, but just now, no matter how glittering the reports, the transportation companies will be unable to create a stampede or recoup their season's losses.

At Seattle, Wash., on the 17th, the steam schooner Rival arrived, fourteen days from St. Michaels, with 100 passengers from Dawson City, among them some few miners with gold dust estimated at about \$100,000. N. H. Sylvius, a pioneer of the Yukon, says that when winter sets in there will be a general exodus from Dawson, as the country cannot support the people there. Men are seeking employment at \$5 per day. Wages have dropped from \$1.50 to 70 cents an hour. Even at that price only a few can obtain work. There is much sickness at Dawson and the hospitals are full of dysentery, which is the chief complaint. This is not confined to Dawson, but prevails along all the creeks.

Indiana capitalists in the Berners Bay district, known as the Alaska G. M. Co. of Indiana, have acquired title to seven claims and a large force is at work erecting buildings to accommodate seventy-five men. In addition to this, a tunnel 7x8 feet has been driven through the companies' properties. A road has been built for half a mile and fifteen bridges erected. The present work consists in driving the tunnel 1500 feet to tap the farthest ledge and give stoping ground for 2000 feet. Several of the veins have been cut and many more which appear on the surface will be intersected. A large stamp mill will soon be placed. The property is rapidly being brought into a productive condition.

IDAHO.

At Florence the San Joaquin mine continues to improve with depth. The vein is 16 inches and assays \$40.40 in gold and three ounces of silver per ton.—At Kendrick this has been a prosperous season for the miners, a majority of them having made paying cleanups. They have had a good supply of water. C. E. Rummel cleaned up \$1700.—At Murray the Chest mill has started ten stamps on a month's run of fair grade ore.

At Mullan the Morning mill is completed. It has a capacity of 800 tons of crude ore daily, which is about 250 tons more than any other lead-silver concentrator in operation.

J. K. Fleming bought the Lucky Boy quartz mine at Idaho City last week for \$20,000, paying \$5000 cash, the balance to be paid in monthly installments.

Work has resumed on the Blue Bird mine near Idaho City under bond.—In the Iowa and Yellow Jacket mines at Quartzburg large ore bodies have been opened and the output is more than the 10-stamp mill can handle.—Work has resumed at the Summit mine near Idaho City.—O. Chellis, while the water lasted, made \$15 a day this season in his placer mine near Challis.—The first cleanup this season at the Buffalo Bill placer mine near Elk City amounted to ninety pounds of gold.

At Wallace men are excavating for the foundation for an extension to the Standard mill. The new building will be 23x28 feet. A crusher will be put in.

The flume of the Twin Springs H. Co. near Idaho City is 6 miles long 5 feet deep and 6 feet wide. The pipe line is 4000 feet long and 4 feet in diameter. Seventy boxes, each 12 feet long, will be put in. Six hydraulic chiefs will be at work next year under heavy pressure. In one claim the pressure will be 315 feet, in another 275 feet, and in the third 125 feet. In the Twin Springs claim the gravel bank is 100 feet deep, in the Big Flat claim 60 feet, and in the next 30 feet. The ground carries gold from surface to bedrock and all of it will pay with the supply of water that will be used. This year the claims were no more than opened. A derrick is being constructed, to be run by water power. An electric light plant and hotel will be put up this fall. Additional ground thirteen miles above the camp was purchased this summer by the Twin Springs Co., on which work will begin soon on a big ditch, and a wagon road will be constructed from the Twin Springs camp to the recently purchased placers. The monthly payroll of the company the past spring and this summer has been \$14,000. A telephone line was completed in June from Boise to the camp, a distance of forty-two miles.

Idaho Statesman: Work has been completed on the Basic Co.'s ditch and flume in Grimes creek near Boise. The ditch is eight and one-half miles long, will carry 1200 inches of water and produce 800 H. P., which is to be used in operating dredges in the Basin.—The Placer-ville dredge is finished and ready to run as soon as power can be furnished for it. The Centerville dredge is on the stocks, rapidly assuming the shape of a boat. So far as dimensions are concerned it will be a duplicate of the first dredge built by the company, but as the ground in the vicinity of Centerville, where it will operate, is not so deep as at Placer-ville, its reach will be a few feet less. The Basic Co. expects to land the last of its electric machinery at the power house before the end of August.—Near Albion, J. Comerford in the Badger mine is sinking a shaft and taking out good ore. About 100 sacks are ready for shipment.—Work will be resumed on the Bimetallie mine, Conner Creek district, soon. Good ore is taken from this claim.—The Comora people, in the Conner Creek district, have completed the raise to the surface from the end of the long tunnel for air, and will continue work on the tunnel.

UTAH.

It is estimated that there are 200,000 tons of tailings at the Mercur mill, Mercur. Mgr. Dern has under consideration the building of a leaching plant to extract their values.—At Fort Duchesne the St. Louis Gilsonite Co. is making regular shipments to Eastern markets.—M. Gibson, Mgr. Geyser-Marion at Mercur, recommends development of new

ground in which ore has been discovered that assays \$5 per ton and which would give the company an output of 200 tons a day.—The Galena mine, at Fish Springs, made a shipment last week of high grade silver and lead ore.

Pres. R. C. Chambers, in his report on the Daly mine at Park City, shows that Dec. 31st, '97, there was cash on hand \$36,199.37, that during the year dividend No. 77 of \$37,500 was paid. From the sale of crude ore \$19,923.69 was derived, while from bullion \$80,067.35 was obtained. In the same period 5369 tons of ore, of an average value of \$17.04 per ton, were milled, while the cost of extraction was \$3.71 per ton. From the ores milled and those marketed in native form the company realized \$162,667.85. The report concludes that since the opening of the mine 275,321 tons of ore have been mined; that from it 11,373,317 ozs. silver and 11,491 ozs. gold were derived; that the whole sold for \$9,579,229.86, and that dividends amounting to \$2,925,000 have been distributed.—The Last Chance Co., at Bingham, is said to have closed down.—The Blue Bird of Gold Mountain made a shipment last week of a carload of high grade gold ore.

Work has begun on the Yankee, at Eureka, and a favorable showing is reported; the tunnel has reached 600 feet.

At the Martha Washington mine, Silver City, drifting for the vein from the 350-foot level is going on day and night.—At Belknap in the Loring mine a ledge is being developed that is 6 feet wide and yields \$9.60 a ton.

—Ore shipments from Park City last week amounted to \$1,553,680 pounds.—Tintic shipped fifty-one cars of ore and twenty-five cars of concentrates.—From Silver City were shipped thirty-two carloads of ore.

The Grand Central mine at Mammoth is outfitting three cars of ore a day. New machinery at an outlay of \$12,000 is being put in. The company has a reserve fund of \$100,000.—The search for ore in marketable quantity on the Comstock at Park City has been resumed under the direction of M. Dusseldorf. Several thousand feet of exploratory work has been done and in spots some high grade ore has been found.

The Starlus Co. at Bingham is sinking a shaft on the Amanda mine, from its old upper workings. It is down 30 feet, all in quartz carrying 5 to 5½ per cent copper and \$1.50 in gold.—Supt. Johnson has completed the survey for a wire rope tramway for the Highland Boy mine to the depot, which may be adopted in lieu of the proposed railroad.—Wilt & Heaton have run 125 tons of 10.40 ore through the Heaton jigs. The product is four in one, and shows 40 per cent lead. They will have between sixty and seventy-five tons concentrates from 250 tons.—E. Hill & Co. will extend the tunnel of the Washakie claim 100 feet. It is in 400 feet on the vein which shows 21 inches of good milling ore.—A 16-inch streak of shipping ore has been struck in the Golden Opportunity new ground.—Work has resumed on the North Star mine near Coryville.—The Spanish mine at Bingham marketed eighty tons of ore last week.

The Grand Central mine, Tintic, is turning out seventy tons of ore a day.—The Silver King at Stockton, which has been idle several years but recently reopened under lease by Gemmell & Cunningham, made its first shipment last week, which yielded 60 per cent lead and forty ounces in silver per ton.—S. Newhouse, who returned from the East this week, announces that contracts will be let for the construction of eight miles of new railway, five miles to connect Bingham and the Highland Boy mine with spurs and sidetracks, and three miles from the Rio Grande Western tracks at Murray to the smelter which is to be erected near there. Work will begin soon and be completed this fall.—The first shipment was made this week from the Daisy mill, of 200 pounds of auro-cyanides, to be followed by a like shipment in two weeks. The Tribune says that in the starting of the Daisy mill the mines of West Dip appear as a new factor in the Mercur district. In a general way the ores there are the same as those on the east dip of the big zone, but as yet there is not a suggestion of anything arduous in connection with them. The ores of the Daisy average about \$6 per ton and as those of the Sacramento were handled at a gross cost of \$1.40 per ton last month, there is no reason to believe other than that Mgr. Mayne will in a short time accomplish the same thing. With the production of auro-cyanides at the Daisy the number of mills at Mercur from which that product is coming is increased to five.

Mercury: The Overland at Mercur continues to develop well. The shaft has cut into the vein 11 feet, all of which is good milling ore. Throughout the mine the vein and values are proving large and uniform and of a quality yielding to the cyanide process.—Tests of the tailings at the mill at Manning have been successful and the dump can be treated at a saving of \$1 per ton. There is estimated to be 200,000 tons which would keep the mill running for two years and add \$9000 monthly to the net earnings of the company.—Work on the old Fred mine has been resumed. The shaft is being retimbered. Extensive development work will be done this season.

MONTANA.

The Golden Scepter G. M. Co. of Quigley is to adjust and pay outstanding claims. The new concern, the Majestic G. M. Co., will complete the mill and electric power plant and operate the Jumbo mine.

Near Nelhart the Big Seven mine paid \$60,000 in dividends in three months. The ore is partly sorted and sacked in the mine, then brought to the ore house where sorters break the chunks and reject all waste. Then it is hauled seven miles for shipment. Thirty-five men are employed in the mine.

The June output for the Montana M. Co., near Marysville, was 2930 ounces of gold and 15,700 ounces of silver from 6211 tons of ore crushed, and 11,591 tons of tailings. The estimated value of the crushings is \$43,400, and of the tailings \$23,800; the cost of treating the

tailings was \$13,443. The total expense was \$58,000, leaving a net income of \$9200.—The Kentucky-Montana M. Co., near Helena, has leased its properties to Missoula parties, who have transferred it to the Vermillion M. Co., a new incorporation with \$100,000 capital. The new company took hold Aug. 1st. The property is well developed. Large ore bodies are exposed and the rock can be handled economically.—The Bimetallie mill, at Phillipsburg, has been running fifty stamps since June and twenty additional stamps were started last week. The full 100 will be in operation soon. There are about 800 men at work. Shipments of bullion are made with old-time regularity. Last week a ton of silver was shipped. The improvements that have been made in the mill have been extensive. The consolidation of the two companies and the introduction of new processes have made it possible for the plant to be operated at a cost that is said to be much less.

Two Libby prospectors made a location last week; another man came along, took a copy of it and, says the Libby News, here it is, letter for letter and line for line, just as it appeared on the discovery post:

July 27, 1898

Located by

Jake Teters and

A. Rosecrance.

Ft. 700 Southward

Ft. 800 Northward

Ft. 300 from Sender

Stake Each Side

None as the Good A Nuf.

That is all there is to it, and while it is not in the usual form, the News believes it is a good location. The five essentials for a legal notice are there, the date, the names of the claim, the direction of the lead and the amount of ground claimed.

T. Ash, Mgr. Great Eastern mine at Castle, has suspended operations and paid off all the miners. It is thought that the mine will be leased at once and operated again.

The Bell mine at Pony is opened by four tunnels at a depth of 1206 feet, and is running fifty stamps treating 100 tons of ore a day, and shipping seven carloads a week that return about \$100 a ton.—At Winston the Diamond Hill mill continues forty stamps in operation and employs thirty men. The ore that was paying only \$1.50 when the mill closed down last summer is now being treated so successfully that it is yielding \$15 per ton.

—At Virginia City D. W. Chambers, representing the Butte Co. that bonded the Fortune group, will soon commence work on a large scale.—The Mammoth G. M. Co. of Coloma, was attached last week by Larabee Bros., bankers of Deer Lodge and W. E. Hosmer, of Boston, president of the company, for \$25,000. The Larabee Bros. account is for an overdraft in their bank and Hosmer attaches for money he has advanced. The Mammoth mine, under the new company and under the management of A. B. Brown, has been running eighteen months, during which time \$100,000 has been sunk.

At Glendale the Hecla Con. M. Co. has found new ore bodies of lead in the Atlantis, Hecla, Trapper and Cleve mines. The company for a long time has had good grade silver ore, but was unable to reduce it without fluxing material. The old lead ore bodies gave out necessitating the closing of the smelter. The silver ores were not sufficiently high grade to ship. The hope of the company was in finding new supplies of lead ores and development was continued with the above results. The company employs 200 men and will increase the force when the second furnace is started up. Last month the payroll was \$30,000, twice as much as for July, '97.

The Gilt Edge mine near Lewiston is treating 107 tons of ore per day.

F. A. and A. P. Heinze filed at Butte a suit against the Boston & Montana Co. of Montana and the Boston & Montana of New York, for \$250,000 damages and an additional \$100,000 for ore alleged to have been mined from the Dayton lode claim.

Anderson & Moore, near Libby, shipped a car of ore that assayed \$338.60 and \$109.20 per ton. The pay streak averages 14 inches in width.—J. Chase made a shipment of a carload of ore from the Lost Cloud mine that carried 260 ounces of silver and from \$1.50 to \$3.50 gold per ton.—The Moulton mine at Nelhart has been unwatered to the 500 level and the pumps have been lowered to continue work.

Butte Miner: The talk of operating the Butte & Boston properties independent of the Boston & Montana and treating only Butte & Boston ore in the Butte smelter and concentrator has died out to a great extent. It is not only thought by mining men in Butte that the smelting plant will ever be operated by the Butte & Boston Co. unless the Michael Davitt mine should prove a bigger producer than it has in the past. The one side of the concentrator is being operated on Butte & Boston ore, of which from the various properties about 200 tons a day is being hoisted. The average grade, however, is low and it is only occasionally that Butte & Boston ore is sent direct to the smelter.

SOUTH DAKOTA.

The company working the placer grounds near Mystic is operating three centrifugal pumps. The method of working the gravel is by sinking shafts. The gold output is satisfactory.

MICHIGAN.

The annual report of the Calumet & Hecla Co. shows its machinery contracts on hand are larger than ever before, amounting to \$855,000, which is \$300,000 more than a year ago and \$200,000 larger than two years ago. It is building a new coal dock and is arranging to do away with the hand-pushing of cars through the levels by the introduction of power through rope transmission. It is having built seven drum cylinders, designed to carry 8000 feet of wire rope, which will reach the limit of the Calumet & Hecla ownership upon the

inclined of its vein. This order amounts to \$300,000 and follows the delivery of three similar cylinders. As mining operations are deepened, larger and more powerful machinery is required. The Corliss Jumbo engine, the largest engine in the world, has been ordered replaced—or, rather, placed in reserve—the moment the engineers reported they could build an engine whose increased efficiency would in three years pay its cost. The Calumet & Hecla in its business operations more resembles a manufacturing company than a mine, but, of course, as a manufacturing company, unless additional ground is purchased, it cannot go on forever with present Calumet & Hecla richness.

ONTARIO.

The shaft on the Emperor mine, at Mine Center, is down 100 feet, and tunneling has begun to meet a 15-foot vein found 75 feet distant.—The Golden Star shaft is down 300 feet and drifting is done from the third level. A stamp mill is being built. Ninety men are employed day and night. Over 4000 tons of good ore are on the dump, and by the time the mill is ready another 300 tons will be added.

COLORADO.

BOULDER COUNTY.

The D. D. Co. near Salina is producing ten tons a day of good concentrating ore.

CHAFFEE COUNTY.

The Cleopatra, Whitehorn district, shows a foot of solid ore, out of which samples run from \$50 to \$75 in gold.

CLEAR CREEK COUNTY.

Leasers in the Little Annie near Idaho Springs have found a new body of ore and are getting out a shipment that will run over \$100 per ton. It carries copper in addition to gold.—The Newton mill has 500 tons of ore ready for treatment.—At the Josephine considerable development is under way. Most of the product is concentrating ore.—Bigger & Co. are drifting in 2 feet of smelting ore, while other leasers have a body of lead and copper ore.

DOLORES COUNTY.

The Sawpit Co. at Sawpit has cut a body of ore that runs \$80 to the ton in gold, with a pay streak averaging 2 feet wide. The company proposes to build a mill.—The Enterprise mine, at Rico, will resume shipments this month. A large force are blocking out ore bodies, and the tunnel is being pushed to open the large low-grade ore bodies in the Laura claim.

EL PASO COUNTY.

The Victor mine management proposes continuing the shaft to the 1000-foot mark. The shipments from the mine continue the heaviest in the camp.—The block formerly known as the Sweeney lease at Victor has been sold to the Mary Cashem G. M. Co. The new owners will at once put in a compressor, sink the shaft and thoroughly prospect the claim.

Lessees of the Specimen have shipped some of the best ore shipped from that property. It consisted of half a ton of ore, estimated at 50 cents a pound, three tons of four-ounce ore from the Hampshire & Lowe lease, and two tons of ten-ounce ore from the Sellers & Lowe workings.—Lessees on the Los Angeles are making steady shipments. Last month about 500 tons of ore were shipped.

—The Creston Leasing Co., Cripple Creek, is shipping a carload a day of three-ounce ore. Three cars estimated at six ounces are on the road to the Leadville smelters.—A big strike has been made in the Kitty mine, which, after taking out \$100,000 in high grade stuff, dropped into a low-grade proposition. Recently at the 400-foot level another rich shoot fully 5 feet in width was entered.—The Pharmacist mine at Cripple Creek has closed down.—The Columbine-Victor tunnel at Cripple Creek has reached 1800 feet and when completed will be 5000 feet, and will connect with the Gold Coin mine.—In the Wild Horse claim, Cripple Creek, fifty tons of ore were hoisted that will average 500 per ton. The shaft is all ore and carries a pay streak 7 inches wide of high grade. The property is being worked by parties who have a lease and bond for \$10,000.—The Lucky Guss, Victor, made a strike last week of a 3-foot vein of high grade ore in the 700-foot level, and it is reported that the new find exceeds anything yet found in the mine. The upper levels are being worked by several sets of lessees. These old workings yielded 150 tons of ore in July, which netted a fair profit for the leasers and a good royalty for the company.

The Mollie Kathleen, Cripple Creek, has a daily output of five tons, the ore averaging \$25 per ton, but so easily handled that it leaves a good margin. Three hundred feet are worked by lessees, the balance by the owner.

EAGLE COUNTY.

From Battle Mountain district seven carloads of ore were shipped last week.

The old stamp mill at Fulford is running on ore from the Adelaide mine and turning out good concentrates. The ore is being taken out as fast as the mill can treat it.

FREMONT COUNTY.

At Canyon City last Wednesday at noon the Canyon City & Cripple Creek Power and Electric Light Co.'s plant, designed to furnish power and lights for the mines and mills of the whole Cripple Creek district, about forty miles distant, was put in motion, Gov. Adams pulling the lever in the presence of capitalists and mining men. The plant is established here on account of the coal beds surrounding the town. Most of the mines of the Cripple Creek district are already equipped for the use of electricity in lights and power, and it is estimated that a saving of 25 per cent will thus be made in the cost of operating them.

GILPIN COUNTY.

(Special Correspondence).—The Gregory Con. Mines Co., capitalized by New York and Boston parties, has expended \$128,000 in de-

velopments and improvements within the past eighteen months. Their property is at Blackhawk, and consists of the Gregory and Bobtail lodes, both of which are developed. Over the former lode is their 145-stamp amalgamation and concentration mill, seventy-five stamps of which are running. From a point near the mill an incline shaft runs 1700 feet, angle 45°, landing on the main level at the 900-foot level. On this level drifting and stoping have been extensive. From the same level a vertical shaft sinks 200 feet on the vein, from which drifts and stopes run both directions in bodies of high grade ore of unusual width. Near the base of the incline above mentioned a crosscut tunnel starts at right angles to the Gregory lode, running 1300 feet southward to cut the Bobtail lode, which was developed years ago through another property. This underground tunnel cuts the Fisk vein and various blind leads in its course and will cut the Bobtail at 350 feet below its present workings and at 900 feet below the surface at the mouth of the old tunnel. If calculations are correct, the breast of the new crosscut tunnel is within a few feet of the Bobtail lode. The workings at this depth are pretty well surfaced with water, which is kept out of the way by a compound duplex steam pump, with a capacity of 800 gallons per minute, stationed at the bottom of the incline, 900 feet below the surface. This pumping power not only drains this property, but incidentally the Fisk, Cook, Sleepy Hollow and other adjacent properties. This work has been done under the superintendence of J. C. Dickey.

In the Cook mine the main shaft has reached a depth of 365 feet. The 100-foot level has been run 500 feet from the stopes in which regular shipments are being made. The 200-foot level goes in 150 feet. The mill ore yields from two to four ounces per cord. The smelting ore runs from \$7 to \$8 per ton net. About 1500 tons per month of milling and smelting ore are being handled.

WASCOOT.

Central City, Colo., Aug. 12th, '98. The shipments of ore from the county for July, over the Gulf railroad, aggregated 279 carloads; shipments for the same month last year were 280 carloads, and the shipments show that the ore production of the county for the present year is keeping close to that of last year, which was the most prosperous in its history.—Lake & Son continue development in their Barnes mine on Quartz Hill, and make monthly shipments of fifty tons of fair concentrating ore.—Returns from the last ore shipments of the Chaffee-Notaway mine at Central City netted fourteen and three-quarter ounces gold per ton.—The Jones mine at Nevada has resumed work cleaning out and repairing the shaft preparatory to sinking and driving the levels. A mill run test on the dirt ran \$10 per ton and a shipment of smelting ore yielded \$18 per ton. The property has been idle a long time.

HINSDALE COUNTY.

The St. Jacobs mine, at Carson, though well equipped has lain idle for six years pending litigation. The owners are having the water hoisted and propose to bring it up to its old record as a producer of good ore.

Reporter: A new industry is about to be inaugurated near Lake City in the concentration of zinc ores. It is said to be profitable to concentrate the zinc ores from the tailings which run from the lead concentrates. A carload has been shipped as a test to the zinc-lead smelter at Canyon City, which will run over 40 per cent metallic zinc, for which the smelter offers a good price.

LAKE COUNTY.

The Big Johnny mine near Weston Pass is leased to Philadelphia people represented by W. P. Garrison. The Big Johnny is developed by a 500-foot tunnel and a 125-foot winze. The bottom of the winze was looking promising and the work had begun on a station when the porphyry began swelling and a cave occurred.—The Rio Grande branch road to the Ibox property, Leadville, will soon be well under way. The line will be ten miles long and will pass the Resurrection, Dollie, Sedalla and several other big gold producers. The road will be completed early in the fall, and it is estimated that it will cost \$100,000.

LA PLATA COUNTY.

At Junction the Golden Rose mine is a regular semi-monthly shipper.—The American Boy tunnel will soon tap the vein.—The Schrader claim is taking out shipping ore.

OURAY COUNTY.

The ore shipped from Ouray in July was 312 cars, an increase over that of last year.

PITKIN COUNTY.

The old Taber properties near Ashcroft are reported sold to M. H. Day. He will at once begin work on the mines and will also build a concentrating mill.

SUMMIT COUNTY.

The Nettie B. mine, Ten Mile district, in getting into shape to output a large amount of ore. The machinery is in place, and work will be pushed with the intention of reaching a daily output of not less than fifty tons. The ore is a fair grade sulphide and carbonate.

SAN JUAN COUNTY.

From the Little Maud mine, near Silverton, thirty-eight sacks of ore were taken that yielded \$250 a ton gold.—The Ridgway mine is shipping two cars a week, which net \$900 per car. The output will be increased. The management have started another drift 150 feet below the present lowest drift, and when this taps the vein there will be opened up a stoep which it will take a year to exhaust.—The Moore smelter is running successfully. Eight to ten tons of crude ore are being put through every twenty-four hours. A carload of matte, the product of five days' run, was shipped to the sampling works for a test as to its values.—The average value of ore in the Irene mine, at Silverton, is 388 ounces silver and 8.10 ounces gold per ton.—The Esmeralda mine is shipping two cars a month of \$80 ore. The vein averages from 6 inches to 2 feet.—

The Green Mountain mine shipped a carload of ore that yielded \$5 gold, eighteen ounces silver and 51 per cent lead per ton.

Standard: The 114-foot extension of the North Star-Yellow Jacket 900-foot tunnel at Silverton, which has been driven to tap and drain the Black Canyon shaft and the lower drifts connected therewith, has been completed. The water was met by a 5 foot drill hole, causing a stream 60 feet in length to shoot out. The shaft tapped is 250 feet below the upper level and was broken into about 30 feet above the bottom of the sump. Through this system of drainage, thousands of feet of ground will be opened up which otherwise would have lain useless.

The tramway building of the Silver Lake mine is said to be the largest of the kind in the world. It is 98 feet long, 49 feet wide and 72 feet high; has a capacity of 10,000 tons; has four floors and eight ore bins. The tramway is 15,000 feet long, has twenty-four towers, the tallest being 22 feet high. A 15 H. P. dynamo furnishes the power. It is working smoothly and dumping concentrates into the bins steadily.

SAN MIGUEL COUNTY.

The Keystone placer mine, near Telluride, has resumed work. Shafts will be sunk to bedrock and a hydraulic elevator installed.

NEW MEXICO.

(Special Correspondence).—The Hearst people are spending large sums of money in development work and in making extensive improvements at Pinos Altos, and as a consequence the camp is booming.

A big copper strike has just been made in the Carrizilla district, not far from Deming. The vein is nearly 60 feet wide, and a mill run on ore taken from the full vein without sorting shows a return of 28 per cent copper and fifteen ounces silver.

A contract was let last week for the building of reduction works in the San Andres district, in Dona Ana county.

The Bennett-Stephenson mine in the Organs, not far from Las Cruces, is now being operated successfully. The concentrator is running night and day, and the ore is steadily improving.

The Surprise at Hanover is now working profitably on lead ore, which is sent to the El Paso smelter.

Hawley Fitch, the new owner of the Ajax mine near Elizabethtown, is putting the property in first-class condition. This was formerly an excellent producer, but for some time has been in bad order.

The well-known Lincoln-Luckey, in the Golden district, which was for a long time tied up in litigation, is now shipping considerable quantities of fine ore to the Colorado smelters.

The heavy machinery recently put to work on the placers in the Moreno valley is doing excellent service. The steam dredge is bringing up the richest gravel yet found in that district, and a nugget worth \$5 is no longer a rarity.

The famous Aztec mine, in the Ute Creek district, is again in active operation. This mine has a record for over \$1,000,000, but owing to legal complications has been lying in a dormant state for a long time past.

The Bandana, in the Moreno district, has produced over \$100,000 in the last two years, with a depth of less than 200 feet.

The Empire, in the Black Copper district, has recently developed a large body of very fine ore, with occasional pockets running as high as \$1000 a ton.

In the Cochiti country there is greater activity now than ever before, and the future of all the camps in the vicinity appears to be very bright. The big cyanide plant in Colla canyon—the largest of its kind in the United States, except the great plant in Utah—is now in operation and thus far everything has gone on satisfactorily. Although numerous tests had been made with the ore before the work was commenced, the practical operation of this important enterprise is still an experiment, and it will be necessary to wait a week or two yet before actual experience places the success of the work beyond any room for doubt, and then if the result meets the expectations of the owners, the whole Cochiti country should join in a great celebration of the event, for the success of this enterprise means that Cochiti is to take rank as one of the greatest mining regions on the continent. Those who are acquainted with the district are fully satisfied of this already, and as soon as it shall be demonstrated by the new mill that these vast bodies of low-grade ore can be worked profitably, the public will know it. More work is being done in the district this year than was ever done there before, and more good ore is being shipped, but for every ton that will bear shipping there are forty tons or more left on the dump, and how to get the values out of this is the question that the new mill is expected to answer.

Albuquerque, N. M., August 10th, '98.

The Miners' Dream mine near Questa has a 135-foot shaft and drifts. From the dump of 500 tons assays have given \$38 in gold.

ARIZONA.

The Pinto Creek M. & S. Co., near Globe, from a ton of Yo Tambien ore, received 19.63 per cent copper \$8 in gold and four ounces in silver and from Winona ore 14.20 per cent of lead, \$5.60 gold and one and one-half ounces silver. Supt. Calder is centering the work on the Yo Tambien and has the shaft down 132 feet.—The Fortuna mine, in Yuma county, is 600 feet deep. The monthly output of gold is \$40,000.

Development work is progressing at the King of Arizona mines with a small force. The water is packed by burros from Tres Alamos, twenty miles from the mines, and this is thought to be uncertain. The mines look good, and only water is lacking to make the property a success.—Gandolfo & Sanguinetti's lead mines at Castle Dome employ forty men, and quantities of good lead ore are being taken out. These mines have improved

with continued development. The ore is freighted to Gila City, then shipped to San Francisco.

The steam wagon brought the first consignment of ore to the smelter at Williams from the Grand canyon copper mines last week. The load weighed forty tons.—A strike has been made in the Nellis group of mines and a large body of ore is being uncovered.

A carload of copper matte from the Nacosari mines has been brought up to Bisbee to be treated at the Queen smelters. Heretofore the matte has been shipped to Baltimore.

Bisbee trib: An authority on Arizona copper mines says that the production in the Territory this year will increase fully 50 per cent. It increased 25 per cent in 1897. The United Verde mine, owned by W. A. Clark, has a monthly output of 3,000,000 pounds and is probably the largest producer in Arizona, but there are other mines that produce 2,000,000 pounds per month.—The Fortuna mine in Yuma county is opened to a depth of 600 feet, an evidence that lodes in Arizona go down. The mine is a steady producer, the monthly output of gold being from \$40,000 to \$50,000.—The Copper Queen Co. are erecting another large ore bin. The old bins were insufficient for the amount of ore hoisted. A new furnace has arrived to take the place of the last small one. The company are increasing their output, which is said to be over 2,000,000 pounds per month.

Owners of the Marcus mine near Stanton will soon commence work.

MEXICO.

The new Wyman shaft on La Colorada mine at Minas Prietas, Sonora, is going down rapidly and has cut the ledge. It is from this shaft, which is triple compartment, that the Don Ignacio property will be worked.

SOUTH AFRICA.

J. R. Williams of Johannesburg, in discoursing on mill practice, says of the treatment of slimes: "This, in the ordinary sense, is a non-leachable product. By non-leachable I mean that it is not practicable to percolate solutions through it. The mode of treatment adopted for this product may be briefly described as follows: The slimes with a large excess of cyanide solution are pumped into any suitable vat or tank, where they are allowed to thoroughly settle, and the clear solution drawn off through a perpendicular series of side cocks, or, preferably, through a decanting pipe which is fixed on a movable joint and can be lowered at will until all the clear solution is drawn off. In cases of rich slimes, it is found necessary to transfer these settled slimes into another tank, which is effected by sluicing with cyanide solution through centrifugal pumps, and the process is repeated. The gold in these solutions is not amenable to the method of precipitation by the ordinary zinc process. Precipitation in this case has to be effected by the Siemens-Halske process, which may be briefly described thus: The solution is allowed to flow through boxes having alternate sheets of iron and lead foil. An electric current is passed from the iron to the lead which precipitates the gold on the latter. This, when required, is removed from the boxes, melted into bars, which carry from 1/2 up to 7 per cent of gold, and is usually sold to the Rand Central Ore Reduction Co. for refining. The combined processes of the mill, cyanide works and slimes plant extract from 90 to 95 per cent of the total gold contents of the ore, which, to the best of my knowledge, far surpasses anything done on any other gold field in the world, and at a cost not exceeding 7s per ton."

President Krueger and his executive have decided to have the entire country of the South African republic surveyed geologically. The work is to be carried out under the supervision of a citizen of the republic, Dr. G. A. Molengraaf.

The recent flotation of two of the Consolidated Gold Fields properties, the South Rose Deep and the South Goldenhuis Deep, and the immediate commencement of work on them seems to augur an increased activity in the mining market. It is also rumored that the mine of Eckstein will shortly commence work on the Robinson Central Deep. The Pioneer mine, which has paid its capital back about twelve times over has declared a dividend of 375 per cent. The mine is a small one, twenty claims, and will be exhausted in about eight months, but there is a reserve pile of ore at the surface, enough to keep the mill going two months. The average grade of the ore milled in June was two ounces of gold per ton. The Johannesburg June output totals 365,088 ounces, 70 1/2 ounces over the May figures.

J. R. Daniel appeared before Judge Granger at Truro asking for the winding up of the Blue Hills Co. The shareholders in April decided to have the company wound up by the Court, and the company had ceased to carry on the business. There were 4163 shares, and the total debts amounted to £2208. The Judge granted the winding up order asked for.

NEW ZEALAND.

At the Progress mines, Reefton, results of crushing for June were: Ore crushed, 3200 tons, yielding (inclusive of sulphurets) £700 £2828, or £1 19s. 3 1/2d. per ton. Expenses, £2181, or 13s. 7 1/2d. per ton. Profit, £4167, or £1 5s. 8 1/2d. per ton. The manager states that the cost is below the average, owing to the milling of reserve ore, consequent on the temporary stoppage of tramway. During the four weeks the 40-stamp mill suspended work for four days.

NEW SOUTH WALES.

The gold yield of New South Wales the past seven months amounted to 181,321 ounces, being a monthly average of 25,974 ounces as compared with an average of 24,351 ounces for the corresponding period of last year.

QUEENSLAND.

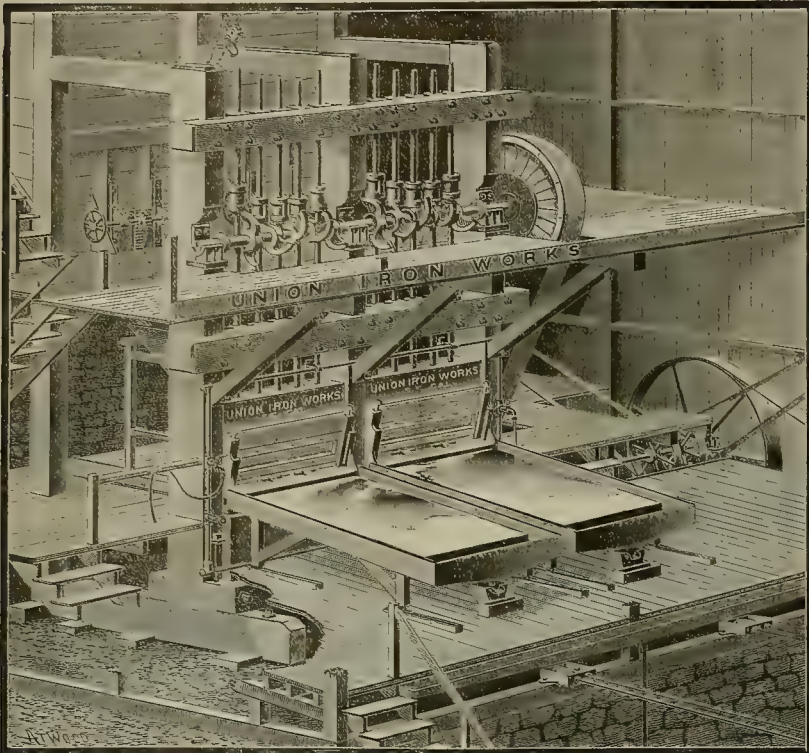
The Queensland gold returns for July were 76,800 ounces.

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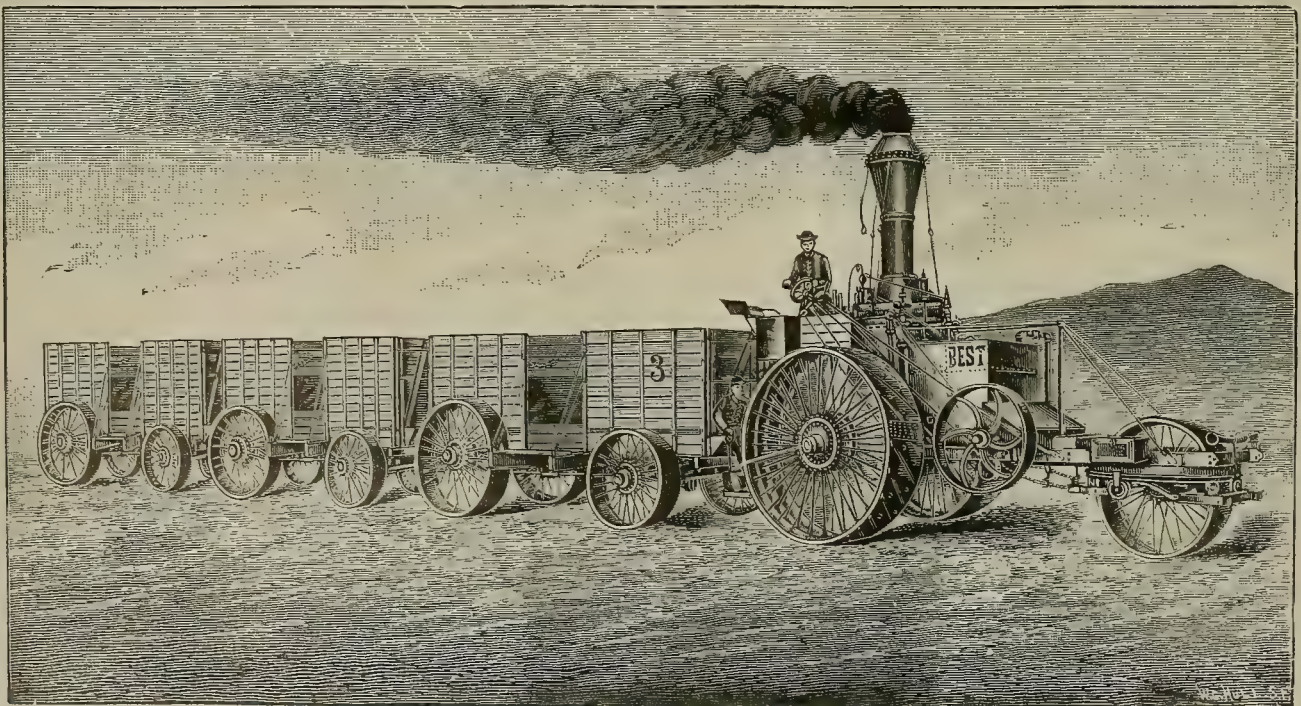


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The illustration shows the details of a modern 10-stamp battery of the back-knee type, driven by belt and tightener from a shaft located upon the battery frame sills below the mortars and plainly illustrates not only the battery and its various parts, but also shows the ore-bin gate, feeders, copper apron plates and water piping, all in their relative positions.

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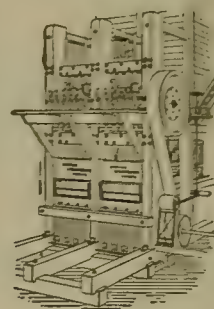
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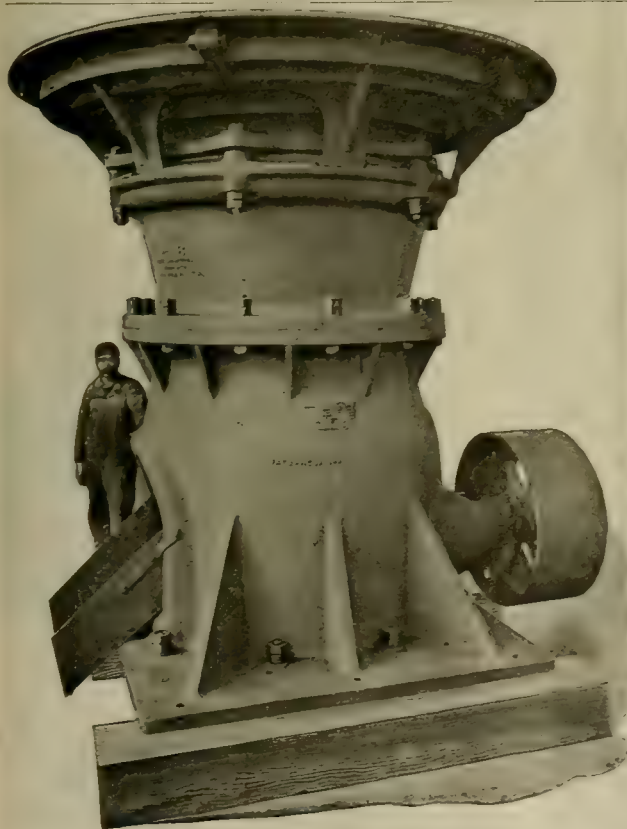
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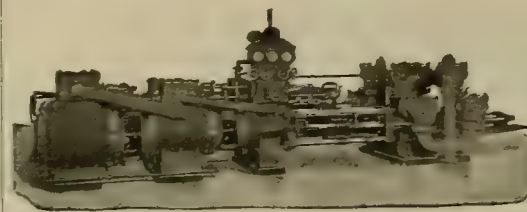
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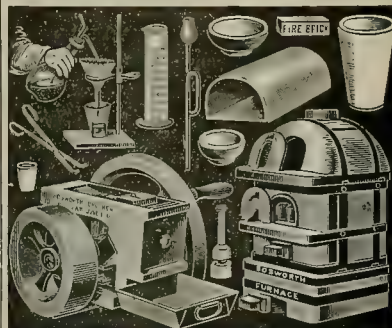
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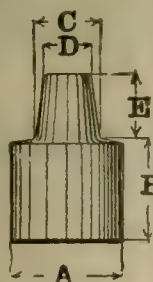
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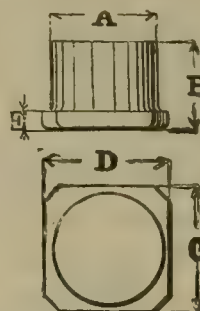
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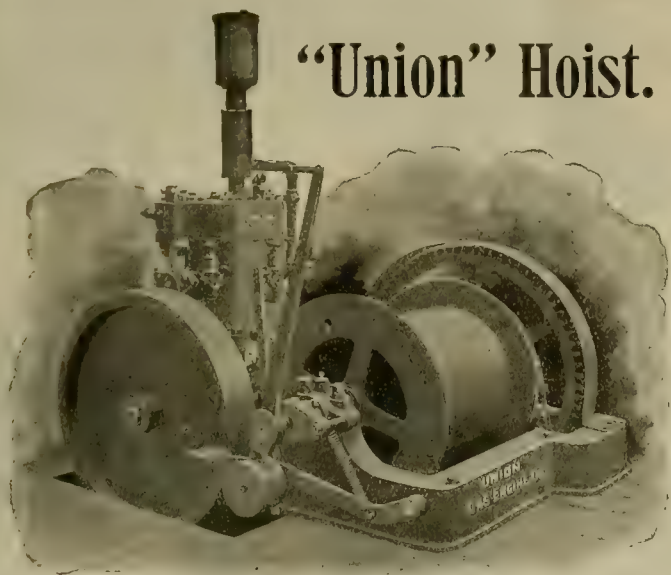
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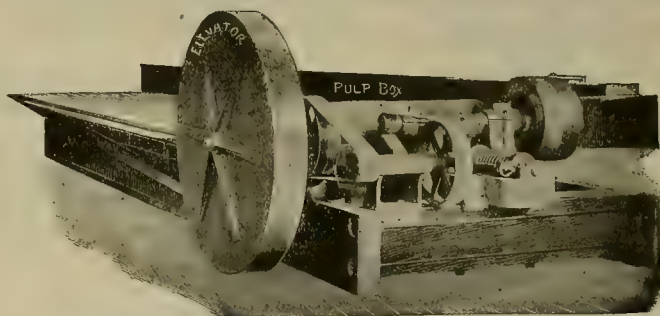
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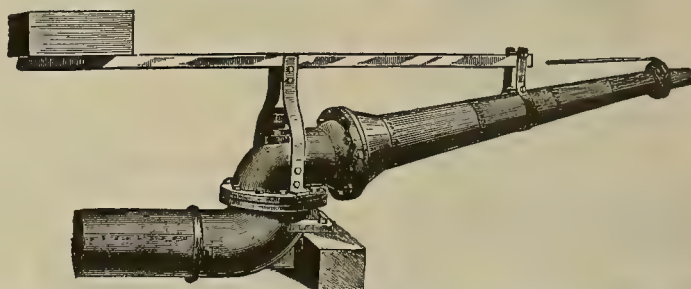
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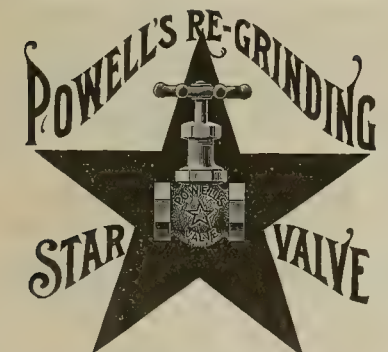
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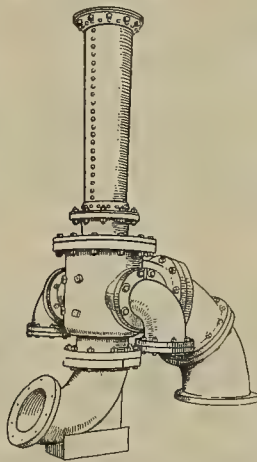
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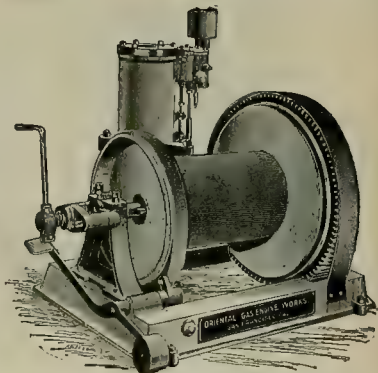
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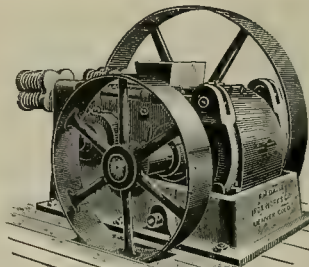


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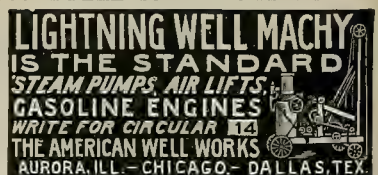
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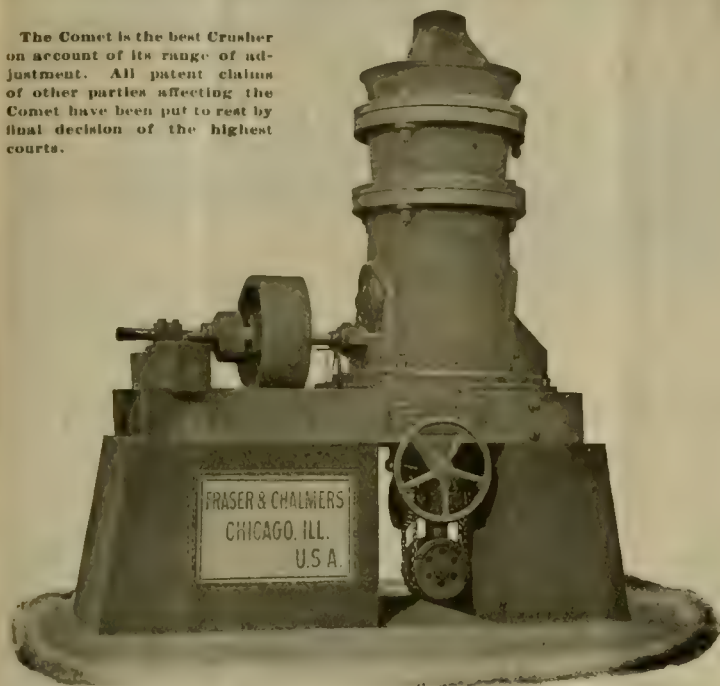
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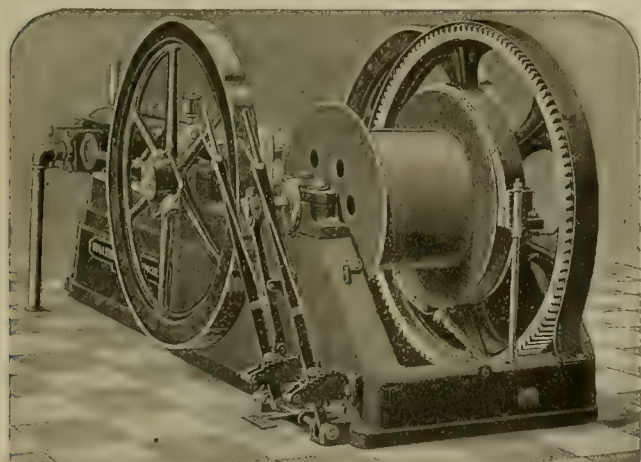
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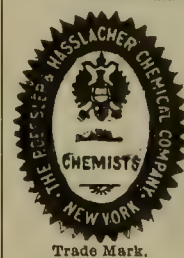
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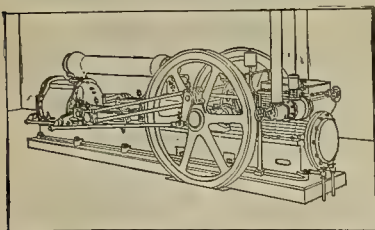
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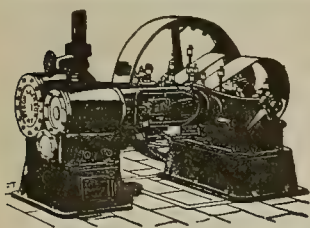
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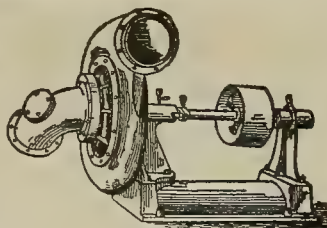
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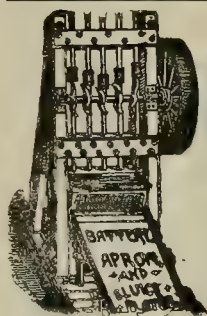
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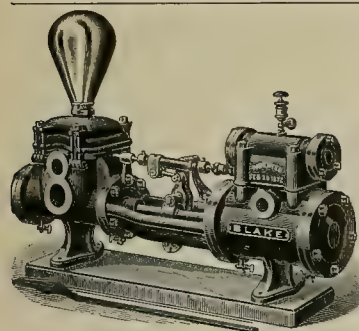
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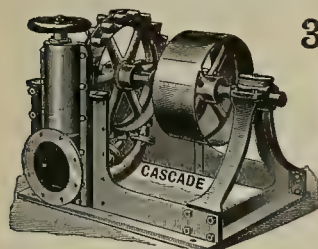
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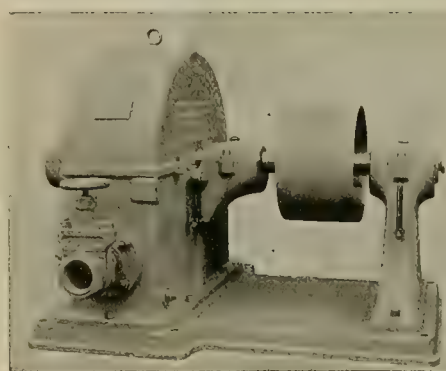
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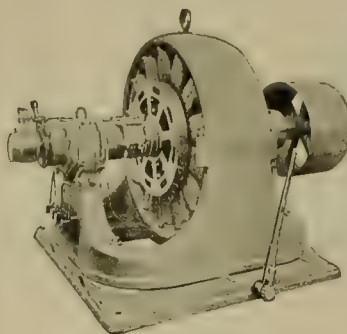
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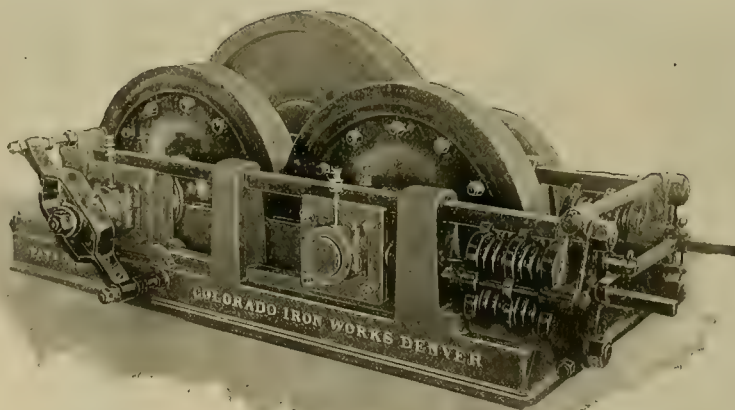
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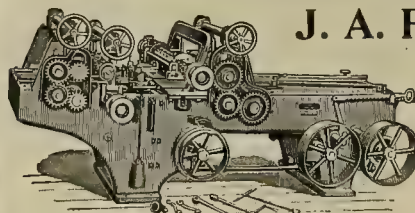
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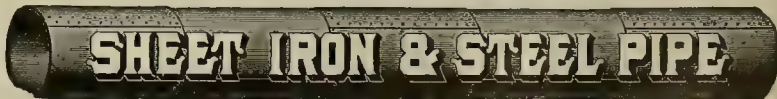
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Market Reports.

The Markets.

SAN FRANCISCO, Aug. 18, 1898.
SILVER.—London, 27½d; New York, 59½¢; San Francisco, 58½¢; Mexican Dollars, 46¢ 40/100.

COPPER.—Boston reports: Copper was advanced rather sharply this week in sympathy with a higher London market, and by reason of the withdrawal of one of the large Lake mines from the market. The demand during the week was larger than recently and the exports are of a fairly large volume, to say nothing of the reluctance of holders to part with their stock at present prices. Lake was advanced almost ½¢ and other grades in proportion. Lake closed at 11½¢@12¢, electrolytic 11½¢ and casting 11½¢@11½¢.

LEAD.—New York reports "higher and more active for consumption. Spot and nearby deliveries closed 4.05@4.12½," smelters quote 3.85; local, pipe, 6@6½¢; sheet, 6½¢@7¢; pig, 5½¢; bar, 6¢.

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—Dull at 5½¢ and 5½¢. According to the preliminary statement of the United States Bureau of Statistics, the production of spelter for the six months ending June 30th was, in tons of 2000 pounds:

| | |
|---------------------------|--------|
| Eastern States..... | 2,955 |
| Southern States..... | 1,695 |
| Illinois and Indiana..... | 21,258 |
| Kansas..... | 21,484 |
| Missouri..... | 10,371 |

Total.....57,743
Last half of 1897.....53,077
First half of 1897.....46,903

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18¢.

ANTIMONY.—9½¢, 10¢.

BABBITT METAL.—10-12-14—best 16¢.

NAILES.—List per keg: No. 20 to 60d, wire, \$2.25; cut, \$2; 10 to 20d, wire, \$2.30; cut, \$2.05; 8d, wire, \$2.35; cut, \$2.10; 6 and 7d, wire, \$2.45; cut, \$2.20; 4 and 5d, wire, \$2.55; cut, \$2.30; 3d, wire, \$2.70; cut, \$2.45; 2d, wire, \$2.85; cut, \$2.70. In carload lots, 10¢ per keg less.

QUICKSILVER.—Domestic, unchanged, \$42.50@43¢; export and carload lots, special rates.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½¢; less than one ton, 17½¢. No. 1* 60%, carload lots, 13½¢; less than one ton, 15½¢. No. 1** 50%, carload lots, 11½¢; less than one ton, 13½¢. No. 2, 40%, carload lots, 10¢; less than one ton, 12¢. No. 2* 35%, carload lots, 9½¢; less than one ton, 11½¢. No. 2** 30%, carload lots, 9¢; less than one ton, 11¢. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.30; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices:

Wellington.....\$8 00 Coos Bay.....\$5 00
Seattle.....6 00 Southfield.....7 50

Cargo lots, Eastern and foreign:

Wallsend.....\$7 50 Cumberland.....\$10 00
Brymbo.....7 50 Cannel.....9 50
Pennsylvania, hd., 14 50 Welsh Anthracite, 12 50
Scotch.....8 00 Rock Springs.....7 60

COKE.—Foreign, \$13; domestic, \$12 per ton.

CORDAGE.—Net rates on not less than 10,000 lbs., subject to change without notice.

Sisal. Manila.
14-in. cir. (7-16 dia. and upward).....114
12-thread (3 dia.).....114
6 and 8 thread (4 and 5-16 dia.).....114
Bale Rope (3 and 4 strand).....114
Bale Rope (2, 6 and 8 strand).....114

OILS.—California Castor, pure, cs., \$1.12 per gal.; bbl., \$1.07; pure No. 2, cs., 85¢; bbl., 80¢; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.11; less than 200 gals., \$1.20; in bbls., 4¢ per gal. less than case; Baker's Crystal, \$1.50; China Nut, 52¢; Linseed, strictly pure, boiled, bbl., 43¢; cs., 45¢; raw, bbl., 41¢; cs., 46¢; lots of 5 bbls., 1¢ less. Lucol, boiled, bbl., 38¢; cs., 43¢; raw, bbl., 36¢; cs., 41¢; lots of 5 bbls., 1¢ less. Kerosene—Pearl, cs., per gal., 17¢; Astral, 17¢; Star, 17¢; Eocene, 19¢; Extra Star, 21¢; Elaine, 22¢; Water White, bulk, in tanks, 11½¢; Mineral Seal, iron bbls., 21¢; wooden bbls., 23½¢; cs., 26¢; Mineral Sperm, 27¢; Deodorized Stove Gasoline, bulk, 12½¢; do., cs., 18¢; 86 deg. Gasoline, bulk, 20¢; do., cs., 25¢; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½¢; do., in cs., 16½¢; Lard Oil, Extra Winter Strained, bbl., 56¢; cs., 61¢; No. 1 bbl., 46¢; cs., 51¢; Neatsfoot Oil, bbl., 65¢; cs., 70¢; No. 1 bbl., 55¢; cs., 60¢; Sperm, crude, 60¢; Natural White, 65¢; Bleached do., 70¢; Whale Oil, Natural White, 40¢; Bleached do., 45¢; Cocoa, cs., 55¢; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 31 @ 31½¢ per lb.; carloads, 28¢; sulphuric acid, 2½¢ per lb. for 60%; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½¢ per lb.; blue vitriol, 4½¢ per lb.; borax, refined, 5@6¢ per lb.; chlorate of potash, 9½¢@10¢; roll sulphur, 2½¢; blue vitriol, 4¢; alum, \$1.90@2.00; flour sulphur, French, 2½¢@2½¢; California refined, 1½¢@1½¢; nitric acid, 12½¢@16¢; caustic soda, 60%, 2½¢@2½¢; 70%, 2½¢@2½¢; 77%, 3¼¢@3¼¢; Cal. s. soda, bbls., 65¢; sks., 60¢ @ 100 lbs.; chloride of lime, spot, 2.10@2.25¢; to arrive, 2.10¢—c; salt peter, refined, 9¢; chlorate of potash, 9½¢@10¢; caustic potash, 8@9¢.

LUMBER.—Retail: Pine, ordinary sizes, \$17@18.50; redwood, No. 1, \$18@20; No. 2, \$16@18.

The following is published by request:

| Countries. | Monetary Unit. | U. S. Value. |
|--|---------------------------|--------------|
| Bolivia..... | Silver boliviano..... | \$ 40, 9 |
| Central America..... | Silver peso..... | 40, 9 |
| China..... | Amoy tael..... | 66, 2 |
| | Canton tael..... | 66, 2 |
| | Chefoo tael..... | 63, 3 |
| | Chinkiang tael..... | 64, 6 |
| | Fuchau tael..... | 61, 2 |
| | Haikwan tael..... | 67, 3 |
| | Hankow tael..... | 61, 9 |
| | Ningpo tael..... | 63, 6 |
| | Niuchwang tael..... | 62, 2 |
| | Shanghai tael..... | 60, 4 |
| | Swatow tael..... | 61, 1 |
| | Takao tael..... | 66, 6 |
| | Tientsin tael..... | 64, 1 |
| Colombia..... | Silver peso..... | 40, 9 |
| Ecuador..... | Silver peso..... | 40, 9 |
| India..... | Silver rupee..... | 19, 1 |
| Mexico..... | Silver dollar..... | 46, 5 |
| Persia..... | Silver kran..... | 40, 9 |
| Peru..... | Silver sol..... | 40, 8 |
| Argentine Republic..... | Peso..... | 96, 5 |
| Austria-Hungary..... | Crown..... | 20, 3 |
| Belgium..... | Franc..... | 19, 3 |
| Brazil..... | Milreis..... | 54, 6 |
| British North America (except Newfoundland)..... | Dollar..... | 1, 00 |
| Chile..... | Peso..... | 36, 5 |
| Costa Rica..... | Colon..... | 46, 5 |
| Cuba..... | Colon..... | 92, 6 |
| Denmark..... | Crown..... | 26, 8 |
| Egypt..... | Pound (100 piasters)..... | 4, 94, 3 |
| Finland..... | Mark..... | 19, 3 |
| France..... | Franc..... | 23, 8 |
| Germany..... | Mark..... | 23, 8 |
| Great Britain..... | Pound sterling..... | 4, 86, 6¼ |
| Greece..... | Drachma..... | 19, 3 |
| Hayti..... | Gourde..... | 96, 5 |
| Italy..... | Lira..... | 19, 3 |
| Japan..... | Yen..... | 46, 5 |
| Netherlands..... | Florin..... | 40, 2 |
| Newfoundland..... | Dollar..... | 1, 01, 4 |
| Russia..... | Ruble..... | 51, 4 |
| Spain..... | Peseta..... | 19, 3 |
| Sweden and Norway..... | Crown..... | 26, 8 |
| Switzerland..... | Franc..... | 19, 3 |
| Turkey..... | Piaster..... | 64, 4 |
| Uruguay..... | Peso..... | 1, 03, 4 |
| Venezuela..... | Bolivar..... | 19, 3 |

*Every port in China has two taels, one being the Government, or Haikwan, tael, in which all duties have to be paid, and the other the market tael.

Mining Share Market.

SAN FRANCISCO, August 18, 1898.

9:30 A. M. SESSION.

| | |
|----------------------------|---------------------------|
| 200 Belcher.....13c | 700 Ophir.....23c |
| 300 Best & Belcher.....17c | 400 Potosi.....17c |
| 400 Chollar.....19c | 600 Savage.....12c |
| 500 C. Cal. & Va.....41c | 250 Sierra Nevada.....60c |
| 300 Crown Point.....12c | 400 Union.....22c |
| 400 G. & C.....16c | 500 Yellow Jacket.....18c |
| 500 Mexican.....15c | |

2:30 P. M. SESSION.

| | |
|---------------------------|---------------------|
| 600 Con Cal & Va.....40c | 100 Justice.....07c |
| 300 Yellow Jacket.....18c | |

Commercial Paragraphs.

The Colorado Iron Works Co. have shipped ten cars of machinery for the San Juan G. M. Co.'s new mill, now being erected near Telluride, Colo. It will require three more carloads before the entire order is shipped. This plant will have the high-speed narrow face rolls to do the fine crushing and the management say that the plant will be a model one throughout.

The Krogh Manufacturing Co. have moved their machinery and stock from 51 and 53 Beale street, recently damaged by fire, to the large brick building Nos. 134 and 136 Main street. With better equipment and facilities than in the past, they will continue the manufacture of high-grade irrigation and mining machinery, for which they have a wide reputation.

The Jeanesville Iron Works Co. have under construction on recent orders four 10, 6x12 stroke, mine pumps; two 20, 12x18 stroke; one 30, 10x36; one 24, 42, 16x48; two 10, 12x18 condensers; one 26, 50, 16x48; one 20, 38, 12x36; one 8, 10, 12 condenser; one 24, 12, 12, all for local coal mines in Pennsylvania. A Middlebrook, the Denver manager, also reports construction of one 10, 16, 5½, 18 for Burke, Idaho, second order from same company, and building a carload of Cameron pattern sinks for the Denver store.

The Pelton Water Wheel Co. report a very active business, which seems likely to continue through the year. The dry season has materially affected the local demand, but their foreign trade is on the increase. Among their recent shipments are five wheels to various mines in Alaska, seven wheels for mining purposes to British Columbia, four wheels for an extensive electric power station in Japan, two wheels for operating a factory in Japan, seven wheels for various works in India and eleven wheels for mines in Mexico and South America.

Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.

COPPER MINE.—One-half interest in a rich copper mine carrying gold and silver and now producing considerable ore, is offered for sufficient capital to pay for necessary developments. For further information call or address MINER, 1032 Mission street, San Francisco, Cal.

WANTED.

Partner in Extensive Placer and Quartz Mines. Free wood and water. JAMES ARTHUR, Cornucopia, Union Co., Oregon.

Wanted by Sept. 1st an Experienced Assayer and Retort Man.

Daily assays and mine books to keep for ten stamp mill, one day from San Francisco Pay \$75 per month. Address, with references and experience, R. A. B., care this office.

A First-Class Map and Mining Draughtsman, with knowledge of Bookkeeping and Shorthand, *

WANTS POSITION with mining company or engineer in general office work. Will go anywhere. Address A. C. B., this office.

Experienced Chemist, Assayer and Cyanide Operator

DESIRES ENGAGEMENT. Has had charge of cyanide plant where segregated slime and slimy material have been worked to high percentage of gold value at small cost. References. Address P. K., this office.

POSITION WANTED

* By Superintendent of Mine and Mill, Having twenty years' experience in assaying, mining and milling gold and silver ores, and bullion refining.

Also familiar with the separation of gold from copper without acids, as practiced in Colorado. Have served four years as assayer in U.S. coinage mint. Address "Mine Supt." Mining and Scientific Press Office, San Francisco, Cal.

WANTED.

METALLURGIST and PRACTICAL SMELTER

Will be open for engagement October 1st as Superintendent of Copper or Lead Smelting Works.

Thoroughly competent in analyzing assaying, and handling men. Speaks Spanish. Excellent references. Address SMELTER, care Mining and Scientific Press.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 29-30 Chronicle Building, S. F.

A GOLD MINE

Seven Miles from R. R. 10 to 15-Foot Vein of Soft Ore, \$7 to \$8 Per Ton.

A half interest will be given to a responsible person for some development and a mill that will successfully treat the ore.

B. F. WILSON, Battle Mountain, Nevada.

Bargain, for Sale.

New Complete Mine

Machinery Outfit, Including No. 3 Merrill Mill, Rock Breaker, Ore Feeder, Etc.

E. A. HOLMAN, 906 Broadway, Oakland, Cal.

FOR SALE.

1 Rock Breaker,
1 5-Foot Huntington Mill,
3 Duncan Concentrators,
35 H. P. Roller and Engine,
Shafting, Pulleys and Belting.
Machinery but little used. Will sell for one-half San Francisco costs on board cars at Bailey. Address L. C. BAILEY, Hailey, Idaho.

MINE FOR SALE OR BOND.

TUOLUMNE COUNTY, EASTERN BELT.

HIGH GRADE.

PARTIALLY DEVELOPED.

Apply MINE OWNER,

Care Mining and Scientific Press, 330 Market St., San Francisco, Cal.

ANNUAL MEETING.—The Regular Annual Meeting of the stockholders of the Marguerite Gold Mining and Milling Company will be held at the office of the company, No. 237 Twelfth street, San Francisco, California, on MONDAY, the 22d day of August, 1898, at the hour of 8 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Saturday, August 20th, at 2 p. m. F. MATTMANN, Secretary.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Sara E. Reamer, in the Pemberton Gravel Mine near Forest Hill, Placer Co., to deposit tailings in Baltimore and Dardanelles canyons, and from Penrose & Barker, in the Bull Run Mine near Relief Hill, Nevada Co., to deposit tailings in a ravine below the mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on August 22, 1898, at 1:30 P. M.

QUICKSILVER!

—FOR SALE BY—

The Eureka Company,

OF SAN FRANCISCO.

ROOM 1, 426 CALIFORNIA STREET, SAN FRANCISCO.

FRESNO, June 25, 1898.

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gasoline engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LODE
M. & D. CO.,

Per N. W. Moody, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

A GOOD INVESTMENT

Three Dollars Brings This Paper One Year—Fifty-Two Issues.
Can You Afford To Be Without It?

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage.

Money loaned mines.

Mining companies organized, their property experted, financed and managed.

Mines, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

Examine mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

EDW. N. BREITUNG,
Marquette, Mich., U. S. A.

Cable Address: EDBEE.

Codes:

LEIBER S.
BEDFORD McNEILL'S.
A B C UNIVERSAL COMMERCIAL.

Assessment Notices.

CONSOLIDATED ST. GOTHARD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of August, 1898, an assessment (No. 15) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 113 Crocker building, sixth floor, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 12th day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. F. HOLLING, Secretary.

Office—113 Crocker building, sixth floor, San Francisco, California.

ROSE CREEK MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1898, an assessment (No. 2) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 164 Crocker building, Post and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 31st day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILLMANS, Secretary.

Office—Room 164, Crocker building, Post and Montgomery streets, San Francisco, California.

BOULDER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, El Dorado County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1898, an assessment (No. 1) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 31st day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILLMANS, Secretary.

Office—Room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

WEST SANTA ROSALIA GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, State of Sonora, Mexico.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of August, 1898, an assessment (No. 1) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, No. 310 Pine street, Rooms 15 and 17, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. W. PEW, Secretary.

Office—No. 310 Pine street, Rooms 15 and 17, San Francisco, California.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 16th day of May, 1898, an assessment (No. 1) of 14 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 7, fifth floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. L. CHENEY, Secretary.

Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 8th, 1898.

R. L. CHENEY, Secretary.

Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to September 3rd, 1898, and the day of sale to MONDAY, October 3rd, 1898.

R. L. CHENEY, Secretary.

Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to September 3rd, 1898, and the day of sale to MONDAY, October 3rd, 1898.

R. L. CHENEY, Secretary.

Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 6th day of August, 1898, an assessment (No. 20) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 12th day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 3rd day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CALVERT MEADE, Secretary.

Office—106 Leidesdorff street, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of July, 1898, an assessment (No. 84) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 32, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of August, 1898, shall be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 26th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 32, Nevada block, No. 309 Montgomery street, San Francisco, California.

POSTPONEMENT.

The date of delinquency of the foregoing assessment (No. 84) has been postponed to TUESDAY, the 6th day of September, 1898, and the day of sale from the 26th day of August, 1898, to MONDAY, the 26th day of September, 1898. By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 32, Nevada block, No. 309 Montgomery street, San Francisco, California.

DELINQUENT SALE NOTICE.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the 29th day of June, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Am't. |
|---------------------------|-----------|-------------|---------|
| Harvey M. Buckley..... | 2 | 1 | \$ 2 00 |
| Alice E. Buckley..... | 20 | 4 | 3 00 |
| Alice E. Buckley..... | 23 | 20 | 40 00 |
| Alice E. Buckley..... | 24 | 20 | 40 00 |
| Alice E. Buckley..... | 25 | 20 | 40 00 |
| Alice E. Buckley..... | 26 | 20 | 40 00 |
| Alice E. Buckley..... | 32 | 1 | 2 00 |
| Alice E. Buckley..... | 40 | 2 | 4 00 |
| Caroline S. Townsend..... | 18 | 2 | 4 00 |

And in accordance with law, and an order from the Board of Directors, made on the 29th day of June, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, room 14, Nevada block, 309 Montgomery street, San Francisco, California, on MONDAY, the 29th day of August, 1898, at the hour of 3 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

WILLIAM MOPHERSON, Secretary.

Office—Room 14, Nevada block, 309 Montgomery street, San Francisco, California.

DELINQUENT SALE NOTICE.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 10) levied on the 20th day of June, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Am't. |
|-----------------------|-----------|-------------|----------|
| G. F. Volz..... | 7 | 500 | \$ 50 00 |
| Frantz Schmitz..... | 32 | 250 | 25 00 |
| Chas. Winters..... | 39 | 1,000 | 100 00 |
| M. Raschen..... | 65 | 250 | 25 00 |
| Simon Stiefvater..... | 78 | 500 | 50 00 |
| Marcus Schwab..... | 79 | 500 | 50 00 |
| Marcus Schwab..... | 80 | 500 | 50 00 |
| G. F. Volz..... | 90 | 500 | 50 00 |
| Meta Ecks..... | 102 | 150 | 15 00 |
| A. Wirtner..... | 114 | 250 | 25 00 |
| Henry Knust..... | 115 | 200 | 20 00 |
| G. F. Volz..... | 116 | 500 | 50 00 |
| Wm. G. Loewe..... | 127 | 857½ | 85 75 |
| F. M. Freund..... | 137 | 500 | 50 00 |
| F. M. Freund..... | 138 | 500 | 50 00 |
| F. M. Freund..... | 136 | 300 | 30 00 |
| F. Kayser..... | 146 | 15 | 12 50 |
| B. Egenberger..... | 210 | 700 | 70 00 |
| Jose Dias Soares..... | 214 | 100 | 10 00 |
| Simon Stiefvater..... | 211 | 400 | 40 00 |
| N. Rienecker..... | 228 | 100 | 10 00 |
| B. Egenberger..... | 229 | 100 | 10 00 |
| Chas. Kayser..... | 245 | 100 | 10 00 |
| B. Egenberger..... | 257 | 100 | 10 00 |
| F. M. Freund..... | 261 | 100 | 10 00 |
| F. M. Freund..... | 262 | 66 | 6 60 |
| F. M. Freund..... | 269 | 42 | 4 20 |
| F. M. Freund..... | 298 | 194 | 19 40 |
| F. M. Freund..... | 300 | 100 | 10 00 |
| B. Egenberger..... | 310 | 100 | 10 00 |
| Adam Miller..... | 350 | 125 | 12 50 |
| N. Rienecker..... | 351 | 200 | 20 00 |

And in accordance with law and an order from the Board of Directors, made on the 20th day of June, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, No. 237 Twelfth street, San Francisco, California, on SATURDAY, the 12th day of September, 1898, at the hour of 4 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

F. METTMANN, Secretary.

Office—No. 237 Twelfth street, San Francisco, California.

REGRINDING VALVES



The Wise Man Who Uses Valves

Calls for Lunkenheimer's Regrinding Valves, because he appreciates their superior and lasting qualities. If you want reliable Valves, specify and insist upon Lunkenheimer's. They have stood the test for over thirty-five years and are indorsed and liberally used by intelligent steam users everywhere. There is no such word as fail if you use Lunkenheimer's. None genuine unless name is cast in body. Supplied by dealers. Avoid worthless imitations. Catalogue of up-to-date steam specialties gratis.

THE LUNKENHEIMER CO., Cincinnati, Ohio, U. S. A.,
SOLE MANUFACTURERS,
26 Cortlandt St., NEW YORK. + BRANCHES: + 35 Great Dover St., LONDON, S. E.

HOISTS, ENGINES, PUMPS, BLOWERS.



WEBER GAS AND GASOLINE ENGINE CO.,
430 S. W. Boulevard,
Kansas City, Mo.

Full Universal Radial Drills.

The special features which have so highly recommended this style of Drill are our double columns, steel gearing, roller bearings, rack feeds to spindles, back gears, power and hand feeds, quick return motion to spindle.

Furnished in three sizes, with large variety of tables, adapting the drills for every class of work possible.

BICKFORD DRILL & TOOL CO.
CINCINNATI, OHIO, U. S. A.
HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal.



TUTTHILL WATER WHEEL.

The Best Jet Wheel in the Market, BARRING NONE.

Wheels, Buckets and Nozzles Designed to Suit Special Requirements, When Head and Conditions Are Given.

Theoretically as well as Practically Perfect. Highest Efficiency Guaranteed.

We have a Sensitive, Simple Governor that will positively regulate speed of wheel. Specially adapted for electric railway and lighting plants.

Write for Catalogue.

Oakland Iron Works, Builders,
108 FIRST STREET, SAN FRANCISCO.
Telephone 1007 Main.



C. H. EVANS & CO.

HAVE REMOVED THEIR

Machine Works

TO 183-185-187 FREMONT STREET,

Where, with Enlarged and Increased Facilities, they are better than ever prepared to do

First-Class Machine Work

Promptly, and at Reasonable Prices, and will continue the manufacture of

Thomson & Evans Steam Pumps,

Deep Well Pumps, Power Pumps, Etc., Also Marine Engines, Ship and Steamboat Work, Pipe Cutting, General Jobbing and Repairing.

HOME MANUFACTURE.

FOWLER'S

Fossil and Asbestos Sectional Covering, As a Non-Conductor, Unequaled. Special Rates for Steam Boilers and Drums. G. C. Fowler, 656-58 Howard St., S. F.





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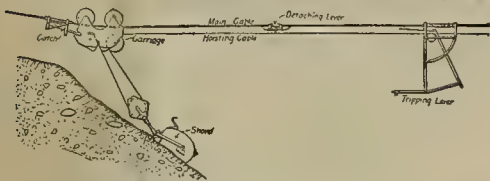
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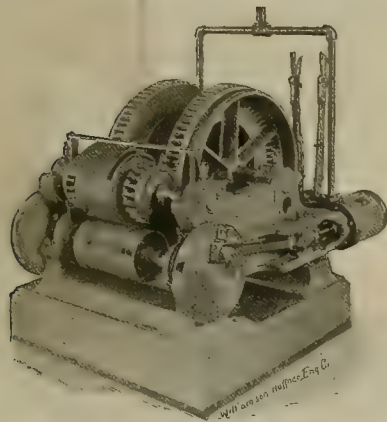
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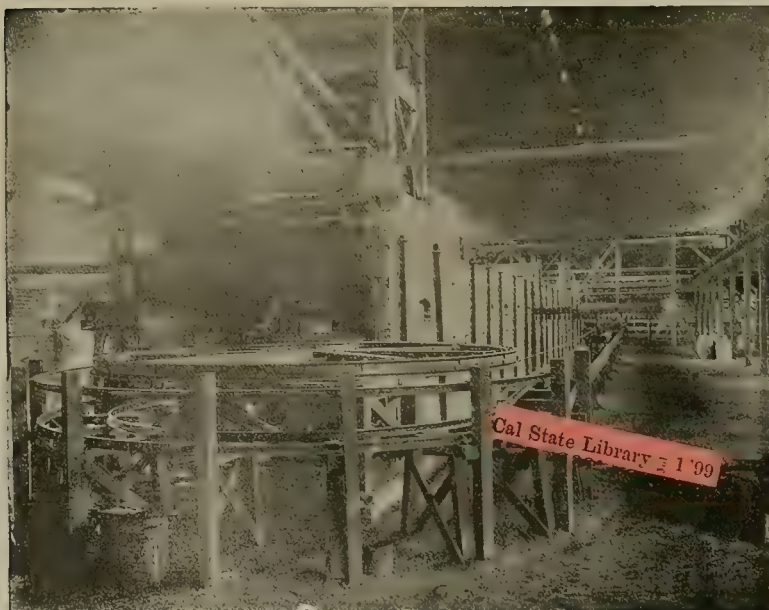
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The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, Utah (one furnace); The Metallic Extraction Co., Cyanide, Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, Colo. (three furnaces); The Selby Smelting & Lead Co., Selby, Cal. (two furnaces); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); Broken Hill Proprietary Co., Broken Hill, New South Wales (four furnaces); Puget Sound Reduction Co., Everett, Washington; Colorado Ore Sampling & Reduction Co., Cripple Creek, Colo.; Consolidated Kansas City Smelting & Refining Co., for the Arkansas Valley Smelting Works, Leadville, Colo.; Robert Lanyon's Son's Spelter Co., Iola, Kansas (two furnaces); Mountain Copper Co., Ltd., Keswick, Cal.

Catalogue on Application.

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For the convenience of our readers in the mining counties we print in legal size, 12x36 inches, the Mine Bell Signals and Rules provided for

in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness. 50 Cents a Copy.

MINING AND SCIENTIFIC PRESS, 330 Market St., San Francisco, Cal.

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No. 1990.—VOLUME LXXVII.
Number 9.

SAN FRANCISCO, SATURDAY, AUGUST 27, 1898.

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The Cochrane Separator.

The Cochrane separator is designed to take water out of live steam, to purify exhaust steam from cylinder oil, giving dry steam, preventing oil coating on the inside of pipes, etc., and permitting the use of the condensed exhaust steam for boiler feed or other needs. Fig. 1 illustrates the horizontal form, as adopted in U. S. gunboats; Fig. 2 is a sectional cut of the new high-pressure pattern for horizontal pipe; Fig. 3 is the standard horizontal form; Fig. 4 the high pressure form for horizontal pipes; Figs. 5 and 6 depict the vertical separator. The Harrison Safety Boiler Works, Philadelphia, have been making these separators since 1889; there are over 1700 in present use, and testimonials evince the satisfactory character of the service. They claim for live steam service that they will, in either the horizontal or vertical form, deliver exhaust steam so thoroughly purified from grease or cylinder oil that this steam can be safely used for heating, by actual contact, water for boiler feed, dye house, and other purposes—or that this steam, when condensed, will be entirely suitable for similar uses. They assert that the measure of efficiency will range from 98 per cent up to practically perfect separation, depending upon the favorableness of the conditions, and the quality of the oil used. The Parke & Lacy Co., 21 and 23 Fremont St., San Francisco, are the agents on this coast. They furnish detailed technical information as to the placing and operation of the apparatus.

It is difficult to understand why the Southern Pacific Railroad Company has always so persistently discounted all efforts to make prominent the mines and miners of California, unless it be that the corporation wants to absorb the mineral area of the commonwealth. While every railroad company in other States does all possible to attract attention to the mines within the borders of the States they traverse, the California road seems afraid that some one will find out that there are gold mines in California. Such a policy is fatal to true progress. Rightly viewed, the Southern Pacific Company should do as every other railway company everywhere else does—encourage the development of the State's mineral area and the growth of the mining industry. No trade or profession is better for the railroad than that of the liberal miner. The farmer only ships his surplus; everything that

the miner produces or consumes is carried by the railway. He is the railway's best customer.

An erroneous statement was made on page 179 of the issue of the 20th inst., wherein it was said that a "placer location of 160 acres by an association re-



FIG. 1.



FIG. 2.



FIG. 3.



FIG. 4.

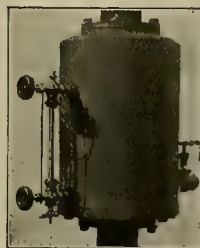


FIG. 5.

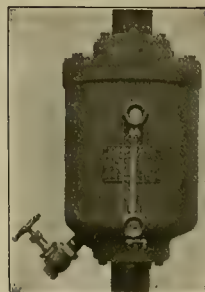


FIG. 6.

THE COCHRANE SEPARATOR.

quires a discovery of mineral on each twenty acres." This is a mistake and misleading. In the case of the Union Oil Co. on review, 25 L. D., 357, 358, Secretary of the Interior Bliss overrides the previous decision thereon, and rules "that when a location is

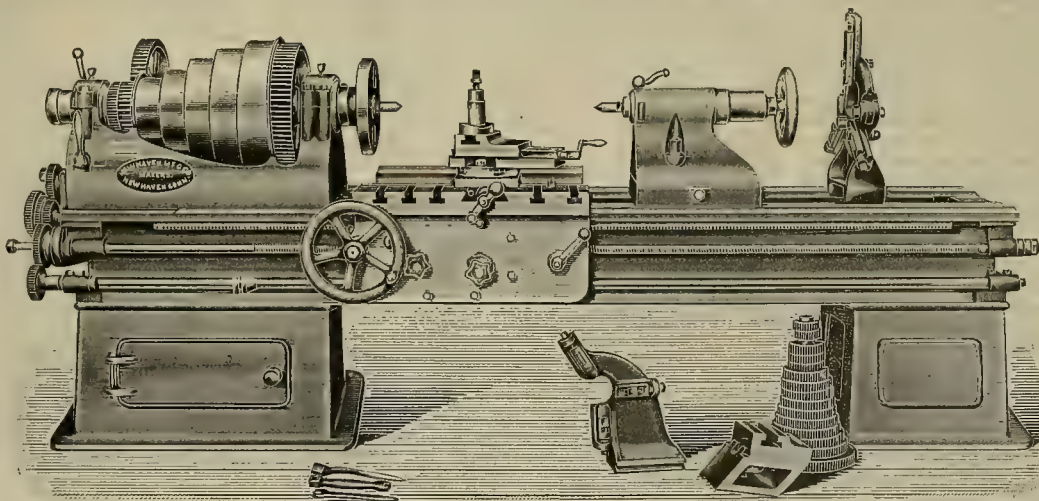
Improved Swing Engine Lathe.

Herewith is illustrated the New Haven M'fg Co.'s latest improved 24" swing engine lathe. The head is stiff and strong, having solid web entirely across under cone pulley, with hammered crucible steel, hollow spindle $2\frac{1}{8}$ " hole running in hard bronze boxes; front bearing $3\frac{1}{4}$ " diameter, $5\frac{1}{2}$ " long; back bearing, $3\frac{1}{4}$ " diameter, 4" long; spindles back geared, hardened steel bushing with check nut, for taking up the end thrust; cone pulleys have five steps of 7", 9", 11", 13", 16" diameter for 3" belt. Carriage stiff, with long bearings on the V's; is gibbed front and back to the outside of the bed, with power cross feed and compound rest, having graduated base, and held by two bolts; with taper gibs scraped to fit, and adjusting screws; tool is adjusted by concave ring and washer. Attachments furnished with the lathes are compound rest, center and follow rests, extra tool block for turning the full swing of the lathe, large and small face plates, full set of screw cutting gears.

Complete friction counter-shaft, with pulleys, hangers, self-oiling boxes, wrenches, etc. Driving pulleys on counter-shaft are 12" and 15" diameter, 4" face and should run about ninety revolutions per minute. They are set up and thoroughly tested before leaving the works, and guaranteed accurate. Taper turning attachments, three tool shafting rests, shafting straighteners, and chucks of any desired make, can be furnished fitted to the lathes.

The New Haven M'fg Co. build lathes from 18" swing to 60" swing, and varying lengths of bed; all as well proportioned and strongly built as the 24" tool illustrated below. Henshaw, Bulkley & Co., corner Fremont and Mission streets, San Francisco, Cal., are local agents for the New Haven Manufacturing Company.

KLONDIKE is still a name to conjure with in New York City, where "mining and transportation companies" issue an ostensible "mining journal for miners and investors." Its leading article in the issue to hand gives the Klondike gold output for this year as aggregating over \$30,000,000. Conservative estimates in San Francisco place the amount received therefrom this year at \$6,000,000. On page 7 is this statement: "\$9,500,000 arrived — \$10,000,000 en route — \$15,000,000 more coming." The success of the Electrolytic Marine Salts Co.'s swindle in Boston shows that there are many on the Atlantic coast sufficiently credulous to invest on the strength of such barefaced lies as those published in this latest "mining journal." Eastern readers should know by this time that by going to that region they will probably lose their health or life, and by putting money into wildcat "investment companies" they will certainly lose their coin.



IMPROVED SWING ENGINE LATHE.

made by an association one discovery is sufficient." It is, of course, evident that to make a location covering more than twenty acres there must be an association consisting of at least one person for each twenty acres so located.

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J. F. HALLORAN.....Publisher

San Francisco, August 27, 1898.

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Treatment of Low-Grade Copper Ore.

An Arizona subscriber asks, "Do you consider it practical to leach a copper ore carrying 5 or 6 per cent copper, which is too silicious to smelt?" To one unacquainted with the exact circumstances it is difficult to more than give an approximately correct answer. In general, it may be said that a 6 per cent copper ore can be leached successfully—that is, from a chemical or laboratory point of view, though the commercial results may not always be favorable. The proposition of our Arizona enquirer does not look encouraging from an economical standpoint. If there are large quantities of that ore and he has command of considerable money, he may make a commercial success of it. The process itself is not a difficult one. The copper must be transformed into a sulphate, if water is to be the leaching medium. In case sulphuric acid can be secured cheaply a simple oxidizing roasting will bring the copper to a condition where it will dissolve in diluted sulphuric acid. In case the copper in the ore is a carbonate, the roasting, of course, can be omitted in the acid leaching. It is a common metallurgical practice in this case to pile the ore, allowing the rain and air to oxidize the copper sulphides, forming copper sulphate, which water will extract from the ores; but this is a slow process, involving a very long wait for the returns. There is an electrolytic treatment to leach auriferous copper ore that, if it gets beyond the laboratory stage, may be of practical use in such cases. In the process mentioned the ore carrying a little gold and copper can be leached with a hot solution of cupric chloride in a rotating barrel, through which a slow alternating current of electricity is passed. This cupric chloride solution is prepared with a saturated solution of calcium or magnesium chloride or salt, so that the combined chemical and electrical action extracts all the copper from the ore. The clear solution is run through a barrel containing copper oxides or hydrates, which remove all the iron and similar impurities from the solution, leaving in it only pure copper. This solution is then passed into rectangular vats containing porous asbestos partitions with electrodes for conveying the current to the solution as it passes in the vats. As the copper is deposited, the solution is pumped back to a reservoir for further use, this being made to last indefinitely, a little water being added to make up for evaporation and a little chemical to supply losses by leakage. The ore being freed from copper is then in condition for cyaniding. It should be added that, so far as known, the above has not been tried on a scale that would entitle it to endorsement from a commercial standpoint. As our Arizona enquirer doubtless knows, a process that may be satisfactory and successful on a very small scale oftentimes fails to produce dividends or even the requisite amounts for salaries, etc.

Carbonate copper ore is susceptible to leaching with sulphuric acid and deposition by electrolysis. A generator of 100 amperes, through a series of 320 vats or plates, will, theoretically, deposit 2000 pounds of copper per twenty-four hours from a sulphate solution and nearly 4000 from chloride solution. The per cent of bluestone is proportionate to the increase or decrease of surface; with 8 per cent it would be about 10 feet. Where sulphate is used and insoluble anodes, lead or carbon would do for the anodes. The vats in such case should be small so that the slimes deposited from aeration of the solution could be easily cleaned out without disturbing too much of the series. A convenient size would be 4 feet square on each end and from 5 to 8 feet in length if a simple series is used, or 15 feet if tandem series; anodes 36x40, or with common series can be composed of smaller pieces. With such plate service the generator should have about 125 voltage.

Before attempting anything in the line suggested, there should be detailed and exhaustive examination and expert advice secured and economy exercised. In this case, as in others, economy means the judicious expenditure of money, and it would be good economy to first spend \$2000 or \$3000 in the way suggested in determining whether it would be worth while to go any further in the matter.

Of Interest to Prospectors and Miners.

A recent decision by Judge Cheney of the Nevada second judicial district is considered of sufficient importance to justify publication in full. One Sisson made a location May 25, 1897, erected a location monument and placed a notice on it. In July the boundaries were marked and five days' work was done on the claim. More than ninety days thereafter, defendants made a location covering the same ground. Sisson then sued the Sommers party for trespass, damages and an injunction; defendant attacked the location of the plaintiff on several grounds, but the court decided the case in favor of defendant solely upon the ground that plaintiff had not within ninety days after posting his notice of location done the amount of work required by the Statute of 1897, page 103, nor did the plaintiff do that amount of work at any time prior to the entry of the defendant. Following is the text of the decision:

In Second Judicial District Court, Washoe county, Nevada. D. H. Sisson, L. S. Bridges, A. F. Sisson and J. L. Barron, plaintiffs, vs. Robert Sommers and R. N. Norris, defendants.

This is an action of trespass to mining property and for damages and an injunction. The plaintiff, Sisson, on May 25, 1897, went upon a vacant piece of ground in the White Horse mining district in Washoe county, which he had previously prospected, and commenced the location of a mining claim, known as the Morning Star, by erecting a location monument with a notice written thereon. Nothing further was done by him until late in July, when, with the assistance of Barron, one of the plaintiffs (who was to have an interest in the claim as pay for his labor performed thereon), he marked the boundaries of the claim and set Barron to work on the discovery work, within the limits of the claim. Barron worked five days and exposed rock in place bearing gold. The excavation was made by him—by some of the witnesses called a shaft and by others a cut—was, more accurately speaking, a combination of both, being a shaft with a cut from it to the surface. Nothing further was done by the plaintiffs on the Morning Star location in the way of development work until after this action was commenced.

The validity of plaintiff's location is attacked on many grounds. The only objection which it is thought necessary to consider at length is that sufficient discovery work had not been done to perfect the location of the Morning Star. In my opinion there was a sufficient discovery of a lode, marking of the boundaries, posting of a notice and recording of a location certificate, prior to the entry of the defendants upon this ground, to entitle the plaintiffs to the possession of it. From a careful consideration of all the evidence as to the amount of development work done by the plaintiffs before defendants started their location, I find that there was a shaft with a depth not exceeding seven feet below the lowest point of the rim at the surface, and that this shaft, which was about three and a half feet by four and a half feet at the bottom, was connected with the surface by a cut on a level a little above the bottom of the shaft. From the point where the cut began on the surface to the opposite side of the shaft was ten feet. This excavation did not cut or expose the lode at any place at a greater depth than eight feet. It did not run along the lode; but the lode, as discovered, appears to run diagonally across it, and the lode was not exposed for more than five feet on its course when this action was commenced.

No rules or laws have been adopted by the miners of this district. The Act of Congress is silent as to the discovery work except that it provides a minimum amount of expenditures in labor or improvements which must be annually made upon each location. There was no State legislation fixing the amount of work necessary to be done upon a mining claim in this State until March 16, 1897, when by the second section of an Act of that date, entitled among other things "An Act relating to the * * * amount of work necessary to hold possession of mining claims" * * * It is provided: "Before the expiration of ninety days from the posting of such notice upon the claim, the locator must sink a discovery shaft upon the claim located to the depth of at least ten feet from the lowest part of the rim of such shaft at the surface, or deeper if necessary, to show by such work a lode deposit of mineral in place. A cut, or crosscut, or tunnel, which cuts the lode at a depth of ten feet, or an open cut of at least ten feet in length along the lode from the point where the lode may be in any manner discovered, is equivalent to a discovery shaft." (Stat. Nev. 1897, page 103.)

It is plain that the plaintiffs did not within ninety days after posting the location notice, or at any time before defendants entered upon this ground, do the amount of discovery work which this statute requires. The United States, as the permanent proprietor of the public domain, has the undoubted right to exact a compliance with every term and condition which it may see fit to impose as a prerequisite to the possession of its mineral lands. To the extent which it expresses its will, miners' laws and State legislation must yield. But it has very plainly indicated an intent and willingness that the miners, to the extent of their district, and the State throughout its limits, may impose reasonable additional conditions and limitations so long as they are not in conflict with the federal legislation. (Lind. on Mines, Secs. 248 and 249.)

Among the subjects which seem unquestionably proper for State legislation, within reasonable limits, is the requirement that a certain amount of discovery work shall be done within a certain time to complete a location. "The State courts have uniformly enforced this class of provisions; and there being no authoritative ruling denying the right of the State to so legislate, these conditions may be assumed to be valid." (1, Lind. on Mines, Sec. 250.)

"The laws of the United States do not prescribe any time in which the excavations necessary to enable the locator to prepare and record a certificate shall be made. That is left to the legislation of the State, which, as we have stated, prescribes sixty days for the excavations upon the vein from the date of discovery and thirty days afterwards for the preparation of the certificate and filing it for record. In the judgment of the Legislature of that State this was reasonable time." (Ehhardt v. Boaro, 113, U. S. 536.)

"The discovery shaft is a part of the process of location subsequent to discovery." (1, Lind. on Mines, page 345. Morr. "Mining Rights," 8th edition, page 27.)

Congress has fixed the minimum of labor or improvements which the locator must annually put upon his claim in order to be entitled to the exclusive possession of it. The history of the discovery of the precious mineral upon the public domain and the acquiescence and legislation of the national government brings forth with great distinctness its dominant purpose and intent, viz., the utmost encouragement to those who in good faith seek for and discover the precious minerals. But this faith must be evidenced by acts. Wisely recognizing that each State has an interest in and a right to legislate respecting the territory within its limits, and that no arbitrary standard except as to the minimum could be safely made for the different conditions of locality and time throughout our extensive mineral regions, Congress has clearly recognized the rights of the States to require labor or improvements in addition to that made necessary by the laws of the United States. Locators should never forget that they are permitted, by the bounty of the owner, to enter on his possessions and dig in the soil thereof upon such terms and condi-

tions only as the owner may choose to impose. The Government does not want an idle possessor of its mineral land, but a vigilant development of its natural resources. Every one familiar with mining localities knows that this bounty and privilege has been grossly abused by every device which ingenuity could invent to retain exclusive possession with the least possible expenditure of muscle or money. The disposition by relocation, evasion and false affidavits to hold mining claims, not for present development, but future speculation, has been so notorious and injurious to our mining interest that the Legislature of this State may well have been moved to interfere to remedy this evil by the exercise of its right to require a certain amount of labor within a fixed period.

The provisions of the Act of 1897, requiring a certain amount of discovery work within ninety days after the posting of the notice of location, are not in the nature of a forfeiture, but an essential element to the location itself—the element of all others in which the State is most concerned. It is a matter of comparative indifference to the State whether its mines are developed by the first locator or another; but it is immensely interested that they be developed. To accomplish this end, it has provided that, before the right to exclusive possession becomes established a definite amount of development work shall be performed.

These provisions are plain, their fulfillment not onerous, their requirements reasonable and he who avails himself of the privilege should observe the conditions exacted. Congress in the exercise of an undoubted right has fixed one year as the period within which a certain amount of expenditures must be made to continue the right of possession. Courts have never felt authorized, with all the liberality which they have shown in other respects, to extend this period when others have acquired rights before work has been resumed. The doing of the annually required work has been deemed imperative. (2, Lind. on Mines, Sec. 624.)

No question of forfeiture arises here. The inquiry is, Has any right ever been perfected? It should not be forgotten, as stated above, that "the discovery shaft is a part of the process of location subsequent to discovery." The power of the State, by the consent which Congress has given it to fix a reasonable period within a reasonable amount of work, must be done to complete a location and seems as certain as the power of Congress to declare the amount that is necessary to continue it. While courts have conceded much to the possible unlettered miner and the obstacles often surrounding the making of his location, there is no reason for extending that doctrine to a failure to use the muscles with which he is usually pretentiously endowed. If the location is made in good faith, the prudent miner will not jeopardize his right by any questionable performance of the required amount of discovery work. His interest, as well as the purpose of the Government, are furthered by the doing of an excess rather than less than the required amount. The right to possess a certain portion of the mineral domain rests not upon a disclosed intent to work it, but the actual doing of at least the amount of development work which the law has declared shall be done.

If the excavation for development purposes may be any less in dimensions than the statute directs, how much less may it be? When the courts depart from the standard of good faith which the dominant proprietor has established, namely, the standard of a certain amount of work within a certain time, they enter upon a realm of conjecture and speculation—an encouragement to the indolent and a discouragement to the vigilant. I am unable to see how the courts have any more right to say that less than the statutory amount of discovery work, within the time fixed by law, will be sufficient, when others have located the ground before work has been resumed by the original locator, than they have to do so with respect to the annual assessment work which Congress exacts. The interests of the bona fide locator, policy of the law, the welfare of the commonwealth and the intention of the Legislature are best fostered by requiring a faithful compliance with these plain conditions, upon the fulfillment of which a right to the exclusive possession of the public domain is granted. The conclusion reached is that, since the Act of 1897, it is necessary in this State to constitute a valid location of a mining claim that the locator shall, within ninety days after posting his notice, do the amount of development work required by that Act. If he does not do so, the ground covered by his notice is subject to location by another, no matter how plain his notice, certain his boundaries, perfect his record or well defined his lode may be. Had the plaintiffs completed the required amount of discovery work at any time before defendants entered and commenced their location, although the ninety days had already elapsed, they could have maintained their rights.

"The failure to perform any of the given acts within the time limited by the laws or local rules may subject the ground to relocation; but if the requirements are complied with prior to the acquisition of any intervening rights, no one has a right to complain. Of course, the locator delays at his peril; but if the appropriation becomes complete before any one else initiates a right, the antecedent delay is condoned and their right becomes perfected. But, unless completed, the attempted location is of no avail as against intervening rights, assuming, of course, that the subsequent entry for the purpose of location is peaceable and in good faith." (1, Lind. on Mines, Sec. 330.)

But plaintiffs did not attempt to do so until after this action was commenced. Let judgment be entered for the defendants.

A. E. CHENEY, District Judge.

Some Questions Answered.

A mining engineer writes from Oakland, Cal.:

Lately, while visiting a remote mining district, a number of questions were put to me, relative to matters of present interest to the miners I met. I answered them, I believe, in the main, correctly, but, by request, I undertook to present them to your paper for answers. As your paper is read by these men, I hope you will give place therein to more authoritative answers. Although the matters are generally well understood, not all your readers are clear about them:

1. Are locations of water rights, lode and placer claims, made on Sunday or other holidays, legal?
2. What are the legal holidays in the State of California, and what business acts done on them are legal?
3. What are the maximum amounts of placer ground which a single person, or persons, may embrace in a single location, and how many locations may be made in the same locality?
4. If a number of placer locations are embraced in a single tract, how much yearly assessment work must be done on each location or claim, and how much to secure a patent?
5. Can work done on a ditch or canal, for service upon all the claims, be applied to assessment work for all, and also for the expenditure necessary to obtain patent?

The above, in their order, may be answered as follows:

- 1.—Yes, generally speaking.
- 2.—The legal holidays in California, within the meaning of the Civil Code, are every Sunday, the 1st of January, the 22d of February, the 30th of May, the 4th of July, the 9th of September, the 1st of October, the 25th of December, every day on which an election is held throughout the State and every day appointed by the President of the United States, or by the Governor of California for a public feast, thanksgiving or holiday. If the 1st of January, 22d of February, 30th of May,

4th of July, 9th of September or 25th of December falls upon a Sunday, the Monday following is a holiday.

3.—An individual locator, whether a natural person or a corporation, may not include more than twenty acres in any one placer location. An association of eight persons may include 160 acres of placer ground in one location or claim. This is not what is termed a "consolidated claim" within the meaning of the Land Office regulations. It is not necessary to mark out the boundaries of each twenty acres in the 160-acre location, but the location must be so marked that its exterior boundaries can be readily traced. Such a claim is limited, however, to twenty acres when it appears that the location was really made for the benefit of an individual or company.

4.—The annual assessment work required upon a placer claim is \$100, whether the location embraces 160 acres or less. Five hundred dollars' worth of work upon each location is a necessary prerequisite to patenting the claim.

5.—Work done upon a ditch or canal may be applied to the representing of a number of contiguous claims held in common if done for the benefit of such claims, that is, if it tends to the prospecting or development thereof, and is sufficient to amount to equal the necessary expenditures upon all the claims. Assessment work of the value of \$500 is usually accepted as sufficient in patent proceedings.

Concentrates.

ENERGY may be defined as the power of doing work.

BUTTE, MONT., has a monthly payroll of nearly \$1,000,000.

THE notorious Hartsfeldt is now operating in Zacatecas, Mexico.

Six little sawmills in Dawson City are each clearing \$1000 per day.

JULY's production of anthracite coal in the United States was 3,770,000 tons.

UTAH has organized a bureau of commerce and mining, with headquarters at Salt Lake City.

THE greater part of the cyanide gold produced in South Africa is between 700 and 800 fine.

AT the Camp Bird mines in Ouray county, Colo., a tramway is being built 10,450 feet in length.

THE Tiger-Poorman mine at Burke, Idaho, reports net profits for the year to June 30th of \$64,604.46.

UTAH is fast developing into a gold-producing State. Colorado maintains the lead she made in '97.

IN addition to the mints at Melbourne and Sydney, a third is to be established in Western Australia.

ASBESTOS of good fiber and in commercial quantity finds sale in San Francisco at from \$20 to \$30 per ton.

THE 6-stamp mill of the Wm. Tell mine, near Sierra City, Cal., was destroyed by forest fire last week.

THE Everett, Wash., smelter has an order for lead from the Japanese government aggregating 1,000,000 pounds.

J. H. BENT wants Prescott, Arizona, to give a \$25,000 guarantee or bonus for a "custom smelting plant" there.

CERUSITE is an adamantine white to grayish-black lead carbonate $PbCO_3$, crystallizing in the orthorhombic system.

AT De Lamar, Idaho, the city band is composed exclusively of miners, all of whom, with two exceptions, are Cornishmen.

THE United Verde Copper Co. in Yavapai county, Arizona, pays taxes on an assessed value of \$222,000 worth of property.

THE Anaconda, Montana, Co. has ordered a steel hoist for the High Ore mine, capable of lifting ore from a depth of 4000 feet.

THE Tribune says that Salt Lake City, Utah, paid \$6000 for the July convention there of the International Mining Congress.

NEARLY every gold-producing California county reports river mining in present progress, the streams being unusually low this season.

MONTANA MEN are about to dredge for gold in the bars of the Missouri river near Stubbs Ferry, where two dredgers are now building.

THE Colorado Fuel & Iron Co. in 1897 produced 6027 tons of pig iron. The same company's product the first half of this year is 34,581 tons.

THE Los Angeles, Cal., Mining and Stock Exchange, which has been operated there, has decided to wind up its affairs and go out of business.

THE Nevada State press are taking sides on the question of bonding the State to raise funds for the resumption of deep mining on the Comstock.

THE ordinary mercury loss in a 10-stamp gold mill should not be over fifteen pounds per month. A pound of quicksilver occupies 2.035 cu. in. space.

IN the St. Paul iron mine at Moravitz, in Hungary, the daily amount of water handled is 35,000 gallons. The pumping plant is run by electricity.

A YEAR with a 9 in it is counted lucky for and by miners: '49, California; '59, Pike's Peak; '69, White Pine; '79, Leadville; '89, the Transvaal; '99, —?

A CIRCLE 12 feet diameter has an area of 113.1 feet and a circumference of 37.7 feet. A circle $\frac{3}{4}$ inch diameter has circumference 1.1781 inch and area .110477 inch.

A. ROSETTE, while ascending the shaft in the Original mine at Butte, Mont., last week, fell 800 feet by the parting of the cable. He was only dazed, receiving no injury.

AT Clausthal, in the Harz, the experiment of using beech and fir instead of pine for timbering in stopes has proven successful where the rock pressure was not too great.

PROTOGENE is a variety of granite in which talc takes the place of mica, so called by French mineralogists, who supposed that it was the first formed of the granites.

THE Tuolumne County, Cal., Independent says there are 1000 more voters on the great register of that county than there were in '96, due to the advancement of the mining industry.

THE total production of crude oil in the U. S. in the year 1897 was 54,394,172 bbls., a daily average of 149,086 bbls. During July, 1898, the daily production of crude oil averaged 125,329 bbls.

THE concentrator at the Morning mill, Mullan, Idaho, has a capacity of 800 tons more than any other silver-lead concentrator now in operation in the world, according to the local paper.

UNITED STATES copper production for last month aggregated

16,052 long tons; for July, '97, 15,344 tons. European copper production last month aggregated 6794 tons; for July, '97, 7327 tons.

ACCORDING to the Mining Reporter, in making a survey to secure patent for title of the Taylor Park placer ground containing 102 acres in Gunnison county, Colo., 700 corners were discovered.

THE Victor mine, in Cripple Creek district, Colo., has declared dividends since March 10th, '93, including that for September, amounting to \$1,055,000, being \$55,000 in excess of the capital stock.

IN the drilling contest at Leadville, Colo., Aug. 14th, N. McKenzie and S. Steward made 42 5-16 inches. This is the best record for Leadville rock, that of last year being 40 13-16 inches.

THE Harney Peak experience does not deter continued investigation of tin deposits in South Dakota. C. Poulot, a French chemist, is examining what is said to be "a tin vein" near Deadwood.

A BROKER is one who handles other people's money, employing none of his own in the business. A banker is one who loans his own money or surplus, whether he maintains a banking institution or not.

THE electric plant at Canyon City, Colo., that furnishes power for Cripple Creek mines, twenty-four miles distant, is said to have cost \$250,000; \$125,000 additional will be spent to complete it at the Cripple Creek end.

THERE will be a meeting in San Francisco, September 6th, of the executive committee and special committees of the California State Miners' Association, at which time the date of the 1898 convention will be announced.

E. S. McCOMAS who is interested in mining on Snake river near Boise, Idaho, has begun the construction of seven dredges. He says the bars there can be operated with dredges at a profit if the yield is only 10 cents a yard.

TO OCT. 1, '96, the Con. Cal. & Va. mine on the Comstock lode, Nevada, produced \$131,637,307.82: of this bullion, \$61,780,474.86 was gold and the remainder silver. The total dividends to the date mentioned were \$78,148,000.

THE duty of the stamps of the Alaska-Mexican Mining Co. is 3.7 tons per twenty-four hours running time: their weight is 1020 lbs., dropping ninety-seven times per minute: the average cost of milling is 45 cents per ton, including sulphuret chlorination.

OWING to the establishment of a larger similar plant in New York, the Alameda, Cal., Pacific Coast Borax Works has shut down after an almost continuous run of twenty-one years. The Alameda establishment refined three carloads of crude borax daily.

IN the Morison quick-running stamp mill the stamps weigh, each, 1000 pounds, the drop is 7 inches, and the speed 135 per minute. The stamp and action was described by the inventor in the issue of Aug. 21st, '97. The stamps are lifted by levers instead of cams.

FROM Grass Valley, Cal., where mining is extensively carried on, were shipped last week 5047 boxes of Bartlett pears, verifying the assertion that in California fruit is plucked from the surface of ground from which the gold product continues to flow.

ALMANDINE is an iron-alumina garnet, Si_3O_{12} . When of a fine deep red, from India, and transparent, it is "precious garnet." The iron-aluminum garnets, which are reddish to black, are cut into gems and then called noble, oriental or rose garnets, or almandine.

AT Cripple Creek, Colo., it has become possible to reach the camp in a Pullman car, ride to the mines in an electric car, descend in an elevator run by electricity, see by electric light the underground workings and observe the ore hauled to the surface by electric power.

EXPENSE and litigation may be avoided by remembrance of the fact that even possession of a mining claim, though accompanied by development work, without compliance with location laws, will not hold against subsequent locators of the same ground who do so comply.

THE silver output of the Broken Hill Proprietary, Australia, during the six months ending June 30th, '98, was 2,873,684 ozs. fine. Good results have been obtained from the sale of lead and copper matte, and, after allowing £37,703 for depreciation, the net profit for the half-year was £139,856.

SINCE the cessation of silver mining in Caribou, Colo., the town had dwindled to twenty people eighteen months ago. To-day there are over 600 people, and within a half mile circle, from which \$12,000,000 silver was produced, there are at present eight mines working, principally gold.

TO DETERMINE the necessary diameter of a required pipe, knowing the volume and velocity of the water, multiply the number of cubic feet of water by 144 and divide the product by the velocity in feet per minute. The quotient is the area: divide this by .7854, and the square root of the quotient is the diameter required.

SECTION 1183 of the California Code of Civil Procedure gives miners in California, performing labor upon or furnishing materials to be used, a lien upon the property on which they have bestowed such labor or furnished such materials, for the value of such labor done or materials furnished, whether at the instance of the owner, or any other person by his authority.

PROFESSOR F. KUPFELWIESER, in the Transactions of the Austrian Engineers and Architects' Society, publishes statistics of the world's coal supplies, extending over a number of years. He shows that Europe, which in 1870 supplied 84 per cent of the coal used, in 1897 supplied only 69 per cent. North America in 1870 furnished 15.1 per cent and in 1895 supplied 30 per cent.

IN connection with the illustrated article "To Measure Flowing Water," on page 113 of the issue of July 30, '98, it may be said in answer to inquiry that the H. P. of water can be approximately determined, where the head or fall in feet and the flow in miners' inches are known. The miners' inch = $\frac{1}{2}$ cu. ft. per minute: the H. P. of 1 inch under 100 feet fall = .24147; of 40 inches, same fall, would be 9.6583 H. P.

THE Montana Power Co.'s dam on Big Hole, Beaverhead county, Mont., which was built last year at a cost of over a quarter million dollars, and washed out last spring before proper headgates could be constructed, will be rebuilt and the electric plant be in operation within ninety days. The Butte Miner says that an additional expense of a quarter million dollars will not prevent its being a dividend paying enterprise.

THE principal varieties of mica are muscovite or white, phlogopite or amber, and biotite or black, the last being of

little commercial value. The value of the Los Angeles specimens submitted depends upon the owner's ability to get it out in large blocks, and the fineness of its grain. There is constant demand for mica mined in blocks of considerable size, and susceptible of being split into even sheets. Canada and India furnish mica in such quantities and at such prices as to discourage domestic production.

THE Red Mountain Tunnel Co. proposes to run a tunnel from the Columbia river near Trail, B. C., to tap Red mountain near Rossland, a distance of five miles. The purpose is to drain the mines of Rossland, ventilate and furnish them with light and power, and afford economical methods of extracting ore. The work is estimated to cost \$4,000,000. C. R. Hossmer, who is interested in the Center Star, Virginia, and Monte Cristo mines, and H. S. Holt, the railway magnate of Montreal, are leading the project.

UNUSUAL is the scene at Summerland, Santa Barbara Co., Cal., where on the ocean beach on a platform built out 300 feet in the water are pumps raising rich, black petroleum from the sea. Rich strata of oil lie beneath the ocean's bed, and wells that puncture the rocky, sandy bottom give it an outlet. The Treadwell platform, or wharf, 300 feet in length, has a string of wells along its sides, and the limit of the submarine oil field has not yet been reached. Even in California it is something new to bore in water for oil-bearing sand, striking it successfully at a depth of 325 feet.

AT the University of California, Berkeley, Cal., during the ensuing scholastic year Curtis H. Lindley of San Francisco will deliver a series of lectures on "The Public Lands, Mines and Water," which will comprise a discussion of the public land system, the methods by which the Government acquires and disposes of its lands, and the genesis, development and theory of the law of mines and the law of water, as applied in western America. Such a series of lectures will constitute an important feature of that part of the University course, and, coming from so competent an authority, will be of value.

SUMPTUARY laws that would be resented by American miners are rigidly enforced in some British colonies. Following is a copy of a notice sent for cause on July 1 to the manager of the Boulder Main Reef, Kalgoolie, by the warden of the East Coolgardie goldfields: Sir,—You are hereby warned that unless you comply with Regulation 98 and Schedule 22 by notifying to the Statist of the Mines Department the result of every crushing and other treatment of ore, within fourteen days, legal proceeding will be taken against you, the penalty being a fine and possible forfeiture of your lease.—F. HARE, Warden.

THE arrastra is still used in California and other States, and is a favorite in many almost inaccessible localities. It is a good amalgamator, but an expensive crusher. It is a primitive contrivance—usually a shallow, tub-shaped enclosure about 12 feet in diameter, of either iron or stone. An upright shaft fixed to pivots above and below stands in the center, and from it arms extend, to which horses or mules are hitched. Usually, however, arrastras are of one mule power. Blocks of stone, attached by thongs or chains to the central arm, are dragged around the enclosure, the front of the lower surface of each block being slightly raised, so that the block crushes the finely crushed ore in its passage. When the ore is well pulped mercury is added and the grinding process continued during amalgamation.

THE Republican State Convention which met at Sacramento, Cal., with cheers adopted the following in its platform: "The mining industry, ranking as it does among the foremost industries of our State, is entitled to the fostering care of both our State and National governments, and we congratulate the miners of California that legislation inaugurated by a Republican Governor, and carried to completion by a Republican Legislature and a Republican Congress, placed their industry where it rightfully belongs, and surrounded it with such legislative safeguards as have restored confidence among those engaged in the mining industry, and caused a large and rapid increase in the yield of the mineral products of California. We pledge our legislative and congressional nominees to continue the work so happily begun under Republican auspices until all needful legislation in behalf of the mining industry shall have been accomplished. We favor the creation of a national executive Department of Mines and Mining, with a Secretary at its head who shall be a member of the President's cabinet, and we hereby pledge our congressional nominees to the use of all honorable means in their power for the creation of such a department. We look forward with pardonable pride to the early construction already assured of the restraining barriers, for which a half million dollars have been appropriated by our State and National governments. The mineral lands of California should be preserved for occupation and development by the miner, and we pledge our nominees for Congress to labor for such National legislation as will fully accomplish this."

THE greenish, or greenish gray, film forming on copper plates, often showing various colors, is due to the oxidation of copper in the amalgam; or it may be due partly to the effect of sulphates in the ore, in which case it would be at least partly a basic sulphate of copper. On good electro-silver plated copper plates it is probably never seen. It certainly does cause a loss of gold in amalgamation. When it appears the stamps should be hung up and the coppers cleaned. This may be done with ammonia, a solution of caustic soda or potash, or a dilute solution of cyanide of potassium. After removal a little more quicksilver should be rubbed in. If it then appears it should be removed as before, all the amalgam scraped off and a good coating of silver amalgam rubbed in. If pure silver can be obtained, this silver amalgam can be easily made by using about three parts of silver to one of quicksilver. It requires about one-fourth ounce of amalgam to each square foot of surface to be amalgamated. If pure silver cannot be obtained, a good way to make it is to use silver dollars. Dissolve them in a porcelain evaporating dish, or any chinaware dish if such be not at hand, in dilute nitric acid, and evaporate it to dryness over hot water, or a water bath. Heat the dry mass gently till it fuses, and all the bluish tinge in it is changed to a grayish black. When this point is reached the copper alloy in the silver coin will be changed to an insoluble oxide. Then dissolve all that will dissolve in a very little water, and filter into a glass jar. To this add the quicksilver required, and drop in a few bright nails or other iron. The silver will be deposited as metallic silver and form amalgam with the quick, and in two or three days it will be complete and ready to use without other care. It is a good idea to always use silver amalgam on the plates, rather than pure quicksilver, because it keeps the surface cleaner and, it is believed, causes a better saving of the gold.

The Coolgardie, Australia, District.

TO THE EDITOR:—Coolgardie was once the chief mining camp in Western Australia. It has met with serious reverses owing to the wildcat contingent and has gone down, notwithstanding it has many excellent mines all round it. Coolgardie grew quicker than any other city in Australia, but as its growth was based on a bubble it has degenerated from a lively mining town into a mere commercial center, which in Western Australia means a carting station on a large scale. Coolgardie had the prospects of a big city until the extension of the railway to Kalgoorlie took away from it the handling of the trade to I. O. U., Kurnalpie, Ejudina, Broad Arrow, White Feather, Menzies and the Northeast Coolgardie district. To Coolgardie Western Australia owes the discoveries of its vast auriferous region.

The aggregate capital of the mines about Coolgardie is £7,000,000, and is distributed as follows:

| Name— | Amount. |
|----------------------------------|----------|
| Bayley's United..... | £155,000 |
| Block 50..... | 225,000 |
| Block 42..... | 150,000 |
| Burbank's Birthday Gift..... | 150,000 |
| Burbank's North..... | 100,000 |
| Burbank's Grand Junction..... | 100,000 |
| City of London..... | 180,000 |
| Flagstaff..... | 240,000 |
| Forest King..... | 75,000 |
| Gleeson's Success..... | 65,000 |
| Golden Leases..... | 120,000 |
| Great Dyke..... | 500,000 |
| Hannan's Gold Estates..... | 750,000 |
| Hannan's Find..... | 90,000 |
| Treasure Trove..... | 90,000 |
| Herbert..... | 85,000 |
| King Solomon's..... | 75,000 |
| Lady Hampton..... | 250,000 |
| Lady Lock..... | 70,000 |
| Extended..... | 150,000 |
| Lily Australis..... | 90,000 |
| Lindsay's Consols..... | 150,000 |
| Londonderry..... | 700,000 |
| McKenzie..... | 75,000 |
| Mount Catherine..... | 300,000 |
| North Burgess..... | 60,000 |
| Rose Hill United..... | 175,000 |
| Sherlaw's..... | 50,000 |
| Vale of Coolgardie..... | 90,000 |
| Wealth of Nations..... | 375,000 |
| W. B. Proprietary Cement..... | 250,000 |
| Westralia and East Extended..... | 200,000 |
| Vincent..... | 75,000 |

The Londonderry, which was the richest mine on the field, is south of Coolgardie one mile. Its discovery and exposure are one of the great episodes of Coolgardie. In the beginning of 1894 two men came into the office of Lindsay, an auctioneer in Bayley street, and asked for information about the country. Lindsay advised them to try Widgiemoolah, sixty miles south. They wanted to try Kurnalpie, but he told them that to men of small means Widgiemoolah offered a better show. They bought from him a condenser and left with a horse and cart for Widgiemoolah. On the 11th of May, 1894, Mills, one of the men, returned and said the country at Lefroy was very dry, but that they were on good feed, and for the sake of the horse they would stop there. He reported that they had what appeared to be an ounce show and asked Lindsay to take up the lease. He called Huxley—his mate—in and they asked Lindsay the charge, saying that they were very poor. Noticing that four other men—who afterwards turned out to be Dawson, Gardiner, Carter and Elliott—were hanging about after the first two named, Lindsay's suspicions were aroused, but subdued when the men frantically attempted to make up the lease money between them. Lindsay brought them to the warden and secured for them lease 575. He took no further notice of the matter at the time. The lease was the Londonderry, which they had discovered on the previous Sunday. However, Lindsay a few days after went into the bush to look for the lease. When he came upon it he found a large fireplace which was evidently not used for cooking. Shortly after he came upon the men, who did not receive him too kindly. By glancing around him he saw that the men had something above the average. The fireplace was used for roasting the quartz in order to facilitate dollying. It appears that Mills, about one week previously, while rapping some stone lying on the surface not far from the camp, had found very coarse gold. A shaft was put down and a very rich find proven. According to the Australian fashion, the men split camp and each set up separately. Although out in the dry wilderness, each camped by himself, cooking and eating apart from his comrades. Each dollied his own gold and made bets as to who should first fill his quart can. As the Australian is a great bettor, these men wagered on a single event, such as filling a quart can, as much as two tins of corned beef, valued at 2 shillings per can. In two weeks they took out 10,000 ozs. of gold. During the two months in which they held the claim they took out over 10,000 ozs. of gold per man—all by mortar and pan. In getting rid of the claim they exercised supreme caution. They had sunk a shaft on the gold to a depth of 50 feet without a sign of exhausting the deposit, but about this time Bayley's Reward, three miles distant, petered out and a panic came. The Londonderry folks sunk a new shaft 100 feet distant from the "golden hole" a depth of 100 feet and drove under the first shaft without finding a trace of gold. They raised up to within 10 feet of the bottom of the shaft with the same result. Then they filled in the workings and

sold the claim on the strength of the golden hole for £350,000. It is said the purchasers, Colonel North & Co., had negotiated for the mine before the work of disproving it was begun. However this may be, the mine was floated in London for £700,000 and one month subsequently was condemned. Colonel North offered to refund the £80,000 he made out of the flotation to shareholders, but died soon after, and his heirs refused to fulfill his promise. A curious fact about the mine is that the quartz beyond a foot outside the golden hole was as barren of gold as marble. The mine was simply salted by nature, as a great many others are here.

Bayley's Reward, now known as Bayley's United, was discovered by Arthur Bayley, an American. It was the first claim located in the Coolgardie gold fields, and, next to the Londonderry, was the richest. Bayley was twenty-six years old when he discovered the claim and had been prospecting in the desert three years before. He came from Nevada and southern California, where he had made enough money as a miner to fit him up with camels and provision him for the time he was prospecting here. After Bayley struck the claim he journeyed ten miles back on his tracks to find a man with whom he had traveled some time, but who did not care to go farther into the country with him. Finding the man, he induced him to return with him and had him go to Southern Cross to record the claim in their names and procure provisions. A few weeks after the fellow left four others—Reddy, Hannan, Burke and Lawton—appeared on the scene and attempted to take the claim off Bayley, but Bayley chased them away with a display of revolvers. Subsequently Bayley's mate returned and, as Bayley did not like his ways, he, too, was run off the premises. Bayley, by strategy, succeeded in obtaining the claim as a reward, and afterward learned that his mate had failed to lodge any application for the claim. That is how "the American swindled his mate out of interest in the property," as they say here. Bayley took £30,000 worth of gold out of the mine and sold one-fifth of it for £30,000 more. The mine was worked out in three months. Its prospects now, although £100,000 has been spent on it, are poor indeed.

Burbank's Birthday Gift is the best mine on the Coolgardie gold fields. So far it has crushed over 6000 tons for an average yield of 3 ozs. per ton. It is situated fourteen miles from Coolgardie. A 10-head mill is on the mine. The reef is proven to 200 feet depth and on the 100-foot level has been driven on 500 feet. There is a slight fault in it above this level, but it behaves well otherwise. The manager is a respectable old professor of geology, who does not understand the theory of praising a mine before it is proven, but believes one consistent dividend payer is worth a hundred wildcats in even the shortest run.

The Wealth of Nations is thirty miles northeast of Coolgardie, and was the scene of the greatest alluvial excitement in Western Australia. Over £100,000 worth of gold was recovered from the surface of the mine before it was floated. It was floated on the strength of a mining expert's opinion that all this gold was shed from the reef. The reef had very little sense to have moulted itself so bare, for it has not enough gold left in it to identify itself. A 10-head mill was erected on the claim two years ago, but has not as yet turned a wheel owing to lack of water, which, I think, if found, would have been unwelcome. Two months ago payable gold was reported to have been struck in the mine and a month later water was found. These were two strokes of luck at the same time, evidently, but as the mill has not been started yet I fear the strike of water was unlucky. I regret to say I am of the opinion that this mine will never pay for the candles that have been burned in it. Nearly £100,000 have been spent on the mine.

Lindsay's Consols in Coolgardie was a good mine. It has crushed 3000 tons for 12,000 ozs., and continues crushing, but I am afraid the reef is disturbed to an extent bordering on disappearance.

The Golden Dyke crushed 5000 tons for an average of 10 dwts. per ton, but found it unprofitable. There are many other mines like it here. The Australian mining man's knowledge of mining is extremely limited, and in Western Australia he is a complete failure. The reason of this is the fact that he is used to obtaining labor so cheaply that he need never think of economizing on labor.

All the successful mines of Western Australia are superintended by Americans. The country is peculiarly adapted for American ideas. The rate of wages given miners is about the same as in America. Australians are used to paying white miners less wages than are paid Chinese miners in America. They are utterly unable to work a 10 dwt. mine at a profit where wages are more than 10 shillings per day, because they are incapable of economizing on labor otherwise than reducing wages. Their knowledge of labor-saving machinery is nil. When they leave the older colonies to come to Western Australia they carry with them the same ideas their fathers had before them. Having been used to employing three or four men at 6 shillings per day to dump each car of dirt raised from the shaft, they do the same in Western Australia, where each man receives

14 shillings per day. Shafts in Victoria 3900 feet deep are only 6 feet by 3 feet in the clear, and less than 50 tons per day can be raised from them. The gallows-frames on such shafts are so fitted that it requires three men besides engine driver to take a load of rock from the cage. When retrenchment is necessary in such mines, instead of putting in appliances that will do away with two men, they reduce the wages of the three. This is an easy matter here, because the miners are as inferior to those in America as the managers are to American managers. Economy on material is practiced with a vengeance here by Australian managers. Miners are required to go to an office for candles before going on shift, and are allowed two candles per shift. If the candles are consumed during the shift, the miner is supposed to work in the dark. Progress is not noted, but the expense for materials is always under the glass. Mining labor in Australia is altogether dearer than in America, notwithstanding that the wages are not half as high. Supervision is what costs.

When the Australian manager can make only 6-dwt. stone pay in Victoria, with white miners at 6 shillings per day, it is not surprising that he can not make 10 dwts. pay in Western Australia, and therefore can not see how to float a mine except by exaggerating the value of its ore, whose true value would satisfy an American. There are several mines here which would be considered good in America. Burbank's Grand Junction, Burbank's North, Vale of Coolgardie, North Burgess, Sherlaw's, Westralia and East Extended are all mines of good prospects.

JOHN DWYER.

Mexican Methods of Mining.

The way which mines in Mexico have been worked by Mexicans may be divided, roughly speaking, into two classes, those that have been systematically worked without development, and those that have been systematically developed. Many native companies have worked and are now working, which, for economical management and results obtained, compare favorably. For the last 350 years the inhabitants of such places as Guanojuato and Zacatecas have lived by mining alone; the whole prosperity, and, indeed, the very existence of these places and others like them depended upon their mines. The modus operandi of a typical Mexican mining company in successful operation is as follows:

Direction.—This is in the hands of five directors, a president, a treasurer and three members elected by the shareholders of the company from among their own number. The president holds the power of attorney for the company, has ample powers to direct the working of the concern and appoint all employees; he is supposed to consult the other directors at least once a month, and expected to visit the mine and reduction works not less than once a week. The president and treasurer are remunerated for their services by a percentage of the dividends, and in some cases the treasurer is allowed the salary of an accountant.

Mining Staff.—This consists of the manager, with a young engineer as assistant, a timekeeper, a storekeeper, and the captain of the ore yard, besides blacksmiths, carpenters, stablemen, masons, watchmen, etc., on the surface; and underground, of a mine captain, with two assistants, or two captains, a day and a night one, a foreman of the carriers, and a man in charge of the tools.

Development.—This is by a vertical shaft designed to intersect the lode a certain depth, generally from 600 to 700 feet, from which crosscuts are driven to the lode at intervals of 100 feet or more, according to circumstances, and horizontal drifts made along it with crosscuts into the country rock on the foot and hanging walls, where such are deemed advisable, and winzes communicating the different drifts. From a convenient point, preferably on the outcrop of the lode and differing in level as much as possible from the mouth of the shaft, a series of winzes to serve as a railway are made into the mine by which all the men enter and come out, none being allowed to do so by the shaft except under exceptional circumstances. Sometimes it is subsequently found necessary to sink one or more shafts, and of late years a preference for inclined ones has manifested itself. The drifts and crosscuts are generally made 2 m. high by 2 m. wide, and are paid for by the running meter, the price being fixed every week by the manager, four couples in two shifts being employed in driving them; only very occasionally in cases of urgency are six couples in three shifts employed. Sometimes crosscuts are contracted out to only two couples working one by day and one by night; they are then expected to be 2 m. high by 1 m. wide. In the best managed mines in the Zacatecas district and generally throughout the country the mine provides and keeps in repair all the tools, and supplies lights, explosives and all other materials required for the work; in some places, however, the men have to find themselves in everything, even having to sharpen their own tools—a very fruitful source of waste of time.

Drainage.—In pre-railway days only a few mines

were drained by steam power, the usual method being by horse whims, with large bags or pouches made of rawhides with an iron ring at the mouth. This method was adequate in most cases, as water is not very often found in great quantities in Mexican mines; when it was, or when a mine was deep, the alternative often lay between the adoption of steam and the suspension of work. The cost of steam engines was so great, the difficulty of transport and getting men to properly attend to them so disheartening, and the wood fuel often so scarce and dear that native companies very seldom had them. The whims have a horizontal arm about 3½ feet above the ground, to each end of which two horses are hitched; to reverse, the horses have to be unhitched, turned round and hitched to the other end of the arm. They occasionally get beyond control, flying round with terrible velocity, the horses being nearly always killed, and the drivers not always escaping. Whims with diagonal arms starting from the top of the axle were introduced some years ago, with which it is not necessary to unhitch the horses to reverse, as they can be turned round by passing under the arm, and yet the pull is at a point sufficiently low to enable them to exert their full strength. When a considerable quantity of water has to be combated, the horses are kept going at a gallop, and so hard is the work that the ground is sometimes wetted by their sweat and turned to mud, and if they are to be kept in good condition they cannot be worked for more than two out of the twenty-four hours. Much use has not been made of adits, because the hill slopes, although steep near the top, are generally not so near the base, and sufficient depth can seldom be obtained without making them very long.

Extraction.—Mexican miners nearly always work in couples, one striking with a two-handed hammer, and the other holding and turning the drill. When employed on the extraction of ore they are paid either with a part of the ore they extract, on the amount of ore extracted, or by the holes drilled. To work out an ore body they prefer to attack it at the top, and work downwards on it, alleging that the increased power that can be put into a down stroke in drilling with the heavy hammer more than compensates for the smaller quantity of stone that is loosened by the blast. The ore is taken from the workings to the shaft on the backs of the carriers, the worthless stones or deads being used as much as possible to fill up old workings, the very rich ore being put in bags before it is taken to the shaft. Each carrier fills his bag with the smaller stones, piling the larger ones on the top, and balances it on his back by an endless loop—part of which is of leather about 2 in. wide—passed round it and resting on the top of his head leaving both hands perfectly free. The weight of stones usually carried by men is from 200 to 250 pounds, but there have been instances of men carrying much more.

Ore Yard.—The ore and stones are hoisted by horse whims, packed in leather pouches, which are emptied at the mouth of the shaft, from where it is taken to the ore yard on wheel or hand barrows. The ore extracted by each couple or set of couples is accompanied by a bag full of the same, having a distinctive mark made of knotted, plaited, or twisted string. These marks are very simple and ingenious, having distinctive names, and are further varied by the part of the bag to which they are attached. They can be divided into groups, and when assigning marks to the men, care is generally taken to confine each group to one part of the mine, and to the men working under similar conditions, so that in the ore yard the part of the mine from which the ore was extracted, and the conditions under which the men who extracted it worked, is at once known. If there are any tributaries at work in the mine the ore extracted by them is put in one part of the yard, and when it has all been hoisted they are called in to divide it into two, three, four, or more equal parts, according to the conditions on which they work, the most usual being two-thirds to the mine, and one-third to the men. The ore is broken, hand-picked, sorted into different classes and weighed, the breakers being paid by the amount they pick, the captain taking care that bad stones are not passed or good ones thrown away.

Assays.—A sample of each of the classes into which the ore is sorted is taken and assayed every week, and besides this four samples are taken of the ore from each heading and working in the mine—one from the coarse gravel made at the time the ore is broken in the yard, another from the fine, and two more from the gravels that come out of the mine with the ore, the coarse gravels being in both cases hand-cleaned first. Samples taken in this way have been found to be reliable and to give a good idea of the values of the ore found in the different parts of the mine.

Reduction Works.—Before the introduction of modern methods the reduction of the ore was carried on in completely separate establishments, often at a considerable distance from the mines, to which the ore was sent on mule or donkey back, or in carts. The method of working the mines thus described, crude though it may appear, is well suited to many Mexican mines. As a rule the pay ore found in them is intermixed with worthless vein stuff, and

seldom in large compact bodies, every part of which is rich enough to cover the cost of reduction; even in the large rich chimneys and pockets that have given big "bonanzas," a quantity of worthless ore has been found mixed with the good ore, and with labor so cheap and hand-pickers so expert, a considerable economy is effected by separating the unprofitable part. Nor is the use of steam power always accompanied by economy; coal is unobtainable in the majority of places, and wood fuel is generally dear, skilled labor difficult to obtain, and to repair or replace breakages, long and vexatious delays are only too likely to occur. On the other hand, horses are cheap. Mexicans skillful in managing them, and, for the working of an ordinary mine, efficient. In reduction works, however, the advantages of steam machinery very far outweigh the difficulties of its employment.

Ward District, Boulder Co., Colo.

The accompanying illustration is that of Ward, Boulder county, Colo., which, as a mining town, is enjoying a good normal condition of activity. The most important achievement of the year has been the completion of the Colorado & Northwestern railway from Boulder to Ward, which not only makes travel to the latter point quicker and more convenient, but makes possible the shipment of low-grade ore from the mines of the Ward district at a small profit.

From Boulder to Ward is a distance of fourteen miles in a straight line, but the mountainous character of the country requires various circuits and



WARD, BOULDER DISTRICT, COLORADO.

curves which lengthen the line to twenty-seven miles. In this distance an ascent of 4000 feet is made. At Boulder the new road connects with the U. P., Denver & Gulf line.

Two well-equipped reduction plants are in operation at Boulder. A rate of \$1.25 per ton on low-grade ore is made from Ward to Boulder by the new road and a \$2 rate on high grade. The shipments at present from Ward are of considerable account. It is claimed that ore of as low grade as \$4 per ton can be shipped from Ward profitably.

In the adit tunnel an upraise is being driven to the upper Dewdrop workings, a distance of 300 feet. The tunnel being driven by the Big Five company to the Ni Wot workings has progressed 2760 feet, set with double track. One thousand feet of this distance is on an ore body of good width. The Big Five is just completing a power plant, having 160 H. P. boilers, 125 H. P. engine and a 15-drill compressor. The B. & M. is well opened from a 550-foot shaft, having good bodies of profitable ore.

The Morning Star, under the management of Wm. Crompton of Boston, is making a good record in the shipment of high-grade ore.

The Worth mine has shipped ore of the value of \$30,000 within the last three months.

The U. P., which has recently been opened, has put in a new plant of machinery.

The Utica lost its shaft house by fire recently and will rebuild at once.

Ward, Colo., Aug. 20th, '98.

WASCOTT.

In 1880 the United States exported iron and steel to the value of \$14,716,524; in '97 this nation's iron and steel exports were valued at \$70,367,527. In '80 we imported \$71,266,699 worth of iron and steel; in '97, \$12,615,913; so that in seventeen years Americans have secured nearly all the home market for iron and steel and nearly five times as much foreign business as in the year first named.

Is Darwinism True?

W. S. PROSSER.

In an article in the MINING AND SCIENTIFIC PRESS (April 2nd, '98) I gave several reasons for dissenting from the Darwinian theory of the common descent of man and other animals; but that article was in such a brief and concentrated form that it seems desirable to enlarge somewhat upon some parts thereof.

First—Is there any such thing in actual operation in nature as a development of new forms by "natural selection" or a "survival of the fittest?"

Second—Is it impossible to conceive of any natural process by which new ideas and novel devices can be introduced into animal mechanics?

Third—The explanation of vestigial and embryonic reminders of earlier forms.

It has never been shown that a distinctly new animal species has evolved itself from another not so good; but it has been assumed and believed, because some variation constantly appears. The planets vary in their paths continually from greater to a less degree of ellipticity, travel at different speeds at different seasons, and are subject to many regular perturbations. Astronomers might, from one of these variations, continued for a month or a year or many years, theorize that the change was continuous, and would increase till the solar system was wrecked, or the planets rushed off into space as comets; that these variations were not cyclic, but permanent and increasing. Such is the position of Darwinism.

In studying evolution, those variations occurring under man's influence must be totally cast aside, if

any hope is cherished of discovering the true history of nature in past ages. Man is a new force, not in ancient times in action. A horse moves a wagon along a road, now here, now there, as his driver wills. That is variation under domesticity. But that affords no clue as to the effect of different forces, as chance winds, to-morrow's tornado or next day's zephyr. They would illustrate chance variations. In the calculations of probabilities, variation by chance leads nowhere. To consider changes under domesticity would not alter the final result—no truth could; but it delays and befogs the mind. The Darwinian argument is that from a little variation under man a great deal more under nature may be assumed; and thus great changes might have occurred, and hence, as the next step, that they did occur. All of which is unjustifiable reasoning. Because pigeons and dogs have, under one force (domesticity), changed in size, color, acuteness of smell, etc., affords no basis for assuming that wild animals, entirely free from that force, may and did change much more—did of their own volition invent and introduce new, strange and wondrous mechanical devices. Certainly food, heat, cold, etc., may alter the general size; exercise will increase parts especially used. Good food carries good blood over the body to each organ, and all grow. Those most used get the most blood and grow the most. But how could this blood, either in the embryo or in the perfected body, create, or lay the foundation for creating, a thousand years later, a new organ, a new mechanism, designed and built on unknown and hitherto untried principles? The thing is absurd.

Survival of the fittest is a very pretty idea. It looks plausible to set out in long array the manifold dangers that surround animal life, destroying most of the young and finally all lives, and to ascribe the long lives of some to their swiftness, strength or hardihood. The argument is simple: those who live are assumed to be the stronger and those who early

perish the weaker. The reasoning is poor, and it is not backed by facts. Many more lives are begun, especially in the lower forms, than reach maturity. Generally the smaller species are very fecund and furnish the food of the larger. The cod, mackerel, etc., produce tens of thousands of young, of which very few mature. How are these few selected? Are they the strongest and swiftest? Not at all. They are of the average. Their enemies, for the most part, are so large and swift that any minute difference in the little ones cuts no figure. At the first rush the nearest are caught, the remoter escape. In a mass some must be on the edges at one moment, others the next moment. Those that escape to-day may be the first to fall to-morrow. It is a matter of chance. A shoal of herrings is surrounded by swift enemies who catch those on the edges or in the center at will, or if confining themselves to the edges are as apt to catch the very fast as the very slow, as either would separate them from the main body which travels here and there, back and forth, now the pursuer in front, now behind. Even if one straight flight be imagined, the average must escape as well as the fastest. Thus, everywhere, the sick, deformed and feeble are quickly killed; the average and those slightly above or below the average have practically an equal show, and their numbers are reduced by chance operation of highly superior forces to the usual amount. These herrings show in every shoal and from year to year substantially the same speed, which would not be the case if any selection of the swiftest were going on. It may be said that this has happened and that they are all swifter than aforesaid. But of this there is no proof, and this disproves: that in that case they would have so gained on their enemies as to be safe from them, and, if so, would have increased beyond all bounds, even to filling the ocean. To avoid this, another assumption may be made: that their pursuers have all increased, which involves increase in their enemies, and so on, and the net result would be the same as no increase. If similar causes produce similar results, all species must have advanced. This is a necessary and integral part of Darwinism, and the result should be a great vacancy at the bottom of the animal series. If not, why not? If some survived before they were the fittest, then the others died, and there was an advance, leaving a gap behind. The same process continued would present to us at last a few high races and no low ones. Or perhaps it may be preferred to say that some survived because they were "fittest," but the others survived anyhow! A clear absurdity.

One great safeguard of the deer is its speed. Adult deer are sometimes caught by carnivora. These lie in wait, usually, and their choice of a victim is from chance; and relative or actual speed cuts no figure, except that the sick, aged, malformed and feeble fall easy victims and thus prevent a falling off in the average of the species. But those in fair average health have the same chance as the best. Other enemies are diseases, parasites, accidents, etc., wherein individual strength and speed are of no avail. Disease among wild animals, except when overcrowded, is the exception. What, then, is the real meaning of speed, color, acute hearing, smelling, etc., as safeguards? Plainly, that they prevent wanton and needless killing. Only hunger will drive their enemies to the exertions necessary to capture. What otherwise would happen is shown when a sheep-killing dog has a night's sport in a helpless band. Even in mankind disease, accident and death overtake the strong as well as the weak. Disease germs that to-day are harmless to a certain one, to-morrow may find him an easy victim. The race, as all races, survives at about its average, and no especial survival of the fittest is visible. If the human race advances it is because of a general advance, in the great body and not from a few exceptional individuals. A noble life helps the race mostly by example; the direct descendants may be villainous.

One Darwinian argument is this: On a piece of ground, covered thickly by young plants, all of a kind, most soon die, and only a few finally grow to maturity and occupy the entire space. This is supposed to show a selection of the best. As a certain writer says: "The strongest, loftiest and hardiest survive and thus makes par excellence among trees." This is another example of poor logic. The position of the seeds in the ground is entirely by chance. Only one plant in about eighty so far can grow on account of sunlight and plant food, and the subsequent crowding out would be chiefly the same requirement of distance, modified to some extent by accidental variations in fertility of soil, the feet or teeth of animals, worms, storms, etc. In all this selection, relative hardness or the plant's internal structure has nothing to do, and the competition, such as it is, instead of "making par excellence," as imagined, does exactly the reverse—damaging the survivors by stunting their early growth. In plant life, as in animal, there is no "survival of the fittest," as an actual evolutionary force.

Darwin's opinion that an animal's worst competitors are those of its own kind is true only to a limited extent, in case that food is scarce. It is not true usually, because food is usually not scarce. Bateson, quoted by Prof. Herdman, F. R. S., etc., concludes, collating known observations, that varia-

tion is discontinuous. It is, perhaps, truer to say that variation is cyclic, returning always to the average of the species, as planets continually return to the average of their orbital paths. As gravity, an unknown power, compels this latter, so does an unknown power compel the former. An accumulative, or continuous, variation is an idle dream. Thiselton-Dyer, F. R. S., etc., does not find that "plants inherit effects of environment." Bonnier says: "Plants transported from Alps to plains, or vice versa, and returned, return to their original condition." Prof. Van Graff lauds Darwin, yet owns that there are "puzzling phenomena" not yet explainable. He quotes Nageli that "there is a sharp distinction between multiformity and variation," and hopes future naturalists will so study zoology as to "evolve a causal science resting on an experimental basis," which means, I suppose, to substitute science and fact for theory and guesswork. More frank is Wallace, the co-originator of "natural selection," who confesses that it breaks down as an explanation of the mathematical, artistic and musical faculties of man, "whose development in civilized nations has been so sudden and so great."

In war the brave and strong go out to fight. If killed, or weakened by privations, both effects ought to show in national deterioration. In nations much given to war these effects ought to be very great. But the contrary is the observed fact. War is not only the mother of patriotism and the nurse of courage, unselfishness and the high virtues, but of physical vigor as well. Show me a nation continually at war—serious war—and I can show a vigorous race. The old Greeks fought each other for centuries and continually killed their best, yet they hammered the race into the most perfect ever known. So the Romans: the faster they killed their best, the stronger they grew; when they ceased to fight, they rotted.

(To be Continued.)

The Functions of Alkalies in Cyanide Treatment.

Saving of Cyanide.—Possibly the most important and certainly the most obvious reason for the use of alkalies in cyanide treatment, says a correspondent of the *South African Mining Journal*, is to economize cyanide by neutralizing acid, free and latent, and acid oxy-salts of base metals in the material treated. This saving they accomplish to a certain extent, but not altogether, as a charge, though rendered thoroughly alkaline, will yet, if it contain the reducing substance ferrous hydrate, consume cyanide by gradually converting it into potassic ferrocyanide. Oxidation, which converts ferrous hydrate into innocuous ferric hydrate, should naturally follow the preliminary alkaline treatment of acid material. With leachable material this may be effected either by draining the charge dry and allowing air to penetrate into the interstitial spaces, or by exposure to the air during transference to another vat. Slime pulp may be aerated by pump circulation or by the application of air from a compressor. The expenditure of time and power required for this oxidation preliminary to addition of cyanide must be set against the saving in cyanide thus effected. In other words, it must be decided in each case whether it is cheaper to convert the ferrous hydrate into a harmless compound by means of oxygen or potassic cyanide. Either lime or caustic soda may be employed as alkalies, but the latter is liable to induce turbidity in the solution leached off; it also retards free percolation, and in the case of slimes delays rapid settlement. Lime has the opposite effect, and is thus generally preferable. The main difficulty in the use of lime is its slight solubility in water, so that in order to gain high efficiency it is necessary for it to be distributed in a fine state of division throughout the material to be treated. In dry crushing or direct cyanide treatment the lime can be added before sieving, whilst in wet crushing sufficient lime may be added to the trucks of ore entering the mill to render the water leaving the plates just alkaline. This practice has the further advantage of assisting amalgamation by neutralizing any acid in the ore which would otherwise tend to discolor the plates.

The alkalinity of water or cyanide solution may be calculated (in terms of caustic soda by titrating 100 c.c. with decinormal acid, using a few drops of a .5 per cent solution of phenolphthalein in methylated spirits as indicator. Each c.c. of decinormal acid employed is equivalent to .004 per cent alkali. In the case of cyanide solutions the free KCy must first be neutralized with silver nitrate solution before making the alkali determination. The decinormal acid may be readily prepared by dissolving 6.3 grains pure dry oxalic acid in distilled water and making up to a litre. A simple method of estimating the amount of available CaO in commercial lime, suggested by Mr. A. F. Crosse, is to place a gramme of the very finely ground sample in a litre flask, fill up with distilled water, and close. This is left for several days with occasional shaking, and, finally, 100 c.c. of the clear solution are titrated with decinormal acid. Each c.c. of decinormal acid employed is equivalent to 2.8 per cent pure CaO in

sample. Magnesian oxide is a useless constituent of lime, so far as cyanide treatment is concerned, as any $MgSO_4$ formed decomposes cyanide as readily as H_2SO_4 .

In a sands plant, or when ore is treated direct by cyanide, sufficient lime should be added to the material treated to maintain the average alkalinity of the solution after precipitation contained in the storage vats at about .02 per cent. By these tests and by daily tests of alkalinity of plate water, the amount of lime employed may be adjusted to the character of the ore. A further effect of the presence of free alkali in the solution is, as experiments show, to conserve the cyanide by neutralizing the carbonic acid from the air, which would otherwise tend to decompose the potassic cyanide.

Flocculating Properties.—The effect of alkalies as regards flocculation and settlement of slimes is analogous to their effect upon percolation; in the latter case the passage of a liquid past a finely divided solid takes place, whilst in the former case the operation is reversed. For slime treatment lime is universally employed to accelerate the settling, which caustic soda actually retards. This lime does by causing the agglomeration into aggregates of the finely divided suspended slime particles, and thus, by increasing the bulk relatively to area, reducing that friction with the particles of liquid which retards their settlement. The solution storages in slime plants should be kept up about .010 per cent alkali by the addition of lime to the slime pulp undergoing treatment. I have been unable to detect any acceleration in settlement by the presence of more than .007 per cent alkali, but .010 per cent allows of a margin for consumption by the carbonic acid of the air.

To settle slimes in spitzkasten, which receive pulp from the mill, after separation of concentrates and sands, and to return clear water direct to the mill, lime should be added as far up the launder and as far away from the spitzkasten as possible. It is best fed into the launder by means of an automatic traveling belt feeder, suggested by Mr. E. T. Rand, which is driven by a little waterwheel placed in the launder itself. The belt travels just above the bottom of the hopper containing very finely ground lime, and constantly delivers into the stream an amount of lime which may be regulated by a sliding door over the opening in the hopper from which the belt issues. The fineness to which the lime has been ground and the length of launder it traverses before reaching the spitzkasten determine the percentage actually dissolved, upon which its efficiency depends. The lime is usually ground in a ball mill with 30-mesh or 40-mesh screening; if lime is used in the mill very little more need be added later to ensure slime settlement. Owing to its power of accelerating percolation a high percentage of mill pulp can be retained in the sand collecting vats as a leachable product where lime is employed in the mill. A saving of the time necessary for free cyanide, when the solution is applied, to come in contact with all parts of the charge also results, and as the subsequent washes leach freely, the dissolved gold is readily washed out, thus giving low residues after treatment.

The overflow of clear water from the spitzkasten need not contain more than .003 per cent alkali if the spitzkasten are of sufficient capacity and properly regulated as regards baffle boards to prevent disturbance by surface currents or by wind; the overflow should be perfectly level and equable, and several inches depth of water should be maintained above the angular edges of adjoining spitzkasten. Slimes from oxidized material are less readily settled than those from pyritic ore, and in such cases somewhat more than the ordinary allowance of alkali and of twelve square feet of spitzkasten per ton of slimes per twenty-four hours may be necessary to effect such concentration of the slimes as would separate 75 per cent of the pulp water as a clear overflow.

Prevention of Rust in Iron Vats.—It is stated in *Comey's Dictionary of Solubilities* that "iron does not rust in contact with air and water containing alkalies even in every small amount." The coating of calcic carbonate, which solutions containing lime tend to deposit on every surface with which they come in contact, would also probably tend to prevent oxidation, and similarly this deposit should lessen and finally stop leakage from small crevices in vats through which calcareous gold-bearing solution was constantly finding its way.

In Boston, Mass., last Tuesday, before the American Association for the Advancement of Science, now in annual session there, C. B. Rush read a preliminary paper on "A New Gas." This is a constituent of the atmosphere, and is found absorbed in many instances. Its chief characteristics thus far experimentally determined are enormous heat, conductivity and low pressure. Mr. Rush showed that its conductivity, even when mixed with a larger excess of other gases, is about 100 times that of hydrogen, the best gaseous conductor heretofore known, and conjectures that the conductivity of the pure gas will be found 1000 or more times that of hydrogen. Mr. Rush claims to have discovered the new gas a year ago whilst looking for secluded hydrogen in gas.

Coast Industrial Notes.

—The White Pass & Yukon Railroad is open for business.

—On the S. F. & S. J. V. R. R., track is laid to Tulare, Cal.

—The Nicaragua Canal would "boom" Pacific coast lumber interests.

—From nine acres J. N. York harvested 742½ bushels of barley at Weston, Oregon.

—Freight rates from the Pacific coast to New York on lumber and shingles are 88 cents.

—Hop contracts at Gervais, Wash., amount to 850,000 pounds, a price from 7 to 10 cents a pound.

—From Aug. 19 to 23 fruit shipments to the East from Sacramento, Cal., amounted to 161 carloads.

—It has been decided to extend the Sierra Railway twenty miles from Jamestown, Cal., to the sugar pine belt.

—Fifty-seven carloads of sheep—over 6000 head—were shipped last week from Porterville, Cal., to Griswold, Iowa.

—The Philippines are not Spanish territory to be disposed of by a protocol. They are United States territory by conquest.

—The San Diego Union says that tobacco raising in San Diego county, Cal., is a success. Some of the plants are 7 feet high.

—Mexico has twenty-one blast furnaces in operation, two in course of construction, seven rolling mills and two partly finished steel plants.

—By Nov. 1st, '98, the Snoqualmie Falls Power Co. expects to have its plant in operation and be furnishing electric power in Seattle, Wash.

—The first steamer of the California & Oriental Steamship Co. will sail from San Diego, Cal., for Japan and China, via Honolulu, in December.

—At Baker City, Oregon, the local sales of wool to date aggregate 75,000 pounds, all of which has been consigned to Eastern buyers. The price realized was 12@12½ cents per pound.

—The annual revenues under Spanish rule in the Philippines amounted to about \$10,000,000. The annual exports from the islands amount to about \$20,000,000 and the imports to \$10,000,000.

—The first railway cars to be used in Alaska were shipped to Skagway this week. They are to be used on the White Pass & Yukon Railroad, which is now in operation twelve miles from Skagway.

—Next Thursday the Pacific Coast Co. makes a general advance in the wages of its employees in the mines at Franklin and Newcastle, Wash., averaging about 10 per cent. About 600 men are employed.

—In Trenton, N. J., the Polynesian Steamship Co. has incorporated to operate a line of steamers between San Francisco, Honolulu, Tahiti and probably Manila. Capital stock, \$1,500,000. Two 3000-ton steamships will be built.

—The Chihuahua, Mexico, *Enterprise* says that the demand for livestock in the U. S. has almost depleted the herds of northern Mexico, particularly Chihuahua and Sonora, the shipments amounting for some time past to 6000 head a month.

—The Esquimalt, B. C., Marine Railway, Ltd., have sold their entire plant and ship-building business to a company which has been formed under the name of the British Columbia Marine Railway Co., incorporated with a capital of \$200,000.

—Oil from Coalings, Fresno Co., Cal., is sold at \$1.30 per barrel, delivered in San Francisco. The cost of transportation is 42 cents per barrel, leaving a net return of 88 cents per barrel to the producers. Four wells yield 540 barrels per day.

—At La Grande, Oregon, \$500,000 beet sugar factory is rapidly nearing completion. Over 5000 cords of wood have been piled up on the factory site. Over 150 men are at work on the buildings, and setting up machinery. When the factory starts it will give employment to 100 persons.

—The contract for the construction of the San Pedro, Cal., breakwater was signed Aug. 12th by Heldmaer & Neu, the contractors of Chicago, and Major Charles E. L. B. Davis, United States engineer, representing the Government in San Francisco. Work begins three months from the date of signing.

—The Kootenay Railway and Navigation Co., Limited, has been formed to consolidate into one system the Kaslo & Slocan Railroad and the International Navigation and Trading Co., Limited, and to connect these directly with the Great Northern and Northern Pacific Railroads by a line either owned or controlled by the company. The capital is \$500,000.

—H. C. Pettit of Snohomish, Wash., is a born trader. He reached Dawson last fall \$200 in debt. He sold his padlock to an old miner for \$20, and going back bought all available padlocks of incoming Klondikers, which he sold at Dawson for \$20 each, clearing \$700. Then he began speculating in Klondike claims and is now back from London, where he sold his claims for \$200,000.

—The San Francisco Chamber of Commerce and the Manufacturers' and Producers' Association of California have both telegraphed to the Saratoga, N. Y., National Conference on the future foreign policy of the United States, urging that the Government retain all the territory conquered in the late war with Spain, and also strongly favoring the building of the Nicaragua canal, and its control by the U. S. Government.

—The report of the Iron Mountain Railway for the year ending June 30th, '98, is not invigorating from a transportation point of

view. The Iron Mountain Railway runs from Iron Mountain to Keswick, in Shasta Co., Cal., a distance of eleven miles, and is operated almost entirely as an ore road in connection with the Iron Mountain mine. The operating expenses of the road for the year are shown to be \$65,118.33, and the total earnings, which were in the shape of freight receipts, amounted to \$178.55, leaving a deficit of \$64,939.78. Still, in connection with the smelting operations, the railroad is a paying investment.

—Consul Denby arrived in San Francisco on the steamer Belgic this week from Peking, China. He says that several important contracts relating to the development of China have recently been entered into by the Chinese Government. A contract has been made by the Russo-Chinese Bank for a railway, 140 miles long, from Tai-yu-an-fu, the capital of Shansi province, to Cheng-ting-fu in the province of Chihli—the first large city south of Pao-ting-fu, the capital of Chihli. Pao-ting-fu is on the trunk line from Hankau to Peking. This contract also includes mining privileges and the building of necessary branch roads. A contract has been granted to Mr. Luzatti, agent of an Anglo-Italian syndicate, for working coal, iron and petroleum throughout central and southern Shansi, with the privilege of building railways and cutting canals to join trunk lines or navigable rivers. The contract runs for a period of sixty years, and is entirely vested in the Anglo-Italian syndicate. This is the greatest industrial concession ever made by China. The engineers and staff are to be composed of English and American engineers. Two American engineers—Messrs. Jameson and Shockey—have visited Shansi, and they report that the minerals are inexhaustible and as yet almost untouched. Consul Denby is credibly informed that the Hankau-Canton line has been granted to an American syndicate. A contract has also been granted H. H. Lowry, an American, to operate, in conjunction with a Chinese company, the coal mines west of the city and to build a railroad to Kaigan, conditioned on the raising of 10,000,000 taels (\$6,730,000).

Personal.

J. P. BOYLE is appointed Supt. Valeo mine, Park City, Utah.

T. MCINERY is Supt. Spenezuma M. Co., Black Rock, Ariz.

P. C. DUPUIS, Supt. German mine, El Dorado, Cal., is in San Francisco.

A. S. GRAHAM has resigned as Supt. of the Lily mine at Columbia, Cal.

ROGER PRENDERGAST succeeds D. B. Lyman as Supt. Union Con., Nevada.

L. DE TOURNIEL is Supt. Argus G. M. Co., Snows canyon via Modoc, Cal.

S. B. MILNER succeeds J. Gray as Gen. Mgr. Dexter mine, Tuscarora, Nev.

F. L. RATHBUN, Supt. Ranch mine, San Andreas, Cal., is in San Francisco.

WM. VAN SLOOTEN, New York City, is at the Mountain mine, Sierra City, Cal.

CLARENCE KING is inspecting the Summit mine, Nevada City, Cal., district.

W. A. HAWLEY, a mine owner of Grass Valley, Cal., is at Grants Pass, Oregon.

W. F. DETERT, Supt. Zeila mine, Jackson, Cal., has returned from San Francisco.

M. W. GIBBONS of the Kasser G. M. Co. has returned from California to Globe, Ariz.

W. B. NEAL of Pittsburg, Pa., is visiting his Lucky Boy mine at Idaho City, Idaho.

A. R. TOWNSEND of Chicago, Ill., is examining mining properties in Calaveras Co., Cal.

J. M. LAKENAN, managing owner Wisconsin mine, Grass Valley, Cal., is in San Francisco.

A. McMAHON JR., Supt. Live Oak mine, Columbia Hill, Cal., has returned from San Jose.

PROF. F. A. C. PERRINE of Stanford University has returned to California from New York.

C. R. KELSEY, Mgr. Mountain Home M. Co., Mountain Home, Idaho, is in Salt Lake City, Utah.

F. DULMAYNE, owner of La Normandie mine, Grass Valley, Cal., has returned from San Francisco.

J. E. JACKSON, Salt Lake City, Utah, Mgr. Kansas City auro-cyanide sampler, is in Spokane, Wash.

W. H. RADFORD, Supt. La Grange hydraulic mine, Weaverville, Cal., is visiting his family at Berkeley, Cal.

BARON E. DE LA GRANGE has returned to San Francisco from his mining properties near Weaverville, Cal.

H. L. SWAIN, Supt. Ibarra mines, Calmali, Lower California, has gone to Santo Domingo for a brief sojourn.

J. SALLEE, managing owner Bully Hill copper mines, Copper City, Cal., has returned from San Francisco.

F. KLEPETKO, Gen. Mgr. Boston & Montana M. Co., has returned to Butte, Mont., from Salt Lake City, Utah.

W. P. DUNHAM, the Mineral Creek mining man, has returned to Florence, Ariz., from Chicago and St. Louis.

GILBERT MC M. ROSS has been appointed Supt. Con. Cal. & Va., Ophir and Mexican mines on the Comstock.

W. J. SUTHERLAND, Pres. Holmes M. Co., Candelaria, Nevada, is in San Francisco en route to Grizzly Flat, Cal.

E. S. BARNEY, managing owner Amador chlorination works, Drytown, Cal., has returned from San Francisco.

A. W. McCLEURE of Salt Lake City, Utah, is Pres. of the Utah & Pacific Ry. Co., which will build seventy-five miles of railroad, on

the U. P. grade of '88, from Milford, Utah, to the State line between Utah and Nevada.

J. TOURTELLOTTE, owner Tourtelotte mines, Minersville, Cal., has returned from San Francisco to Weaverville, Cal.

J. D. HURD has been appointed Pacific coast agent of the Colorado Exploration Co., with headquarters in San Francisco.

S. W. CHENEY, San Francisco, is visiting the Mammoth-Garfield mine, of which he is Gen. Mgr., at Whitehouse, Cal.

H. W. FAIRBANKS of the University of California at Berkeley, is examining mining properties in Calaveras county, Cal.

H. MCCORMICK, who has been directing work at the Lucky Boy mine at Custer, Idaho, has returned to Salt Lake City, Utah.

R. G. BROWN, Mgr. Bodie Con. M. Co., Bodie, Cal., has returned from La Huerta, L. C., where he examined mining properties.

D. B. LYMAN has resigned the superintendency of the Con. Cal. & Va., Ophir, Mexican, Union Con. and Utah Con., Comstock, mines.

M. FLYNN, who has resigned as Supt. of the Sacramento mine at Mercur, Utah, to accept a position in West Australia, is succeeded by A. Benner.

A. CAMINETTI, the mining attorney, Jackson, Cal., has returned from San Francisco, after placing his son in the military academy at San Mateo.

FRED J. HELLMAN, a former Comstock civil engineer, is reported to have been appointed Mgr. of a South African mining property at a salary of \$30,000 in gold a year.

TIREY L. FORD, prominent in the councils of the California State Miners' Association, was nominated by acclamation at the Republican convention on the 24th inst. for Attorney-General.

G. H. ROBINSON, Salt Lake City, Utah, has returned from an extended sojourn at Butte, Mont., and is giving his attention to the Sioux-Ajax tunnel at Mammoth, of which he is Gen. Mgr.

J. H. NEFF, the honored president of the California State Miners' Association, was on the 24th, at Sacramento, Cal., unanimously nominated by the Republican State Convention for Lieutenant-Governor of California, amid great enthusiasm.

JOHN B. FARISE, consulting engineer of the Exploration Co., Ltd., is investigating a mining region in southwestern Siberia, in the heart of Kibiriz Tartary, with headquarters at Karkaralinsk. He has examined several properties in Roumania and Transylvania, and will return from Siberia Nov. 1.

THE ROSSLAND, B. C., *Miner*, in noting the recent sale of the Center Star mine for \$2,000,000, mentions the report made thereon by R. A. Parker, on which the sale was largely based. Capt. Parker is now practicing his profession as engineer in San Francisco. His office is Room 225, Crocker Bldg.

BERTRAM HUNT, the local agent of the Gold & Silver Ex. Co. of America, has a cable from the MacArthur-Forrest people calling him to London, whence he goes to assume charge of some of the company's interests in West Australia. Mr. Hunt leaves this week. His successor has not yet been designated.

JOHN BECK has resigned as Pres. of the Bullion-Beck M. Co. at Eureka, Utah. He is succeeded by J. A. Cunningham. The Silver City Star says that this action probably marks the complete severance of John Beck from a mine he located twenty years ago, and which raised him from a poor prospector to wealth and importance.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CURTAIN HANGER.—H. F. Bogel, San Francisco, Cal. No. 609,179. Dated Aug. 16, 1898. This invention consists essentially of rings or loops which are adapted to slide upon the curtain pole, and in conjunction with these are automatically closing gripping devices adapted to seize and hold the upper end of the curtain and connect it with the hangers. These bands are loops of metal the normal tendency of which is to straighten out or expand, and the band has at one end a jaw. The second jaw is pivoted with relation to the first named jaw, having a portion extending above its pivotal connection, and a connection between the extended end of the second jaw and the free end of the band, so that the band and jaw may be detachably engaged and the band made to surround a curtain pole. The device is thus easily engaged or disengaged at will.

SPRAYING APPARATUS.—G. A. and R. F. Dunn, Dinuba, Cal., assignors of one-third interest to W. A. Conn of Fresno, Cal. No. 609,183. Dated Aug. 16, 1898. This invention relates to an apparatus which is designed for the purpose of spraying trees and plants with mixtures or solutions intended to destroy insects and vermin and to otherwise improve the condition of the trees or plants thus sprayed. The invention consists essentially in the novel construction of the tank or vessel containing the solution, a means for strengthening and cheapening the construction thereof, and of an air-forcing pump with means for reversing the flow of the air into the tank, means for straining the liquid before it is discharged and for cleaning the strainer if it becomes clogged. The containing vessel is made in the form of a cylindrical tank or barrel, with exterior hoops and plates at each end. Transversely of the pieces forming the heads. These plates are united by rods extending from end to end exterior of the tank and connecting with bars which rest upon the strengthening pieces, so that when the nuts

are turned down upon the rods these parts are clamped together with any desired degree of tension and pressure and will thus prevent the dislodging of the heads. Inlet and outlet passages are connected with the tank and with suitable joints to prevent leakage, one having perforations for the admission of air and the other a passage by which the liquid is discharged without coming into contact with the pump. A suitable strainer is fixed in the outlet pipe exterior to the tank, and the discharge pipe connects with the pipe above the strainer. The valve chamber is so situated and connected with these pipes that air may be discharged without the corrosive liquid coming in contact with the valves.

DRAFT REGULATOR FOR PLOWS.—C. G. Hampton, Ryde, Cal. No. 609,187. Dated Aug. 16, 1898. This invention relates to a device for regulating the draft of plows so as to throw it from one side to the other. It consists essentially of a draft bar having the rear end flexibly connected with the plow frame, the front end adapted to receive the draft connection, a second bar having the front end connected with the draft bar and diverging rearwardly therefrom, and a connection by which the rear end of the second bar may be moved backward or forward upon the line of the frame, so that the draft bar is moved from one side to the other. A fulcrum lever serves by its connection with these bars to move them as may be desired.

DUMPING VEHICLE.—W. A. Cowley, Benicia, Cal., assignor to Baker & Hamilton of San Francisco, Cal. No. 609,182. Dated Aug. 16, 1898. This invention relates to improvements in dumping carts or wagons having bodies turning upon pivot or fulcrum points, which are fixed with relation thereto so that the body may be turned and dumped. This invention is designed to enable the body to be turned so as to dump the load without contact with the axle or other parts. The body is preferably made of sheet steel and has a circular segmental periphery and trunnions upon the sides, which are axial with relation to this periphery. A crank axle extends across beneath the body and above the vertical line of its support, the crank portion having arms upon which the bearing wheels of the vehicle are journaled and turnable, and extensions above said arms to which the bearing trunnions of the body are connected out of the vertical line of the bearing wheel journals, so that the body is suspended approximately above the wheel bearings and is turnable about its trunnions, to discharge the contents completely without their falling upon the crank portion of the axle. Winding drums and gearing are fixed at the front of the vehicle, and chains or wire ropes coil upon these drums and connect with the dumping body upon opposite ends of its curved face, so that by turning in one direction the body will be tilted to discharge its load, and by turning it in the other direction it will be returned to its upright position.

ACETYLENE GAS GENERATOR.—John Kirkham, Oakland, Cal. No. 609,189. Dated Aug. 16, 1898. This invention relates to apparatus which is designed for the generation of acetylene gas. It consists of a cylindrical generating chamber having an interior carrier so constructed as to contain a plurality of carbide containing cylinders, said carrier being rotatable, so as to present the carbide containers successively to the action of water, which is so introduced to the apparatus that it may be delivered into the contents of the carbide cylinders as they are presented at the point of water supply. The carbide chambers are perforated cylinders, which are slidably fitted into the holders, and the outer case has openings with closing doors or plates, so that when these closing plates are removed any one or more of the cylinders can be withdrawn or returned to its place in the carrier. The water supply for the apparatus is introduced through a pipe which extends into the end of the case above the uppermost of the cylinders, so that either one may be brought into line beneath it to allow the water to percolate through the contained carbide and produce gas until this cylinder is exhausted, when another is brought into line, and so on.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING AUGUST 16, 1898.

609,170.—CURTAIN HANGER.—H. F. Bogel, S. F.
609,003.—PROJECTILE.—P. Borelli, Wapinitia, Or.
609,182.—DUMPING VEHICLE.—W. A. Cowley, Benicia, Cal.
609,332.—GYROSCOPIC TOY.—Donaldson, Owen & Williams, Garvanza, Cal.
609,183.—SPRAYING APPARATUS.—G. A. and R. F. Dunn, Dinuba, Cal.
609,095.—CAR BUFFER.—Gilman & Brown, Tacoma, Wash.
609,187.—PLOW DRAFT REGULATOR.—C. G. Hampton, Ryde, Cal.
609,350.—DREDGER.—T. R. Jones, Sacramento, Cal.
609,189.—GAS GENERATOR.—J. Kirkham, Oakland, Cal.
609,381.—FIRE ESCAPE.—Leach & Turner, Truckee, Cal.
609,283.—COUPLING.—W. N. Long, Salem, Or.
609,118.—SKIRT PROTECTOR.—C. E. Nye, Walla Walla, Wash.
609,049.—ROTARY ENGINE.—S. S. Rose, Amador, Cal.
609,174.—BICYCLE SUPPORT.—G. S. Thurston, Santa Rosa, Cal.
609,378.—WINDMILL.—J. A. Weitzel, Redlands, Cal.
609,175.—GUM MOISTENER.—W. L. West, Portland, Or.
609,384.—CUE TIP.—Young & Bundy, Santa Ana, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Life of an Electrical Engineer in the United States Navy.*

To enter the service as an electrician the candidate must first pass an examination by the electrical boards of the naval recruiting station at which he makes application. The examination aims to secure only those men who have a good working knowledge of the business. If successful, the candidate goes to the receiving ship, takes his physical examination and is "sworn in." He is furnished with his clothing outfit, and at this point makes the discovery that there is no gold lace whatever on any garment, and that the equipment yeoman has forgotten to put his sword in. The electrician's pay is very small, and he ranks only as petty officer. If he has never been to sea, his rate is second class.

Until assigned to some vessel, he is kept on duty in the navy yard, in the dynamo-room or in the repair shops. The first few days I was in Brooklyn, the captain of the Vermont, to which I was first sent, did not discover that he had me with him, and, as a consequence, I was sent with a working party on my second day to help load the Sterling. As I thoughtfully marched back to the Vermont that night, I made up my mind to find out on the morrow what that examination was for; but it was not necessary, for all the new electricians were sent to the dynamo room next morning, where we were given something definite to do. On my fifth day I was assigned to the New Orleans.

On most ships of war the electricians stand their regular four-hour watches in the dynamo rooms. We do not. The steam engineering department has charge, and it is our care to look after the circuits, the instruments, and make such repairs as are necessary. A complete test of the whole plant must be made each "quarter," and we have just finished our first one. The current is furnished by three 32-kilowatt generators direct connected to Armstrong compound generators. Their capacity is 400 amperes each. When it is considered that there are motor and searchlight circuits, and that the whole system needs constant attention, it may be seen that much work is necessary to keep the system in working order. The main battery, consisting of the guns, is provided with electric firing devices and miniature incandescent lamps for night sights. This power is furnished by batteries, and, beyond testing twice each day, they do not require much attention. A correct and complete log must be kept daily. This includes the reading each hour of the steam pressure, engine speed, voltage and current on the generators, with any remarks as to the general working of the system during each twenty-four hours. All materials expended from the electrical storeroom must be carefully accounted for. When at sea in the enemy's country a man must sleep on each fighting top for possible operation of the searchlights—of which we carry four. Our work is, of course, harder some days than others. Every one knows that trouble never comes singly, and accidents on board ship, as elsewhere, go in streaks.

When "general quarters" sounds we are transformed. General quarters is the signal to clear for action. Our first duty is to place spare batteries on all the guns, cut off all circuits not necessary for the navigation of the vessel, and take down all fixtures and globes liable to be injured by concussion from the guns. When that is done we become part of the "bo's'n's" fire brigade, and are stationed aft, where we may see all the battle, and possibly get our heads knocked off by falling rigging or an exploding shell. All men on the spar deck are in like danger—but the safest spot in time of action is where you are. Altogether, an electrician's position is far from being a snap. There is much disagreeable work and it seems to a new man that the officers have unpleasant ways of saying things.

*Peter Wintermuth, U. S. N., in Leslie's Weekly.

Restoring Burnt Steel.

The so-called regeneration of burnt steel is most simply accomplished in the following manner:

Heat the steel several times to a dark red and quench after each heating in hot water. The steel finally recovers its former qualities. The first heating and quenching has the strongest effect, which gradually becomes weaker until after the fourth or fifth treatment the steel is affected no longer. From this it is evident that three or four temperings are usually sufficient. By examining the fracture surface of steel thus regenerated, it will be found that its grain has become as fine as it was before burning. In fact, its structure is identical with that of similar steel hardened, but which has not suffered any previous burning. It is, however, always to be understood that the above-mentioned chemical change of the steel in regard to its carbon contents has not taken place simultaneously with its burning. In this case this simple tempering method is of no avail, and the steel has to be subjected to a different treatment, according to the circumstances. If the steel has absorbed too much carbon, it should be heated slowly, allowing free access of air. If it has lost too much carbon, it has to be recarbonized before hardening. This is accomplished by putting the tools or other steel articles to be treated into boxes of sheet iron or crucibles and imbedding them either singly or collectively in powdered bone or charcoal. After the boxes or crucibles have been closed tightly, these, together with the contents, are heated for about one hour, when the articles are taken out and tempered in water. Frequently heating in closed vessels is dispensed with, and simple hardening means applied to the articles. In this case, for instance, ferro-cyanide of potash can be sprinkled on the articles after they have been heated to a brown red, and they are then tempered in water.

A number of means for regenerating burnt steel are in use, and either one or the other is recommended by their respective champions; some favor pure water, but others prefer stronger mixtures, of which we give a few receipts:

1. Ten parts of resin, five parts of fish oil, three parts of mutton fat. When employing this mixture the steel is heated to a dark red and quenched in the molten liquid, after which it can be tempered in the usual manner.

2. Ten parts of mutton fat, ten parts of linseed oil, one part of lampblack. This mixture is melted and the heated steel is dipped into it for one minute.—Werkmeister Zeitung.

A Water Spyglass.

A. McL. Hawkes, chief engineer of the Chilkoot Railroad & Transport Co., having to examine the bottom of a muddy stream, has devised what he calls a water spyglass. A wide-mouthed bottle, a cork, a candle and a piece of 3-inch gaspipe comprised the outfit necessary, and the only other accessories used were a jack knife with a corkscrew in it, an old tinpail and a clean pocket handkerchief. These were employed as follows: A pailful of the muddy water was first drawn and set aside; a hole was then made in the cork of a vaseline bottle with the corkscrew, and reamed out with the knife blade, and the cork was then forced on the end of the 2-inch pipe, which had been heated in the camp fire so that the hole was burned to exact size. The cork was next forced into the bottle, with the top of the cork slightly below the glass, and the hot grease from the lighted candle was allowed to run into this space, and a large mass of the grease was run about the rod and the neck of the bottle. A funnel was now made, out of the leaf of a fieldbook, and lined with the handkerchief, and enough water was decanted from the pail—which meanwhile had been acting as a settling basin—to fill the bottle and about 1 foot of the pipe; as this pipe was lowered into the water more water was

poured in to equalize the pressure. This outlet formed the spyglass, and objects were to be observed through it. Without the spyglass white objects, 6 inches square, could barely be seen through the muddy water at 1 foot depth; with it stones of any size and color could be seen 3 feet below the surface, and small stones 6 feet below. The only distinguishing colors, however, were black and white. Shining objects, such as brass and polished steel, could be very plainly observed. With another spyglass, made on similar lines, but filled with clear spring water, it was easy to see 16 feet into water which, without the glass, the white page of a fieldbook could only be dimly seen at a depth of 5 to 6 feet.

Cost of Rare Metals.

The following shows the cost of rare metals per pound, avoirdupois:

| | |
|---|-------------|
| 1. Gallium..... | \$68,600 00 |
| 2. Vanadium..... | 10,780 00 |
| 3. Rubidium..... | 9,800 00 |
| 4. Thorium..... | 8,330 00 |
| 5. Glucinium..... | 5,800 00 |
| 6. Calcium..... | 4,900 00 |
| 7. Lanthanum..... | 4,900 00 |
| 8. Lithium..... | 4,400 00 |
| 9. Indium..... | 4,400 00 |
| 10. Tantalum..... | 4,400 00 |
| 11. Yttrium..... | 4,400 00 |
| 12. Didymium..... | 4,400 00 |
| 13. Strontium..... | 4,300 00 |
| 14. Arium..... | 3,675 00 |
| 15. Erbium..... | 3,675 00 |
| 16. Ruthenium..... | 2,695 00 |
| 17. Niobium..... | 2,450 00 |
| 18. Rhodium..... | 2,450 00 |
| 19. Barium..... | 1,960 00 |
| 20. Titanium..... | 1,102 00 |
| 21. Zirconium..... | 1,040 00 |
| 22. Osmium..... | 1,040 00 |
| 23. Uranium..... | 980 00 |
| 24. Palladium..... | 580 00 |
| 25. Tellurium..... | 450 00 |
| 26. Chromium..... | 400 00 |
| 27. Gold..... | 300 00 |
| 28. Molybdenum..... | 245 00 |
| 29. Platinum..... | 144 00 |
| 30. Thallium..... | 122 50 |
| 31. Iridium..... | 112 00 |
| 32. Tungsten..... | 36 00 |
| 33. Potassium..... | 28 00 |
| 34. Selenium..... | 18 80 |
| 35. Cobalt..... | 6 00 |
| 36. Magnesium..... | 4 50 |
| 37. Bismuth..... | 2 75 |
| 38. Sodium..... | 2 50 |
| 39. Aluminum..... | 2 00 |
| 40. Manganese..... | 1 10 |
| 41. Cadmium..... | 1 00 |
| 42. Arsenic..... | 40 00 |
| Manganese, chemically pure, per lb..... | 160 00 |

A NEW KIND OF CARBON for arc lamps is reported to have been patented in Russia. It is made from 90 per cent of very pure carbon and 10 per cent of carburet of silicium, the ingredients being very finely pulverized and agglomerated with pitch. The carburet of silicium contains no volatile element and resists oxidation more than other substances, the carbon being necessary to make it a conductor. It is claimed that the duration of these carbons is 360 hours and that they not only save 25 per cent in current, but yield a richer tinted and stronger light than that of ordinary arc lamps.

THE rapid rise of the land about Hudson bay is said to be the most remarkable gradual upheaval of an extensive region ever known. Driftwood covered beaches are now 20 to 60 or 70 feet above the water, new islands have appeared, and many channels and all the old harbors have become too shallow for ships. At the present rate the shallow bay will disappear in a few centuries, adding a vast area of dry land or salt marsh to British territory in America.

THE Geddes & Seerie Stone Company of Colorado has filed a \$12,000 damage suit against the Pioneer Electric Power Company and the Union Light and Power Company in the United States Circuit Court. The damages are alleged to have been sustained through the failure of the company to perform its part of a contract entered into between the parties for the construction of a wall across Ogden canyon, Utah.

HUMAN talk can now be had over a telephone at a distance of 1800 miles, and conversations a distance of 1500 miles are common. There are now nearly 1,000,000 telephones connected with this country's service, employing a capitalization of about \$100,000,000. Every day about 17,000 employees make on an average more than 3,000,000 telephone connections.

Advertising a Bid for Publicity.

A party who has been continuously advertising more than thirty years said to me recently: "I advertise to be known—to keep known. I employ salesmen to sell my goods. I do not want my representative to enter a factory in California or Illinois and on presenting his card be met with the query: 'I never heard of your house; how long have you been in business?' We recognize that publicity is capital, and we spend thousands of dollars to keep our house before the public, and our salesmen have a great advantage over rivals who do not see the value of publicity."—Carriage Monthly.

PROF. SHALER does not believe that the ice age in America was caused by much more intense cold than is now known on this continent, but rather by an enormously increased fall of snow in the boreal regions of America, such as would follow an enlarged evaporation from adjacent seas. The glaciers of Greenland and northern Scandinavia are attributed in great measure to the Gulf Stream. If, then, the region about Behring strait should sink down enough to admit a large part of the Kuro Siwo or Japanese current into the Arctic sea, it is possible that the conditions would be furnished that would be necessary for the formation of our great ice sheet. Evidence is found around Mt. St. Elias that the adjacent shores of Alaska were once 4000 feet lower than they are now, a fact that lends color to a theory of this sort.

THE greatest known depths of the sea are in the South Atlantic ocean, midway between the Island of Tristan d'Acunha and the mouth of the Rio de la Plata. The bottom was there reached at a depth of 40,236 feet or seven and three-fifths miles. In the North Atlantic ocean, south of Newfoundland, soundings have been made to a depth of 4580 fathoms or 27,480 feet, while depths equaling 34,000 feet or six and a half miles are reported south of the Bermuda islands. The average depth of the Pacific ocean, between Japan and California, is a little over 2000 fathoms; between Chili and the Sandwich islands, 2500 fathoms, and between Chili and New Zealand, 1500 fathoms. The average depths of all the oceans is from 2000 to 2500 fathoms.

A CATALOGUE is the representative publication of a house—a sort of salesman. It is supposed to list and fully describe the kinds of merchandise for sale by the house. As to its use, the catalogue usually presupposes an interest in the goods it describes either among consumers who have asked for it or among dealers. Its mission is, therefore, to satisfy an existing demand rather than to create one. As a salesman, the catalogue should show samples, where possible, by means of illustrations, which portray the articles of merchandise, etc., in as realistic a manner as their nature permits. The description which is given of each article should be complete enough to satisfy the curiosity at least of the reader and to give him a thorough understanding of its points of usefulness.

AN employe of one of the underground trolley roads in this city apparently received a discharge of 2000 volts through his arms a few days ago and was not killed. He entered the conduit through a manhole in order to remedy some defect; but, while climbing out after completing his task, accidentally placed both hands on the channel rail. He was instantly rendered unconscious and was picked up apparently dead, but soon revived and had only some severe burns on the hands to remind him of his carelessness. The full strength of the current was 2000 volts.—N. Y. Medical Record, Aug. 13th.

THE first telephone was constructed in 1877, between Boston and Somerville, Mass., a distance of three miles.

Mining Summary.

CALIFORNIA.

Amador.

Pres. Pearce of the Blue Lakes Co., after a trip to the lakes and having made a survey of the water, stated at Jackson that the company has enough water to supply patrons with one-half the amount they have been using to operate their property, until Jan. 1, 1899. The prospecting work on the Spagnoli at Clinton continues systematically. The level at the 100-foot station is in 40 feet on a vein from 24 to 36 inches thick, which assays from \$50 to \$75 per ton and contains 3 percent sulphurets.

Record: At the Lincoln mine, Sutter Creek, work is progressing satisfactorily. The shaft has been sunk and timbered 218 feet; good progress is made in sinking; in two weeks 50 feet has been sunk and timbered. Some good quartz has been found. The 10-stamp mill at the Pocahontas mine, Drytown, is nearing completion. They have struck the same ore on the lower level that they had in the upper crosscuts. The Wildman and Mahoney mills are hung up because the Blue Lakes Water Co. fail to furnish the usual water supply.

Republican: The Kennedy M. & M. Co., Jackson, bought the Massa ranch, \$3000 cash and \$7000 later on. It is said that this purchase includes the Jackson Gate mine. The Keystone mine and mill at Amador City are idle, and it is probable that work will not be resumed for some time for scarcity of water. The water in the old Morgan shaft is being drained by the tunnel the Butte Basin M. Co. is running. The South Eureka is working as usual and shows no signs of idleness.

Butte.

In the Golden Gate mine, near Lovelock, twelve men are at work. A tunnel is in 3500 feet and gravel has been reached.

Oroville Register: Nine teams came out from Biggs last week with lumber and other material for two new dredgers that are to be built on Feather river. Six men came out to work on one and seven on the other.

Oroville Mercury: At Yankee Hill the Clark claim is running on good pay ground. It is locally reported that the Buchanan Hill mine is to start work soon. J. McConnell has struck an old river channel which prospects well. It is 300 feet above the present river bed. The Scott & Stone claim at Murphy Hill will begin work shortly. The mining enterprise for the development of the North Fork of Feather river is in a very promising condition. It was thought at first impossible to transport the necessary machinery to make the work successful. In fact, because of this, the North Fork has never been worked except under the benches and bars, and the bed of the river is known to be virgin ground. All along the sides of the North Fork miners for years have earned wages by use of the old-time methods, and the many tributaries have been worked with good success since the early days of mining. However, all the machinery necessary for the work is on the ground, having been taken over gulches, difficult to even climb. The company controls eight miles of the river bed.

Calaveras.

(Special Correspondence).—The Fellowcraft and San Andreas mines near San Andreas were sold yesterday by A. N. Lewis and J. W. Provand of San Francisco to J. M. Lively, representing southern Ohio capitalists for \$100,000. The Fellowcraft has a 250-foot shaft, several crosscuts and a 10-stamp mill. The property has been idle some time. Work will begin Sept. 1, by unwatering the shaft. San Andreas, Aug. 25th, '98.

C. J. Decker has bought the Keystone and Bonanza King mines in Railroad Flat district for \$30,000, the payments to be made at the rate of 25 percent of the gross proceeds. A shaft will be sunk 500 feet before any levels are run or stopping done.

Lumber is distributed along the line of the flume being built by the Utica Co. from Downs Landing. The work of building has begun. The company estimates its expenditures on this work at about \$50,000.

At San Andreas, C. J. Decker bought the Keystone and Bonanza King mines for \$30,000. The Keystone has a 9-stamp mill. M. Emery of the Rose Hill mine has bought the half interest in the Pillsbury reservoir and the Italian reservoir, near El Dorado, together with all water rights, and will place them in good condition to furnish power at the Rose Hill.

Chronicle: The Mokelumne & Campo Seco Canal Co., will build a large storage reservoir up in the mountains. In a few weeks fifty men will be set at work. The stream the company intends to dam is the Little Mokelumne. The proposed work will cost in the neighborhood of \$10,000 and when completed will obviate all shortage of water in this section in the future. While crosscutting at the 700 level in the Ford mine, near San Andreas, a 20-foot wide vein was found that is of fair grade.

Del Norte.

The Jones Creek M. Co. near Crescent City has suspended operations for the summer on account of failure of water. The claim is in good condition and a profitable run is expected next winter. At closing down a streak of gravel had been reached yielding coarse gold intermixed with quartz.

El Dorado.

Near Josephine, Shultz & Root are running a tunnel on a 3-foot wide ledge of fair grade ore. The Cash Rock M. Co. is working a large crew.

Democrat: Work on the new mill and electric power plant at the Griffith mine, Diamond Springs, is progressing. The electric power will be furnished by the plant projected by J. J. Crawford. E. W. Chapman has put costly machinery on the Gold Note mine,

Omo Ranch, and is giving employment to seventy men.

Inyo.

Montgomery Bros. at the Weaver mill at Ballerai cleaned up eighteen pounds of bullion, or \$4000, on ore from Tuber canyon.

The Independent says that a plant will be erected within ninety days at the borax marsh capable of manufacturing 100 tons of refined borax per month, and within six months borax will be placed on the market at the rate of 100 tons per month.

Independent: The new smelter of the Inyo D. Co. on the Sorbi-Lane mine, near Darwin, is a success. Twenty-five tons of ore are daily reduced.

Register: The first shipment of bullion from the Darwin smelter amounts to twenty tons. The smelter is running steadily.

Kern.

A cyanide plant is to be built at the Eureka mill, Randsburg, with three tanks of ten tons each. One and a quarter pounds of cyanide are used to a ton of tailings assaying from \$10 to \$20. Usually tailings require four or five days' submersion in the cyanide solution, but it has been found that sixty hours' submersion is sufficient for the ores of that district.

Los Angeles Review: In the Butte mine at Randsburg at the 280-foot level several men are stopping. The ledge is 4 feet wide and the ore runs from \$200 to \$400 per ton. At this level 100 feet of stopping ground has been blocked out. A 2-foot ledge of good ore was uncovered at the 321-foot level. In the 378-foot level a ledge of hard, bluish-colored rock was uncovered, carrying both free gold and sulphurets. At the 480-foot level this same rock was found and it appears again in the main shaft at a depth of 500 feet, the vein being 7 feet wide. At a test run of four tons from the 480-foot level the result was \$18 per ton free gold, \$2 per ton tailings and \$104 per ton sulphurets.

Randsburg Miner: The Red Dog mill at Johannesburg has been running entirely on Butte ore the past week. Work on the Windy mine is active. Ten men are employed and two shafts being sunk on different ledges. More prospecting is going on about this section just now than at any time during the past year, and several very promising claims have been located which give evidence of good results. At Randsburg only high-grade ore is being hauled to the mills controlled by the Yellow Aster people. All the low-grade ore is saved until the company's mill is in operation. A strike has been made in the Buckboard mine, beyond the Stringer district, of ore 2 feet in width at 90 feet depth of high grade. The Wedge mine will soon begin sinking the shaft to 1000 feet depth. The company is taking out good ore.

Los Angeles.

W. A. Perry, who has a bond on the Ojer mine, in the Holcomb valley district, is developing the property. There are several custom mills operating in that section.

Mariposa.

(Special Correspondence).—Dillon & Co. have the Porter mine on the west belt under lease and bond. A 2-stamp prospecting mill has been placed on the property.

After a shut down of three weeks for the purpose of making necessary underground connections, the Louisiana mill has resumed work. The mine is reported looking unusually well just now.

Chicago parties have bonded the Murphy mine in White's gulch and are sinking a new shaft.

The Merced Co. is making extensive improvements at the Mary Harrison. New boiler and shaft houses are under way and the great hoisting engine formerly at the Louise will be placed here. The new galloways frame, 100 feet high, will contain grizzlies, crusher and ore bins; skips will replace the present cages and cars will load direct at the collar of the shaft. A 10-ton locomotive will take the place of mules on the tramway. The mill is expected to start about Sept. 1st, the water on hand being thought sufficient to last till the rains. The mine is in shape for a long run and large amounts of wood are being delivered. If the present mill run starts satisfactorily that \$3 assessment will be called at last, and after repaying the money borrowed for the development of the past nine months further additions will be made to the plant.

The Compromise has been unwatered to the 300 level and found in good condition, with considerable milling ore in the faces. The mill is running steadily on ores from near the surface.

The prospecting work in the McAlpine has uncovered good ore once more and operations are suspended while arranging for money to work on a larger scale.

The Contention is closed indefinitely, and nothing is being done on the Garibaldi, near by.

J. S. Jayquith succeeds J. Gowie as Supt. Big Betsy. About thirty men are employed on development work and the company has bonded a number of adjacent claims.

Owing to dissensions among the owners the Selleck mine and mill have been sold by the sheriff. Mr. Selleck repurchased the property.

An unusual amount of work is in progress throughout the whole Sherlock district.

Bear Valley, Cal., Aug. 23d, '98.

Gazette: Mrs. Merck is taking ore from her mine that yields \$20 a ton. She has been in the mining business for thirty years. J. D. Ludwig is sending ore to the Yellowstone mill at Bear Valley.

Nevada.

Transcript: This week water was turned into the Electric Power Co.'s new pipe line leading from Rock creek, for the first time. This line gives a 700-foot pressure for the works on the South Yuba, and will effect a saving of two-thirds over the old line in the amount of water required to run the machinery.

Transcript: At the Delaware drift mine

near Nevada City, which has paid large profits for a long time, the machinery has been taken down. Recently a ledge of favorable looking quartz was struck, but proved of no value. The channel within the boundaries of the claim has been worked out. A force is cleaning and retimbering the Midnight mine.

Placer.

The statement of the Pioneer Mining Co. for twenty-six days in July shows: Tons rock crushed, 3902; value gold bars, \$4768; payroll, \$9222; bills, \$695; total expenses, \$3917; net earnings, \$850; average value rock, \$13.17; men employed, 44. The water supply diminished steadily during the month, but it has been a favorable time for constructing the dam, which is about completed. When finished and the new electric plant installed, there will be sufficient power for all purposes.

The shaft in the Marguerite mine near Auburn has reached 400 feet. The company will continue sinking for three months and then begin running drifts.

Plumas.

The Four Hills quartz mine, near Johnsville, has a 4-foot ledge of good milling ore. The company proposes to build a mill on the property early next spring. The property is owned by San Francisco people. The Cameron mine, in Butt valley, has driven 1150 feet of tunnel. The body of gravel is 80 feet wide and is said to pay \$10 a day to the man. Five men are employed. The Dunn Bros. have considerable ore on the dump and are crushing from three to five tons a day.

San Diego.

The San Diego court has rendered judgment in favor of the plaintiff for \$341.85 in the case of Paul J. Johnson vs. the Senator M. Co. et al.: The Buena Vista, General Hart and Susan Dutton gold quartz mining claims, together with a 20-stamp mill, buildings, improvements and appurtenances, which are ordered to be sold to satisfy the judgment.

Sierra.

The Arctic Co. at Sierra valley are running an incline into the channel and will thoroughly prospect it.

Shasta.

At Copper City exploration on the Bully Hill properties continues successfully. The depth reached through tunnel workings is 400 feet. The ledge varies from 5 to 8 feet and is sulphide ore. Sixty tons a month are shipped to Selby's at a cost of \$20 a ton from the mine to the smelter. Hugh McDonnell and J. Sallee are developing the property. The Menzel & Pugh claims near Shasta have a tunnel 150 feet. The ore vein is from 3 to 22 inches wide and carries gold, but the greater values are in the sulphurets. Supt. Kemp of the Boston-Montana Co. on Stillwater, has received instructions to increase the force on development work, which is at present being pushed on various portions of the property.

The mills about French Gulch are unable to run, as there is not enough water for the batteries. J. Cannon, leasing at the Washington mine, has struck a 1-foot ledge of good ore and is shipping to the smelter at Vallejo. Development work at the Niagara mine continues with satisfactory results.

The Mt. Shasta mine, near Shasta, is shipping ten tons of ore a day that smelts \$40 a ton. Twenty men are employed. The shaft is 120 feet deep and several hundred feet of levels have been run, all in ore. The Van Ness mine, near Bragdon, is producing good results in the systematic development work being done. The Iron Mountain Investment Co. has bought the Westbourne and the Arlington quartz properties in Flat Creek mining district.

Courier: The 10-stamp mill at the Spanish mine, near Shasta, makes only short runs at present on account of the limited water supply. The case of the Government vs. Mt. Copper Co. will be heard by Judge Morrow on October 10th.

Siskiyou.

(Special Correspondence).—The Schroeder Con. mine, seven miles from Redding, it is currently stated, will soon have a new mill to replace the one destroyed by fire about a year ago. The property comprises five patented claims and has been a good producer. Since the burning of the mill work has not been neglected in the mine. There are over 4000 feet of tunnels, in all of which the vein averages 5 feet in width. At 1200 feet depth one tunnel cuts an ore body 100 feet wide, in which 4 feet have produced \$132 a ton. The formation is porphyry. J. H. C. Schroeder of Yreka is the owner.

Yreka, Aug. 22nd, '98.

The company prospecting the Yreka creek basin, near Yreka, has forty-eight more prospect holes to sink to bedrock in testing the ground at McNulty's place, upon which an option has been secured. Probably in another month or so the company will complete the entire prospecting from Hawkinsville to the Yreka boundary, when definite knowledge will be secured as to what may be obtained from the stretch of country tested, extending over an area of two miles in length and between high bedrock on both sides of the creek bottom. A. Smith, of the Pacific mine at the mouth of Humbug creek, Klamath river, has succeeded in getting the claim unwatered again. The bottoming is to be widened to a greater area. The bedrock gravel in this claim prospected well where tested, and if the men can hoist gravel without interruption a good amount of gold will be realized this season.

Near Cecilville S. A. Cunzetti has six men employed and is taking out considerable gold. The Deep Bank M. Co. had only a three month's run on account of the short water season. The returns were satisfactory. The final payment on the Thompson placer claim was made on the 6th. Steele & Maiben have done much development work on the property since buying and intend to put in giant and pipe next season. The Sumer-

ville Hydraulic M. Co. paid a good dividend this year.

Trinity.

C. Jensen is developing a 15-inch vein near Junction City. The La Grange Hydraulic Co. near Weaverville have sufficient water to run five hours a day.

The Chloride-Bailey mine on Canyon creek has fifty-six men in the mine and thirty men building a road from Dedrick to the mine. A. J. Helson is taking good ore from the Ridgeway mine near New River. On the White Elephant mine development work is being pushed. A ledge of fair grade ore has been found.

Tuoimne.

At Big Oak Flat, M. Cleveland is having rock tested at the Butler mill. Sheban Bros. are doing prospect work on their ranch. The Butler is putting up a new hoist.

The mill at the Moody mine will be in operation soon. At the Mountain Lily mine, Columbia, six men are at work. The Over mine is putting up a gasoline hoist and will push sinking. At the Little Mint mine work has been resumed.

From Sonora it is reported that J. M. Meighan has returned from Boston, where he formed a company for the operation of the Mt. Jefferson mine at Groveland. The company has been incorporated under the laws of Maine, and much of the capital stock has been subscribed. Last winter about 400 tons was milled, averaging \$18 a ton. A new 60 H. P. hoist and a new 10-stamp mill will be in operation Jan. 1st, '99.

Democrat: The new mill on the Carlotta and Pennsylvania is dropping its stamps. Good rock is taken from the Hope. Resumption of work on the Agnes shows good results.

Sinking has been discontinued in the Rappahannock. Crosscutting from the 1100 level is in progress. W. E. Booker has bonded to Dean & Stevenson of San Francisco 309 acres of the Brunell ranch, near Sonora. The bond expires in ninety days and calls for the payment of \$5500 should the property be taken. The mine has some development. The vein shows from 3 1/2 to 4 feet of quartz, and at the surface milled \$6 per ton.

NEVADA.

The latest shipments of concentrates from the Dexter mine at Tuscarora show a value of \$330 in gold and sixteen ounces in silver. The bullion output of the mine averages about \$30,000 a month.

The Glasgow & Western M. Co. at Cherry Creek have let a contract for the building of a concentrator at Six Mile springs. The plant will have a capacity of 100 tons of crude ore daily; the ore will be from the Star mine, in which a body has been found yielding gold, silver and lead. The mill product will be sent to the smelter at Golconda, where a third furnace is being put in. The North Mountain mine at Cherry Creek, owned by John Dern & Co. of Salt Lake City, will soon make dividend-paying shipments.

At Virginia City, as soon as the second ore bin at the Justice mine is full, work will be suspended in the whim shaft and operations resumed through the Woodville shaft. The station on the 370 level has been repaired and a drift will be run to the Barclay shaft. The Washoe mill, the property of the Justice Co., will run on rock from the above mine. It is locally reported that the Logan & Hully mill at Como will start shortly.

OREGON.

(Special Correspondence).—Contracts have been let for building a wagon road from Glendale to the Gold Bug mine, recently purchased by Senator and Sam Jones; a 20-stamp mill will be erected on the property at once.

The Green Back mine, at Placer, has been purchased by W. J. Cartan and E. Smith of Denver, Colo.; a compressor and hoisting plant will be put on the property at once and extensive development work pushed rapidly. Leland, Aug. 21st, '98.

The Miller & Dysert placers near Grants Pass were sold last week to S. W. Ferguson and others of San Francisco, for \$15,000. The gentlemen buying this property have also secured bonds on adjoining properties. The new owners of the Sugar Pine mine have struck a good body of ore.

Epigram: Sloan & Haskell, the veteran Susanville placer miners, arrived in Baker City last week with about \$10,000—the result of their labors for '98. About \$4000 of this gold ranged in weight from \$1 to upwards of \$100; the remainder, or about \$6000, was in fine dust. The mines from which this gold came have recently been sold by Sloan & Haskell for \$8000, they retaining a small portion of their holdings for future working. Mr. Sloan has also sold to the Badger M. Co. his group of ten quartz claims, located near Susanville, for \$50,000. One of this group of mines, the Bull of the Woods, recently yielded 115 ounces of gold after a twenty-six days' run with an 8-stamp mill. A 4-foot vein of high-grade free-milling ore was found the first of the week in the Rachael mining property, near Baker City.

Democrat: Supt. Nelson of the Beaver G. M. Co. and of the Robbins mine has put a force at work on the Robbins mine near Baker City cleaning out crosscuts, drifts, etc., and relaying track preparatory to further working of the mine. This mine was shut down three years ago for want of capital. The mine was recently sold to people of Pittsburg, Pa.—The Capt. Jack ledge, 6 feet wide and assaying \$30 per ton, has been cut 150 feet below the surface in tunnel No. 2 by the Beaver G. M. Co.—The Baisley-Elkhorn mine is shipping bullion twice a month and sacking some high-grade ore.—The Collateral-Virtue mines from a partial cleanup obtained 104 1/2 ounces gold, over \$1800. The mill has been running only a few days and a full cleanup will not occur until later.

WASHINGTON.

Near Silverton the tunnel on the Hoodoo mine is being driven and the property is in

condition to be made productive so soon as the Everett & Monte Cristo railway is finished. —The tunnel on the Eclipse has reached 500 feet. —Development continues on the Bonanza, the White Rock, Eagle, and Big Bear. —The El Dorado M. Co. is doing extension work, which is in progress day and night. —M. Haber, the German mining expert, has made the first payment on the option secured last fall on a group of mining claims in the Troublesome mining district near Galena, for \$50,000. He expended \$30,000 in prospecting the property before closing the deal, and at present has forty men employed. —The Republic mill at Republic is running night and day on good ore.

BRITISH COLUMBIA.

Thirty inches of ore is showing in the Bosum shaft, Slocan, and galena is taken from the tunnel. On the Mollie Hughes the showings in all workings are improving. —A strike of 3 inches of galena was made last week on the Eclipse.

A carload of ore was shipped last week from the Giant mine near Rossland. The lead in the Giant runs diagonally across the claim, giving it a length of 1600 feet. The soil has been removed at intervals along its course exposing the vein to a width of 25 feet. Rock from any part of this is impregnated with arsenical iron and molybdenum, carrying good values in gold. Where the ore is taken for shipment shows no difference from any other part. A crosscut tunnel is in upwards of 300 feet to catch the ore chute at a depth of about 150 and sinking on the lead is also in progress. —The Thistle, Pansy and Anderson claims at Albion have been sold to parties from Salt Lake City for \$20,000. G. Kislinsky Supt., representing the company, has fourteen men at work on the Thistle. —The Canadian Pacific Exploration Co., operating the Porto Rico near Ymir, has sixty men at work in the underground development, and grading for the new stamp mill.

The Le Roi mine at Rossland has 140 men employed in development work. —Ore shipments from Rossland last week were 1215 tons; total for the year, 55,320 tons. —The Antoine in the Slocan is shipping 100 tons of ore this month. —The tunnel in the Payne mine near Sandon is 1400 feet long. This property has paid dividends amounting to \$300,000. —The American Boy mine is running a new tunnel to cut the vein at 1000 feet depth. —The Payne's ore shipments amount to 10,000 tons. —The Slocan Star has a daily capacity of 150 tons. It has paid in dividends about \$400,000.

The North Star Co., East Kootenay, has shipped nearly 3000 tons of ore the past three months. The company is doing assessment work on twenty-one claims. They will sink a shaft 300 feet on the North Star mine. —Hamilton Bros. are working the Bellview claim and have a tunnel in 130 feet, on 6 feet of galena with a high percentage of silver. —The Canadian Pacific Exploration Co., operating the Porto Rico near Ymir, has sixty men at work on development and grading for the new stamp mill.

The Last Chance, in the Slocan, is again shipping ore, and Engineer Riblet is surveying for an aerial tramway to the K. & S. railway. —The Athabasca Gold Mine, Ltd., expects to drop the stamps for the first time in the new 10-stamp mill being built on the property in Nelson division Sept. 1st.

The B. C. Mining Critic, noting that the ores at the Trail smelter produce 1000 pounds of lead to the ton, and the smelter, running at full capacity 300 days in the year, would output 22,500 tons of lead, questions that the Trail output will command the home market, and that the experiment will give rise to the discussion of the lead question from the standpoint of a national industry.

The Ymir Miner estimates the number of men employed in the eight or ten properties working in that camp at 250.

ALASKA.

The company operating the upper river boats on the Yukon will build a railroad from the foot of the lake to the portage—thirty miles.

The steamer Brunswick arrived at San Francisco on the 24th inst. from St. Michael, bringing twenty-five passengers from the mouth of the Yukon and about \$200,000 in gold from the Klondike. Most of the men have been in from two to six years. They report work slack, owing to the heavy royalty, as miners do less work in order to escape the odious tax, and many leave their claims, going to the American side, in the hope that the royalty will be modified, when they expect to return to British soil.

UTAH.

The output of the Ophir Con. mine at Ophir this month will reach 1000 tons of concentrates. —In the North Star at Tintic are two classes of ore. The one shows seventy-two ounces silver and \$27 in gold, while the other shows a valuation of twenty-five ounces silver, 45 per cent lead and over \$4 in gold. The new body was found in a winze off the 300-foot level, and is described as the strongest in the mine. —The cost of the new mill on the Silver King mine, at Park City, which will have a capacity of 150 tons a day, is estimated to be \$100,000. It will be equipped with electric power and modern methods for the economical milling of ores. The Silver King has paid dividends to the amount of \$1,649,500.

The Sioux-Ajax tunnel at Mammoth has reached 4000 feet. It will soon make connection with the properties of the Sioux Con. M. Co., when extensive prospecting is to be undertaken. —Another good ore body has been found in the Julia Dean mine at Bingham. It is in an old upraise, which was lifted by leasers last year and abandoned. Work was begun where they left off, and within 3 feet ore began to fall. In one day upwards of three tons of unsorted ore that averages

over 100 ounces silver and is well up in lead were housed. —The Dalton & Lark employs thirty-seven men, mostly in the 800 and 850 levels. In the latter there are 2 feet of ore carrying 20 per cent copper, 22 per cent lead and thirty-six ounces silver. The 10-stamp mill is turning out a carload of concentrates per day.

Near Richfield in the Nancy Hanks gravel mine Chaffin & Hoy cleaned up \$7000. —Work is practically suspended throughout the district in July and August owing to the hot weather, but operations will commence in a few weeks. —M. J. Ryan is pushing work on the California bar, and T. O'Keefe is sluicing on his Santa Rosa claim and doing well.

Last week's shipments from Tintic were sixty-seven cars of ore, twelve of concentrates and ten bars of bullion. —From Silver City was shipped forty-two carloads of ore. —Park City shipped 1,690,710 pounds of concentrates.

—The Bullion-Beck at Eureka, which has not been among the regular shippers for several months, began shipping last week, the smelter having contracted to take the entire output until Jan. 1st. —If the tests that are being made for the Winnamuck at Bingham prove satisfactory, a mill will be built on the property next season. —The Rustler mine at Alta is marketing ores that assay 60 per cent lead and ninety ounces silver per ton. A tunnel is in on this property 1200 feet and the ledge is 3 feet wide.

Tribune: Upon the site of the Old Crescent mill at Park City, recently wiped out by fire, J. H. McGregor of the Crescent M. Co. is engaged in the installation of a set of jigs that will put fifty tons of crude ore daily into concentrates. There are several thousand tons of ore on the dump awaiting treatment. —The plans and specifications for the Highland Boy smelter at Bingham have been approved by the company, and the breaking of ground for the big plant is to begin at once. The builders hope to have it in operation by Jan. 1st. —Since the closing of the new contract with the German smelter, the Bullion-Beck has sent fifty cars of ore, and the marketing of that allowed to accumulate during idle intervals will be carried on as rapidly as possible. The earnings of the company during the last fifteen days of the present month are expected to show it capable of producing as much ore as at any time in its career. —At Provo a mining sale took place this week under the sheriff's hammer of a number of the Ozokerite M. Co.'s claims. R. J. Kroupa brought action against the company recently for \$3600, for services performed as Mgr. He obtained, by default, judgment for the amount. The property is estimated to be worth \$40,000.

IDaho.

In the Zenith mine near Florence high grade ore has been found. The ore body is 3 feet in width.

At Idaho City a \$5000 payment was made on the Lucky Boy mine last week. The mine is bonded to Pittsburg men for \$20,000. A payment of \$2000 will be made each month.

At Wallace the Helena Frisco Co. is cutting a station on the 1600-foot level, in which a Riedler pump will be placed. —Work has begun on a tunnel in the Colwyn mine at Wallace, contracted to run 900 feet. —Last week a strike was made in the Black Bear of ore 8 feet wide assaying 65 per cent lead and thirty ounces silver. The Black Bear was worked extensively years ago and yielded good returns, but during the financial panic it was mortgaged and has since lain idle.

The mill at Custer is being operated by the Lucky Boy M. Co. with good results. Ore is being extracted from the Lucky Boy mine, hauled to the tramway and dropped to the mill, 3500 feet down the side of the mountain, with a descent of over 1300 feet. This wire rope tram has done duty seventeen years, with only three changes of rope. The mill is reducing thirty-five tons of ore per day. The tailings are piled up in the yard, and will be worked in future. Up to one year ago the tailings floated down the Salmon because they were thought worthless. When cold weather comes the mill will close for the winter.

J. Hutchinson, Mgr. Trade Dollar mine at Salmon City, after an investigation says of the Seven Devils country that the work that is going on there now will make that camp one of the best in the country in the next two years, or it will demonstrate that it is merely a surface cropping. The showing already made, however, is not such as to discourage those operating there.

Press: Near Wallace, in the Black Bear mine, last week ore was struck in the lower tunnel, 8 feet wide, 2 feet of which is almost pure galena, assaying 65 per cent lead and thirty ounces silver, and the remainder concentrating ore. The old tunnel was extended from the original direction over 900 feet when the ore body was struck. The depth from the upper workings is 330 feet, so an amount of ground will soon be opened up. Some years ago the mine yielded handsomely, but it was managed badly and the owners in the East became dissatisfied and the works were closed down. —The Republic mine, Lemhi county, produced \$63,000 worth of ore in July. The shipments to the smelter were 293 tons, averaging \$174 to the ton, making about \$50,900 and the product of the mill was \$12,000.

Statesman: The Comoro mine near Albion has a tunnel on the ledge 308 feet, and from this they have taken 250 tons of ore that assays on the dump from \$24 to \$25. One block of ore weighing 440 pounds assayed \$34 in gold, sixteen ounces in silver, 53 per cent lead and 1.4 per cent copper. Four shafts have been sunk and show the vein to run from 3 to 5 feet wide. One shipment from these shafts assayed \$47.25. —About eighteen carloads of ore have been shipped from Badger, Jennie and Melcher, all paying well. The first car from the Badger of seventeen tons returned \$1325, showing a gold value of \$57 per ton.

Weiser Signal: E. L. Ford of Colorado has bought eight-twelfths of the Placer Basin group of gold properties for \$21,333, paying

\$4000 down, the other payments to be made soon. The remaining four-twelfths which have not yet been bought are owned by J. Bourne of Portland and H. G. Siskron of San Francisco. It is locally reported that a complete mining and milling plant will be put up and the mine turned into a heavy producer.

Avantech: In the Flint mines near Silver City the mill has been shut down on account of shortage of water, but the work in the mine is being continued with twenty-five men. The drifts in the 400-foot level of the Rising Star are being pushed. Ore is being bagged for shipment.

MONTANA.

The New Departure Co. at Dillon, the Graeter Co. in Bowhead county, and the Graves Dredge Co., are all operating dredges successfully. The latter company's plant is run by electricity. The Bon Accord Co., an English corporation, has completed its dredge and begun work. The M. A. Gibson, built a year ago, is still in successful operation. A New Jersey company is building a dredge, and will build two more next season. Coal is used for fuel in preference to wood.

T. G. Merrill at Clancy is sinking from the 400 level in the Liverpool mine to 600 feet depth. The ore in this property runs from 400 to 1550 ounces silver per ton. Since 1892 this mine has produced \$500,000.

At Clancy Bailey & Leary have taken a bond on the King Solomon mine for twenty-one months from Aug. 2 for \$20,000, and the royalty, 15 per cent, to apply on bond. The King Solomon is a silver property, carload lots having in the past been shipped from it netting more than \$3000 at the present price of silver. —The Magpie and Blaine claims at Boulder have been bonded to E. D. Sullivan for \$25,000.

Butte Miner: The Anaconda has ordered a new hoist for the High Ore mine, to be made of steel and capable of a depth of 4000 feet. A crosscut has been run from the 1600, and with diamond drills the company has explored, following the lead 1000 feet deeper than the deepest shaft in the camp. High-grade copper ore has been brought up by the drills. It is stated that in future the Anaconda Co. will put in steel hoists when replacing the old ones capable of operating the mines down at least 4000 feet. —It is expected that the trouble over the Nippur claim of the M. O. P. with the Anaconda Co. will soon be adjusted and shipments of ore resumed. The Nippur, which is the property of Heinze and associates, has developed into a producer, and there is a large body of high-grade copper and silver, from which shipments were made up to the time of the injunction. The silver values in the Nippur ores run higher in proportion to the copper than in any of the big mines of Butte, with the exception of the syndicate group of the Anaconda Co. —At Phillipsburg last week the Granite bimetallic mining properties were closed down, the miners and all others, except a watchman and one or two men, were laid off without date.

COLORADO.

BOULDER COUNTY.

The Culbertson mill at Boulder, from a shipment of two cars of \$5 mill dirt from the Big Five, showed a saving of 90 per cent concentrated seven into one. A shipment from the Star returned a saving of 90 per cent, and a twenty into one concentration from the No. 5 mine showed a saving of 84 per cent.

The Crown Point mining property at Eldora has been sold to Lang & Moor for \$17,000. Developments prove this to be a good free gold proposition of high grade. A tunnel has been started that will cut the ledge 1000 feet deep.

CLEAR CREEK COUNTY.

(Special Correspondence). —The Georgetown district, in Clear Creek county, includes the properties around Georgetown, Silver Plume, Empire, Silver Creek and Lawson. The largest mines are near Silver Plume and consist of the Mendota, Pelican-Dives, Smuggler, Seven-thirty, Dunderburg, Pay Rock and Cory City, which are all regular shippers. The Dunderburg, Seven-thirty, Pelican, Pay Rock and Cory City have similar ores, averaging 200 ounces silver, 15 per cent lead, with some zinc. The Mendota and Smuggler groups are heavy lead producers, averaging 50 per cent lead, 60 ounces silver and $\frac{1}{4}$ ounce gold.

At Georgetown the Centennial produces an ore which averages about 20 ounces silver, 2 ounces gold, 8 per cent copper and 8 per cent lead. The Griffith, in the same locality, yields ore averaging 50 ounces silver, 1 ounce gold, 20 per cent lead and 5 per cent copper. The Doric tunnel is a big enterprise at Georgetown. Thus far it has been driven in about 3000 feet and if continued will cut the Griffith, Richmond and Hood lodes.

Up Leavenworth gulch from Georgetown are the Kirtley, Aliundi, Equator and others. The Kirtley has shipped ore which averaged 500 ounces silver and 25 per cent lead. The Aliundi ore is also very high grade.

The Moscovite, Mineral Chief, New Boston and Smith & Wesson, near Georgetown, produce high-grade lead ore, much of it running 60 per cent in lead, 12 ounces silver and \$2 gold. The Polar Star and Rogers ship ore averaging 250 ounces silver.

Silver Creek, which is 2000 feet above the railroad at Lawson, is the location of the American Sisters and the Joe Reynolds, which are producers of high-grade silver ore with some lead. The Joe Reynolds has a well-known lead as a producer for many years. It is developed through a tunnel 624 feet long, at the breast of which a shaft sinks 700 feet, from which nine levels are run on each side; from the tunnel an upraise goes 400 feet vertically, making development 1100 feet deep on the vein. The ore now produced runs from 60 ounces to 350 ounces silver.

The Georgetown district shipped an average of over 1000 tons of ore per month for 1897. It is assumed the record for 1898 will be about the same. The cash paid mine operators for ore during 1897, after deducting freight,

sampling and smelting charges, amounted to \$704,000.

Most of the work progresses under the leasing system, which proves very satisfactory. The royalties paid will average about 40 per cent. The lessees, when they hire help, pay \$3 per day. The wages paid by mine owners, where they operate the mines themselves, is \$2 50 per day.

At Empire there are two mills operating. The Atlantic mill was closed up by the mortgagees on the 9th inst. —Wascott. Georgetown, Colo., Aug. 10th, '98.

Near Georgetown, a strike is reported said to run \$280 per ton. This is aside from the silver, which runs 222 ounces to the ton.

CUSTER COUNTY.

The Terrible mine at Isle has enlarged its mill to a 200-ton per day capacity. The mine was at one time a producer of lead carbonate, known as cerussite—the crystallized carbonate. Greater depths have produced a change in the character of the ore, which now requires concentration.

EL PASO COUNTY.

Building the Southern Cross cyanide mill, Woodland Park, is being pushed, and it will probably be at work early in the fall. The mill will be fifty tons daily capacity.

At Victor the Victor gold mining report for the first six months of the year shows: Receipts from ore sales, \$361,304; expenses, \$123,724; net, \$237,580; cash on hand June 30th, \$130,894.

The Keystone, Cripple Creek district, is shipping ore in car lots running \$40 a ton. —The new Elkon strike is an ore shoot, 5 feet or more wide, 600 feet long, extending from the second to the fourth level. Screenings from it run \$200 per ton. —The McVickers-Sellar's lease on the Lucky Guss shipped ten sacks, ranging from \$195 to \$221 a ton. The strike was made in an abandoned shaft 60 feet deep. —A 4-foot lead of from \$10 to \$20 ore has been opened by Burns & Co. on the Lucky Guss. The Ashby lease on the same property marketed thirty tons of five-ounce ore. —The leasers on the Vindicator are taking out forty tons daily that runs \$90 per ton. The Vindicator mine is keeping up its production of 1600 tons, which is the maximum capacity of its equipment. —The Modoc has been shipping one car a day for two weeks. The ore is high grade. —The lessees on the Blue Bird are outputting thirty tons per day. —A car day is the output from the Baker lease on the Los Angeles. —An eighteen-ton shipment made by lessees from the Favorite ran 3.35 ounces.

—Sixty-eight tons of ore came from the Union properties last week. The better grade ran from \$600 to \$1000 per ton. —A 3-foot vein assaying from \$120 to \$180 has been discovered in the Lucky Taylor lease of the Dante at Victor. —J. K. Vannetta has secured a lease on the main workings of the Pharmacist for eighteen months with a royalty of 25 per cent. He is required to sink 200 feet, which will bring it to 665 feet.

H. Guyot has sold three claims near Victor to Boston men for \$11,000 cash. Guyot also sold two patented claims on Straub mountain, which will be prospected by a tunnel 1600 feet.

GILPIN COUNTY.

The Jones mine, near Nevadaville, has resumed work, cleaning out and repairing the shaft, preparatory to sinking. A mill test on the dirt ran \$10 per ton, and a shipment of smelting ore yielded \$118 per ton. The property has been idle a long time.

Lessees of the East Nottaway mine, near Central City, in five weeks took out about twenty tons of ore, for which they received returns of \$2757.99, with six tons yet to be accounted for.

GUNNISON COUNTY.

The Maid of Athens group and the Citizen group of mines at Pitkin have been sold for \$104,000, the cash payment amounting to \$46,000. The owners propose to do thorough development. Both groups have been idle for some years.

HINSDALE COUNTY.

C. E. Dewey, manager of the Hidden Treasure mine and mill, near Lake City, Colo., reports the new concentration mill running regularly on hard quartz and galena ores. The equipment consists of crushers, rolls, Wilfley tables and jigs. None of the ore is crushed finer than a 10-mesh. The concentrates shipped are about 60 per cent lead. The capacity of the mill is 100 tons per day. The power is water which also runs a dynamo for an electric hoist at the mine. A new air compressor is being put in for air drills.

The St. Jacobs mine at Carson is being unwatered. —Work on the Superior property at Carson will be started soon. This has produced many tons of first-class ore, but has been idle for some time, owing to litigation.

LAKE COUNTY.

The Dyatt lease on the 1200-foot shaft of the Gallagher mine, at Leadville, is shipping 125 tons daily of iron sulphides. Considerable new development work is under way. The water at this depth is not troublesome. —The Small Hopes M. Co., near Leadville, is working through its 1430-foot, three-compartment R. A. M. shaft. Eighteen teams are daily hauling three loads each of iron sulphides daily, which is equal to 360 tons. These mines are now the heaviest shippers in the district, and the ore body is said to be six sets high. This tonnage comes from the Marion-Cyclop and Venus leases which is bought by three different smelters in the State. The water from these workings is handled through the company's Robert Emmett shaft, which also handles the Mahala water as well as the overflow from the Maid of Erin and Wolfstone workings. —The lessees on the Wolfstone mine are sending to the smelter thirty-five tons of ore daily. The ore comes from the 700 level.

The Mab mine, Leadville, since getting good air by connection with the Mahala, is shipping daily seventy-five tons of lead sul-

phides to the smelters. This output will be increased as room is gained in the stopes.

LA PLATA COUNTY.

Near La Plata the Golden Rose is shipping ten tons per week. The ore runs five ounces gold per ton.—On the East Mancos the North Star mill is running night and day, crushing twenty-five tons per day.—The Yellow Eye is taking out shipping ore.

OURAY COUNTY.

Two hundred and twelve cars of ore were shipped from Ouray in August.—The shipment of ore from the Kheide and Bachelor in July was 150 tons. Only high-grade ore is shipped from these mines.

RIO GRANDE COUNTY.

The Homestake vein at Jasper has been cut at depth by a crosscut tunnel 160 feet long and shows a 7-foot vein of sulphide ore averaging \$11.65 per ton in gold. The tunnel cut through a 25-foot body of decomposed quartz carrying values of \$7 per ton.

SAN JUAN COUNTY.

The Esmeralda in the Minnie gulch district is shipping sixty tons monthly of \$40 ore. The vein varies from 6 to 24 inches and is worked by four men. The extension of the Esmeralda, the Bland, is also outputting good ore.

SAN MIGUEL COUNTY.

The Japan Mines Co., operating at Telluride, has purchased the Florida group of claims adjoining the Japan mine, for \$50,000.

Five mills for the treatment of ore have been added to San Miguel county since the beginning of the year. Two more will be built before the end of the year, while several are in contemplation for next year. The combined daily capacity of the mills erected and being built is 460 tons.

SAGUACHE COUNTY.

At Crestone Mathewson & Bangs are working copper property which returns \$60 in gold per ton, with a good percentage of copper.—The Gold Standard M. & M. Co. is still pushing development work.

NEW MEXICO.

(Special Correspondence).—W. J. Cartan has sold the Albemarle mine in Bernalillo county to the Cochiti G. M. Co., of Boston; the company is now operating successfully a modern 200-ton cyanide mill, all steel construction, and employing 250 men at Bland, Aug. 21st, '98.

Near Rinconado, the Copper Hill Co., composed of Colorado and New York capitalists, have developed a copper property and are placing machinery at the Rio Grande river three miles from the mine, from which the product for the present will be transported by wagon. The ore runs \$45 per ton in copper and carries some silver. J. P. Turner of Colorado Springs, Colo., is Gen. Mgr.

At Santa Rita 200 men are employed in the mines; the shipments of copper ore amount to over 600 tons per month. Eighty tons of iron ore are shipped daily to the smelters. The shipments of iron will be increased to 150 tons per day.—At Central, the Texas shaft has attained a depth of 428 feet. The foundations for the new mill are in place and the mill building nearly completed.—At Cooney, a big strike is reported upon the Queen mine of ore 5 feet in width assaying \$37 per ton, gold and silver.—At Mogollon, the Confidence mine, operated by the Helen Mining Co., is running steadily, employing about seventy miners and producing eighty tons of ore per day.

Bland Herald: The Albemarle plant, at Bland, with a capacity of 125 tons of ore per day and an ample supply of ore on hand in the dumps and stopes of the mine, has been completed and is running satisfactorily. It is understood that the present saving is 88½ per cent from \$10 ore and that this amount can be increased. As a first result, with new machinery and piping, this saving is considered high.

ARIZONA.

Near Ehrenburg at the Daisy mine the ledge is said to be 24 feet wide. The ore plates \$12 per ton and carries a good percentage of fair grade sulphur.

J. Potter of Salt Lake City has bonded several properties near Dos Cabezas, Cochise county, and will begin their development at once.—The Commonwealth M. Co. at Pearce intends to shortly erect a 20-stamp mill to take the place of its pulverizers, which are not giving satisfaction.—A tunnel in the West Oro Bonito mine, Tiger district, Yavapai county, exposed a 2-foot vein of \$40 ore.—The shaft of the Diamond mine in Gila county is in good sulphide ore.—The Blackfoot mine in Todd basin, Mohave county, has 3,000 feet of tunnels, shafts and stopes. Ore is taken out that averages \$125 per ton, the pay chute being from 4 to 6 inches in width. About \$40,000 worth of shipping ore has been taken from the mine.—The Congress shaft has been sunk 150 feet deeper. The men are now opening a station at the 1850-foot level.

There will be three new steam hoists erected on mines at Chloride, Mohave county, this fall.—The Commonwealth Co. is shipping from Pearce six carloads of ore a week.—Preparations are being made for the erection of a 40-stamp mill on the Del Monte group of mines at Harqua Hala, Yuma county, recently sold to Eastern capitalists.—Bisbee is a shipping point for ore from Sonora. Every day several wagon loads are brought up. Twenty tons arrived from San Miguel Thursday.—F. McCann & Co. are building a cyanide plant on Gleason mountain to do custom work. The whole of the Cedar mining district abounds in cyaniding ores.—Twenty-five men are on the payroll of the Spenazuma M. Co. at Black Rock. A smelter of 500 tons capacity is said to be on the way, and ground is being prepared for it. The miners are engaged in running tunnels and crosscutting.—The Nighthawk mine, near Kingman, is reported to be clearing \$200 per day. Lyons & Dewey had a carload of ore from

the Prince Albert mine, White Hills, worked at the sampler which netted from two tons 1900 ounces silver and one ounce gold to the ton, while the balance ran over 200 ounces silver and one-half ounce in gold. It was thought that the Prince Albert mine was worked out, but indications are that there will be many hundred tons taken from the old mine.

Yuma Sun: A new strike on the Mountain Rose and Monitor claims, in Gila county, runs 14½ per cent copper from the lowest grade ore. The ledge is 10 feet wide, and there is enough ore in sight to run a 60-ton furnace.—In the Arade silver mine, in Pinal county, at a depth of 147 feet the vein is 4 feet wide, and contains sixty-one ounces silver and \$2 in gold per ton.—The White Hills M. Co. of Mohave county recently shipped 1000 pounds of silver bullion to San Francisco.—Work has begun on the Pay Roll, at Chloride, and on the Twiss and Champion, near Cerbat, in Mohave county.

MEXICO.

The Reina mine near Cusiuhcachi is producing a large amount of good ore. It has 4000 miners at work. Last year it produced \$500,000 silver and has an equal amount on the dump. The Santa Elena, in the same district, ships forty to seventy cars of ore daily to the smelters.

At San Miguelito, Sonora, the San Miguelito G. M. Co. has been operating successfully for five years and is now working at a depth of 500 feet on a vein of ore averaging 3 feet in width and yielding \$40 per ton gold value.—Last week the Santa Rosalia M. Co., Nogales, shipped another carload of high grade gold ore.—El Urbabo Con. M. Co. is doing work near Torres. The new hoist is in operation; the shaft has reached 115 feet, and ore is coming out which runs 1000 ounces in silver and \$30 to \$40 per ton in gold.

PERU.

The smelting works of the Backus & Johnston Co. at Casapalca are the largest in Peru. The company is composed of J. Backus of Brooklyn, N. Y., J. H. Johnston of Bath, Me., and H. Guyer of Idaho. The smelter is situated at Casapalca, on the Oroya railroad, in the Andes, ninety-five miles from the sea, at an altitude of 13,606 feet. The Supt. is F. Pierce of Denver, Colo. About 500 men are employed. The vein is 7 feet wide and some of it assays 159 ounces of silver to the ton. The tunnel is 3000 feet below the outcroppings of the ore.

Obituary.

JOHN PERSCHBAECKER died from paralysis in San Francisco on the 21st inst. He was the owner of the Napoleon group of mines in Mexico, and was the discoverer and original owner of the Perschbaecker mine, Magalia, Butte Co., Cal. He was 75 years old.

CH. H. OGDEN, PH. D. M. E., died at Rosario, State of Sinaloa, Mexico, Aug. 2, 1898, of gastritis. He was a native of Ulster Co., New York, aged 58 years and was a well-known mining engineer and metallurgist in the States of Nevada and California. In the former State he operated at the Tybo mine, Belmont and Reveille; was also connected with the U. S. Topographical Survey under Lieutenant Wheeler, U. S. A. For several years he was with the chemical department of the California State Mining Bureau and conducted later a laboratory in San Francisco for investigations of the cement and asphalt deposits of California. (Kingman, Arizona, papers please copy.)

Recent California Mining Incorporations.

North Pacific M. & D. Co., San Francisco; capital stock, \$150,000; subscribed, \$5000; P. M. Maher, C. T. Wilder, W. B. Lees, A. Ramsay, C. W. Ashford.

West Dredging and Almagamating Co., San Francisco; capital stock \$100,000, subscribed \$5000; C. Baker, H. S. Maloney, C. H. Swain, F. D. Brandon, J. T. Bradley.

North Pacific M. Co., Ltd.; capital stock \$150,000; P. H. Maher, C. T. Wilder, W. B. Lees, A. Ramsay, C. W. Ashford.

Coneto M. Co.; capital stock \$100,000, subscribed \$70; I. M. Kallach, C. A. Warren, T. H. Day, G. Gall, E. Davis, A. M. Ellsworth, G. T. Shaw.

Sheep Ranch G. M. Co., San Francisco; capital stock \$600,000, subscribed \$700; W. H. Clary, B. F. Langford, G. E. Fletcher, G. F. Volz, C. A. Kern, L. Schumacher, C. L. Fensier.

Golden Treasure M. Co., San Francisco; capital stock \$100,000, subscribed \$3500; C. W. Tabor, E. P. Gray, N. Rennie, C. R. Eager, E. Dubedat, F. DuLmaine, J. E. Stearns.

Commercial Paragraphs.

The Dearborn Drug and Chemical Works of Chicago have recently analyzed fourteen boiler feed waters and shipped two carloads of suitable scale solvents to large sugar concerns in the Hawaiian Islands.

The government of Victoria, Australia, has placed an order with the General Electric Co. for six Thomson recording watt meters of 100 volts and varying capacities. These will be deposited in the electrical bureau of the home office of Victoria, and will be used as the official standards by which all electricity meters used in the colony will be tested. In future no meters measuring electrical energy will be allowed to go into service in Victoria unless they agree with those just ordered and receive the final sanction of the Victoria government.

The Denver Engineering Co. have this week shipped to the British Columbia Bullion Extracting Co., Ltd., at Silica, British Columbia, a 75-ton cyanide plant, together with

all the electrical machinery to be used in the mill, amalgam pans, time samplers, etc. This is the second cyanide plant they have shipped to British Columbia this month. They have also shipped a carload of their new style water jackets to one of the Colorado smelters.

Recently Declared Mining Dividends.

South Swansea, Utah, \$7500; Aug. 23.

Mammoth, Utah, \$20,000; payable immediately.

Yellow Aster, California, \$35,000; payable immediately.

War Eagle, B. C., 1½ cents per share, \$24,750; payable immediately.

Mercur, Utah, \$25,000; Aug. 25.

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Man of experience will develop gold mine for ¼ interest, or will bond whole property and develop. Must have ore chute IN SIGHT. State exact conditions. Correspondence with owners only. Address P. O. Box 887, Los Angeles, Cal.

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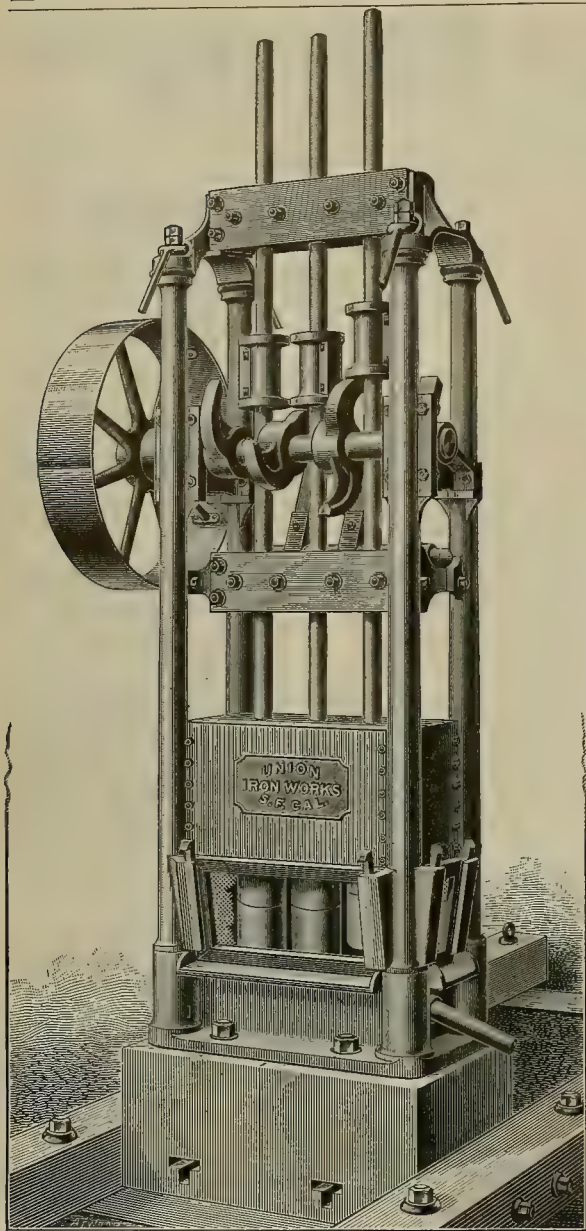
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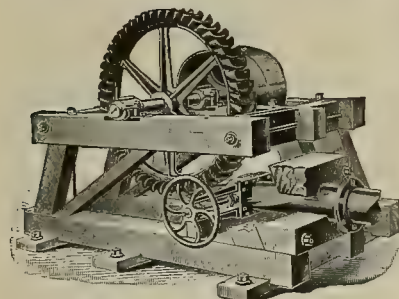
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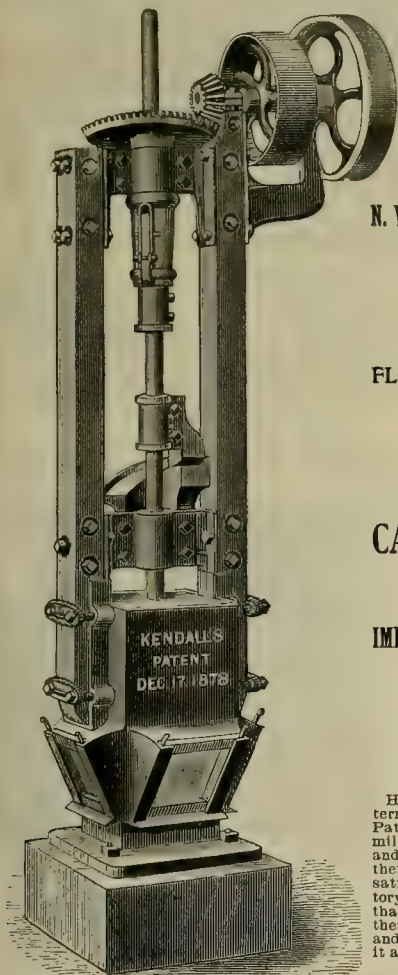
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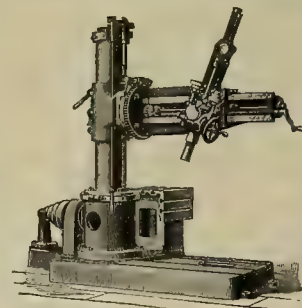
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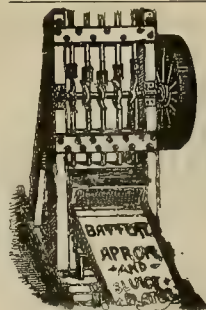
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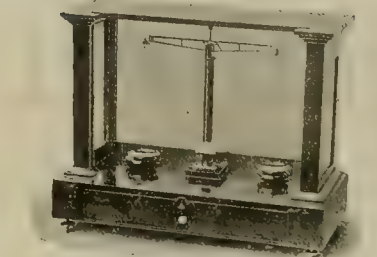
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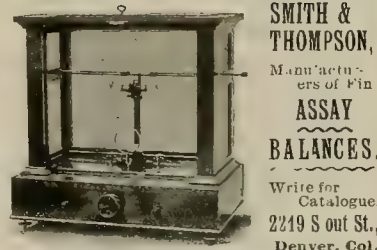
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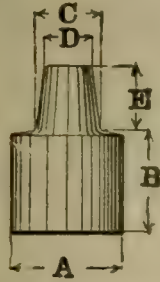
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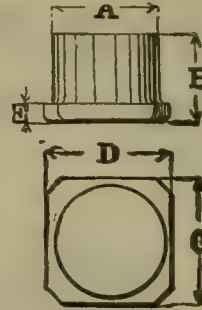
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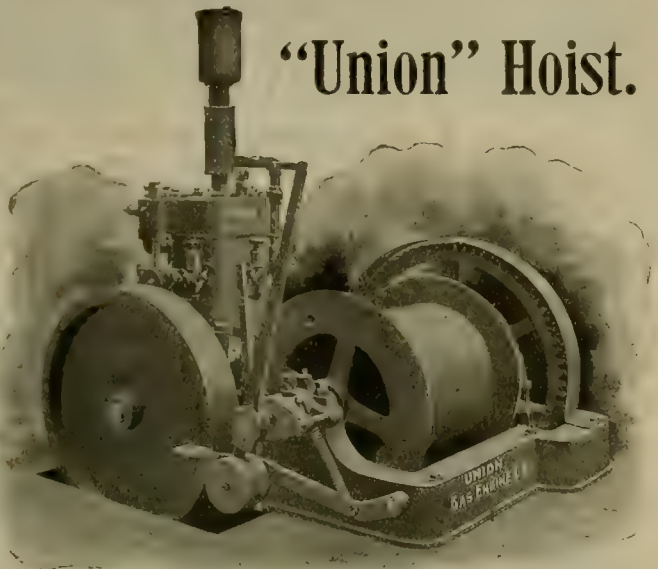
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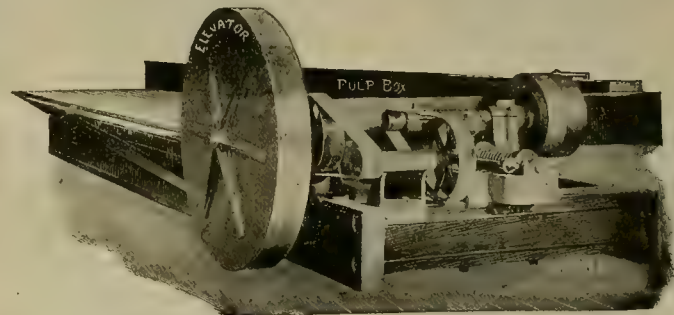
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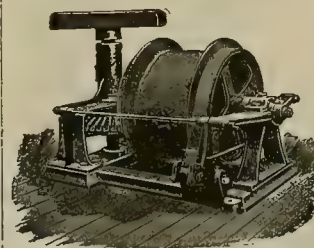
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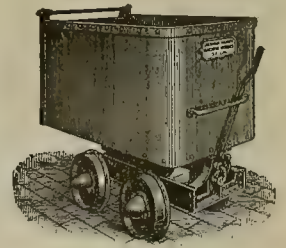
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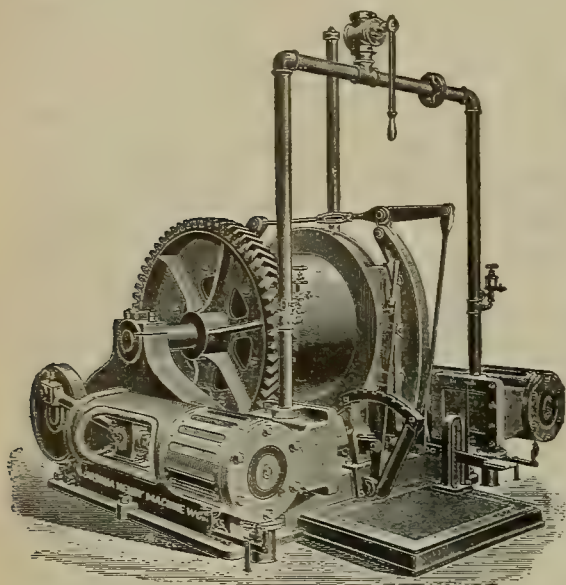


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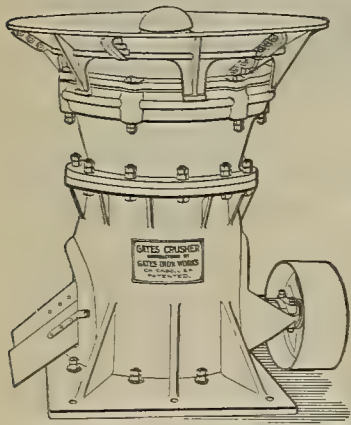


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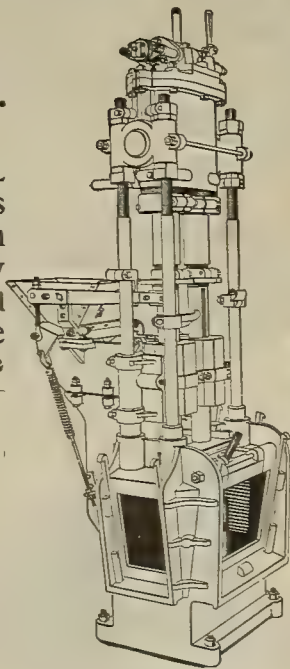
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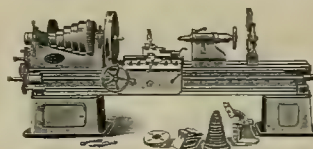
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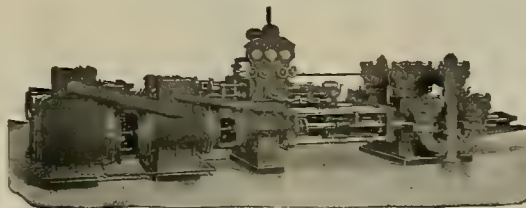
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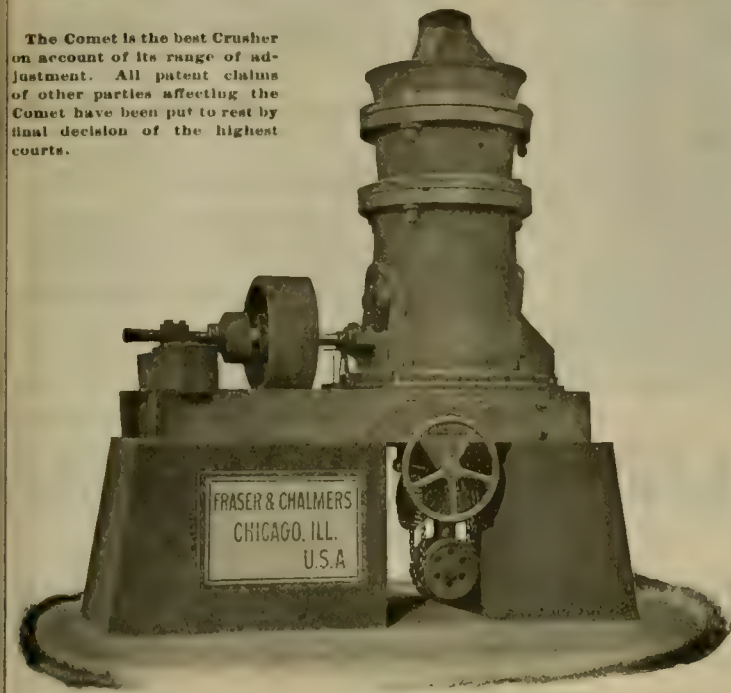
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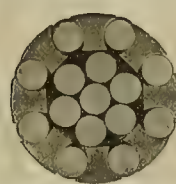
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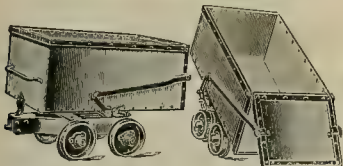
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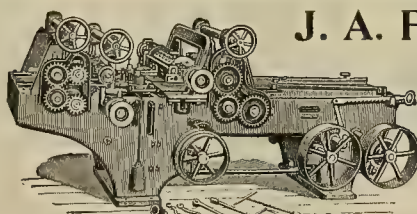
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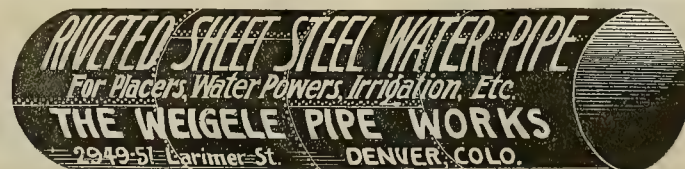
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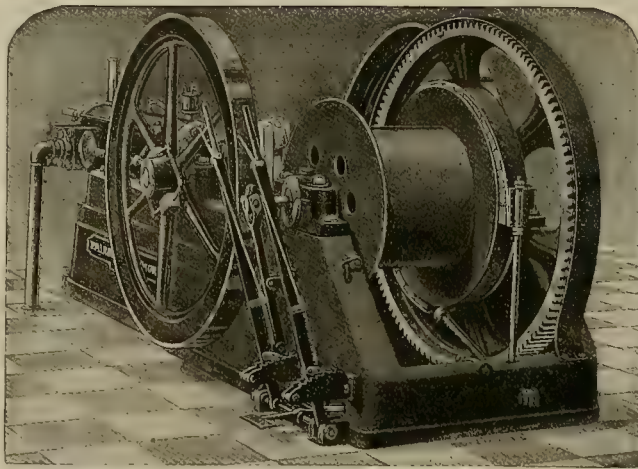
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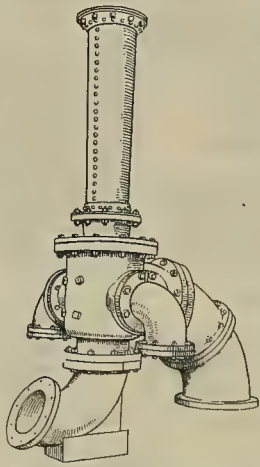
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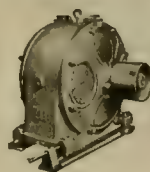
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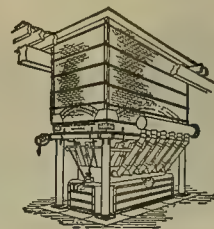
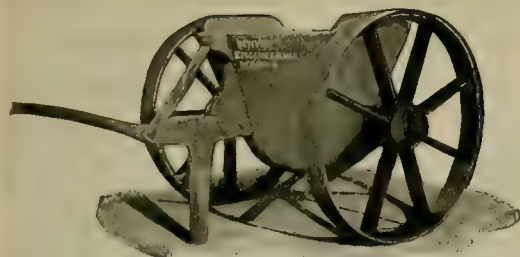
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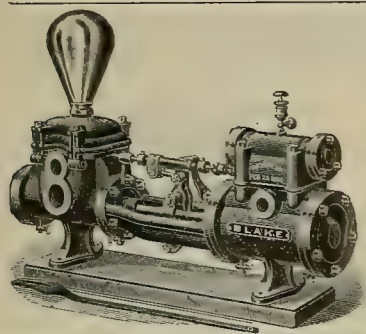
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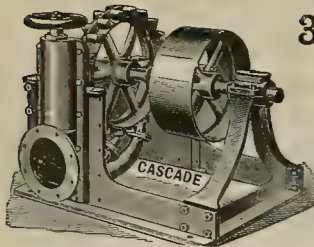
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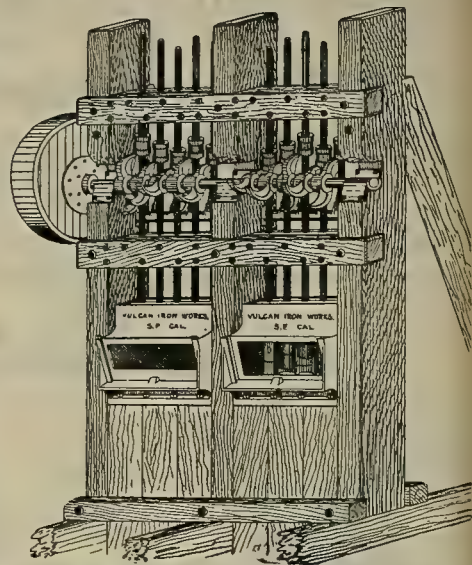
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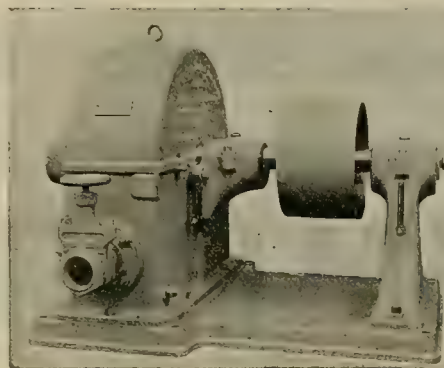
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Spokane, Wash.
New York City, N.Y.
St. Louis, Mo.
Joplin, Mo.

AGENCIES:



Jimenez.

REFINING WORKS:
Argentine, Kas.

—In Mexico.

San Luis Potosi,
City of Mexico,
Chihuahua,
Pachuca,
Hermosillo.

THE COLORADO IRON WORKS CO.,

DENVER, COLO.

Established 1860. + ENGINEERS AND MANUFACTURERS OF

Ore Milling and Smelting Equipments.

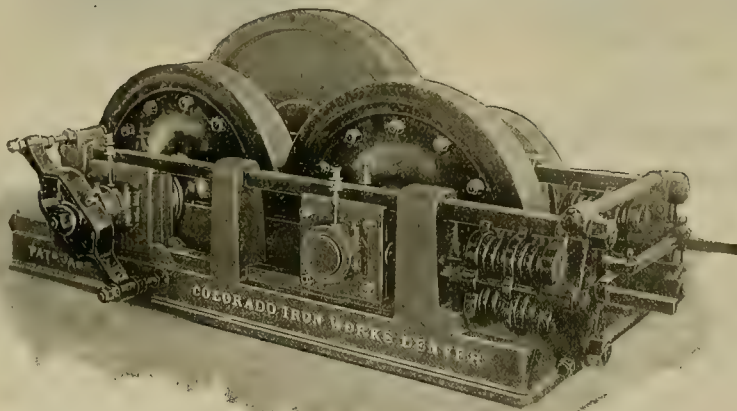
We beg to call attention to our

High Speed Special Rolls

as being the most efficient and the most economical machine for fine dry crushing ever placed upon the market. The rolls having

NARROW FACES and
LARGE DIAMETERS

can be fed evenly over the whole width of faces with certainty, and hence the faces or crushing surfaces are easily kept true. Descriptive pamphlet on application.



HIGH SPEED SPECIAL ROLLS, WITHOUT HOUSING.

Double rope tramways are acknowledged to be superior to those of the single rope type, and any one contemplating the erection of a tramway should investigate the merits of the . . .

**THE ONLY
AUTOMATIC
TRAMWAY
BUILT.**

**FINLAYSON PATENT
AUTOMATIC WIRE ROPE
TRAMWAY.**

In this system the cost of transportation is brought below any figure heretofore reached. Its tonnage capacity is unsurpassed. Further information on application.

Bolthoff Combined Noiseless Gear and Friction Hoist.

THE MOST POPULAR HOIST BUILT.

HIGH SPEED.

COMPACT.

VERY DURABLE.

A GREAT FUEL SAVER.

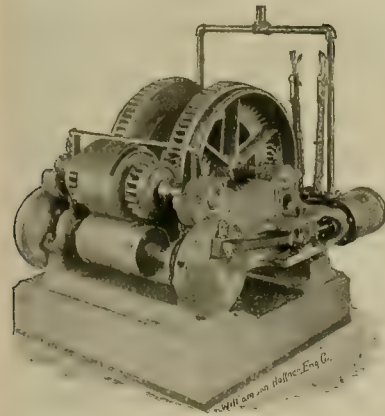
Cylinders equipped with Automatic Release Valves.

Driving shaft has pulley from which exhaust fan or saw can be driven.

IF IN THE MARKET FOR A PROSPECTING OUTFIT GET OUR PRICES.

THE HENDRIE & BOLTHOFF M'F'G & SUPPLY CO.,

COR. 17TH AND WAZEE STREETS, DENVER, COLO.



MINE BELL SIGNALS.

Adopted, Used and in Force in Accordance with State Law.

For the convenience of our readers in the mining counties we print in legal size, 12x36 inches, the Mine Bell Signals and Rules provided for

in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness. 50 Cents a Copy.
MINING AND SCIENTIFIC PRESS, 330 Market St., San Francisco, Cal.

Market Reports.

The Markets.

SAN FRANCISCO, Aug. 25, 1898.

SILVER.—London, 28d; New York, 60½; San Francisco, 60; Mexican Dollars, 46½@47c. London reports a Spanish demand for silver of probable continuance. It is thought that pending financial arrangements between the Spanish Government and Paris bankers are also an influence in the matter.

COPPER.—A Boston authority says: "The copper market is remarkable for its strength, when within a few weeks many of the prominent producers considered that copper had seen its top price and was on the downward move. As a result, most of the large producers sold very heavily at 11½c. The demand from Europe and this country was somewhat enormous and quickly absorbed all copper offering. Many of the mines have sold ahead until the first of January. If the present consumption of copper continues, the price of copper has got to advance very materially. The production of copper was never so large as at the present time nor the visible supply so small. While the production has increased enormously during the past five years, the consumption seems to absorb it, and while the consumption of copper in this country for the first six months of this year was the greatest ever known for that period, it is the opinion of competent judges that it will increase during the last half of 1898. The demand from Europe is simply enormous, as the heavy exports show. Bids for large amounts of copper, in some cases as high as 10,000,000 lbs. for future delivery, are being constantly declined by all the companies. I am very bullish on the copper situation and believe that if the present demand continues the price of copper will rule around 13 to 15 cents. There is nothing artificial in this movement—it is simply the result of the law of supply and demand. With our enormous exports, I do not see how copper can go down." Lake closed at \$12.15 bid, \$12.25 asked.

LEAD.—New York reports "unchanged," \$4.10 bid, \$4.12½ asked. Smelters quote \$3.90; local, pipe, 6@6½c; sheet, 6½@7c; pig, 5½c; bar, 6c. The directors of the National Lead Co. of New York have declared a quarterly dividend of 1½ per cent on preferred stock, payable Sept. 15th.

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—Unchanged, 5½@5½.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c.

ANTIMONY.—9½, 10.

BABBITT METAL.—10-12-14—best 16c.

QUICKSILVER.—Domestic, unchanged, \$42.50@43; export and carload lots, special rates.

POWDER.—F. o. b., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1** 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 725 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices:

Wellington.....\$5 00 Coos Bay.....\$5 00

Seattle.....6 00 Southfield.....7 50

Cargo lots, Eastern and foreign:

Wallsend.....\$7 50 Cumberland.....\$10 00

Brymbo.....7 50 Cannel.....9 50

Pennsylvania, hd., 14 50 Welsh Anthracite. 12 50

Scotch.....8 00 Rock Springs.....7 60

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.12

per gal.; bbl., \$1.07; pure No. 2, cs., 85c; bbl., 80c; Baker's AA Castor Oil, in case lots of 200

gals. and upward, \$1.11; less than 200 gals., \$1.20; in bbls., 4c per gal. less than case; Baker's Crystal, \$1.50; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 43c; cs., 48c; raw, bbl., 41c; cs., 46c; lots of 5 bbls., 1c less. Lucol, boiled, bbl., 38c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17c; Astral, 17c; Star, 17c; Eocene, 19c; Extra Star, 21c; Elaine, 22c; Water White, bulk, in tanks, 11½c; Mineral Seal, iron bbls., 21c; wooden bbls., 23½c; cs., 28c; Mineral Sperm, 27c; Deodorized Stove Gasoline, bulk, 12½c; do., cs., 18c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½c; do., in cs., 16½c; Lard Oil, Extra Winter Strained, bbl., 56c; cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatsfoot Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs., 60c; Sperm, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 31 @ 31½c per lb.; carloads, 28c; sulphuric acid, 2½c per lb. for 60%; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½c per lb.; blue vitriol, 4½c per lb.; borax, refined, 5@6c per lb.; chloride of potash, 9½@10c; roll sulphur, 2½c; blue vitriol, 4c; alum, \$1.90@2.00; flour sulphur, French, 2¼@2½c; California refined, 1½@1¾c; nitric acid, 12½@16c; caustic soda, 60%, 2½@2¾c; 70%, 2½@2¾c; 77%, 3¼@3¾c; Cal. s. soda, bbls., 65c; sks., 60c @ 100 lbs; chloride of lime, spot, 2.10@2.25c; to arrive, 2.10@—c; saltpeter, refined, 9c; chloride of potash, 9½@10c; caustic potash, 8@9c.

LUMBER.—Retail: Pine, ordinary sizes, \$17@18.50; redwood, No. 1, \$18@20; No. 2, \$16@18.

CORDAGE.—Net rates on not less than 10,000 lbs., subject to change without notice.

| | Sisal. | Manila. |
|---|--------|---------|
| 1¼-in. cir. (7-16 dia. and upward)..... | 10¼ | 11¼ |
| 12-thread (¾ dia)..... | 10¼ | 11¼ |
| 6 and 9 thread (¼ and 5-16 dia.)..... | 11¼ | 12¼ |
| Bale Rope (3 and 4 strand)..... | 10¼ | 11¼ |
| Bale Rope (2, 6 and 8 strand)..... | 10¼ | 11¼ |

Mining Share Market.

SAN FRANCISCO, August 25, 1898.

9:30 A. M. SESSION.

| | | | |
|-----------------------|-----|------------------------|-----|
| 100 Andes..... | 30c | 100 Mexican..... | 13c |
| 100 Belcher..... | 12c | 800 Ophir..... | 17c |
| 100 C. Cal. & Va..... | 38c | 100 Sierra Nevada..... | 55c |
| 400 Justice..... | 13c | 400 Union..... | 17c |

2:30 P. M. SESSION.

| | | | |
|-----------------|-----|--------------------|-----|
| 200 Ophir..... | 16c | 200 Justice..... | 12c |
| 200 C. & G..... | 13c | 300 Challenge..... | 13c |
| 50 Belcher..... | 12c | 300 Mexican..... | 12c |

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage.

Money loaned mines.

Mining companies organized, their property experted, financed and managed.

Mines, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

Examine mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

EDW. N. BREITUNG,
Marquette, Mich., U. S. A.

Cable Address: EDBEE.

Codes:

LIEBER'S.
BEDFORD MCNEILL'S.
A B C UNIVERSAL COMMERCIAL.

Working Capital for Mines.

PACIFIC EXPLORATION COMPANY

Will form companies and find capital to develop mines on shares or commission. Miners who have a good prospect should write the manager of this company for particulars. Address W. E. HOLBROOK, Manager, 23-30 Chronicle Building, S. F.

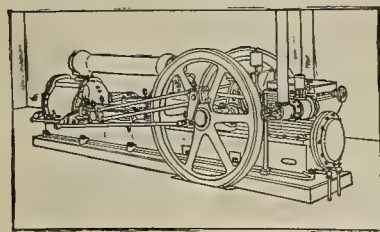
THE NORWALK

Air and Gas Compressor.

In use in every State in the Union, Central and South America, Great Britain, etc. Also by the U. S. Army and Navy.

ESPECIALLY DESIGNED FOR DRIVING

Rock Drills,
Pneumatic Locomotives,
Engines, Pumps, Coal Cutters,



And Other Mining Machinery. The Best Machine for Compressing Air for All Dynamic Purposes. Send for Illustrated Descriptive Catalogue.

HENSHAW, BULKLEY & CO, Agents. - San Francisco, Cal.

W. & P. ROOF PAINTS.

W. & P. PLASTIC SLATE.

An unequalled Roof Coating. Fire proof. Hardens like slate. Also Shingle Stains, and Creosote Roof Paints in colors.

Pacific Refining and Roofing Co.,

Sold by Dealers. 113 NEW MONTGOMERY ST., S. F. Send for Samples.

California Vigorit Powder Co.

—Manufacturers of—

Dynamite High Explosives and "Vigorit Low" Blasting Powder.

OFFICE: 208 California Street,
San Francisco, Cal.

WORKS: Point Isabel,
Contra Costa Co., Cal.

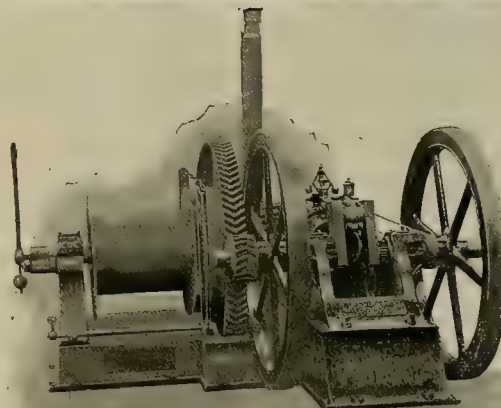
Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.



FRESNO, June 25, 1898.

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIRS:—

The fifteen-horse power gas line engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LODGE
M. & D. CO.,

Per N. W. Moody, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

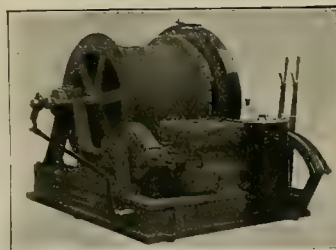
Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

ELECTRICITY.

Standard
of the
World.



Hoist Driven by Electric Motor.

THE
Economical
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MINING PROBLEM.

PUMPS,
HOISTS and
LOCOMOTIVES.

REFRACTORY MINES RENDERED PROFITABLE.

GENERAL ELECTRIC COMPANY,

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WEST COAST OF MEXICO.

WÖHLER, BARTNING Suc's, Mazatlan (Sinaloa), Mex.

Bankers, Importers, Exporters and Commission Merchants.

Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco.

ORE BUYERS AND EXPORTERS. - MINING SUPPLIES.

H. P. DICKINSON.

W. H. KINNON.

J. F. CRITCHETT.

Denver Ore-Testing Works,

*CHEMISTS *ASSAYERS *ENGINEERS.*

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WORKING TESTS by Amalgamation, Concentration, Chlorination and Cyanide.

ORES CRUSHED AND SAMPLED. + MILL RUNS.

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SOLE MANUFACTURERS OF

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Blocks for Boilers.

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ANTI-CALORIC PLASTER.

The Best and Cheapest Insulating Plaster in the Market.

Used exclusively by the S. P. R. R. Co., Pacific Mail and other large corporations.

Office, 507 Market Street.

Assessment Notices.

CONSOLIDATED ST. GOTHARD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of August, 1898, an assessment (No. 1) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 113 Crocker building, sixth floor, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of September, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on WEDNESDAY, the 12th day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. F. HOLLING, Secretary.

Office—113 Crocker building, sixth floor, San Francisco, California.

ROSE CREEK MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1898, an assessment (No. 2) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 30th day of September, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 26th day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILLMANS, Secretary.

Office—Room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

BOULDER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, El Dorado County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of July, 1898, an assessment (No. 1) of five cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 30th day of September, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 26th day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. M. WILLMANS, Secretary.

Office—Room 163, Crocker building, Post and Montgomery streets, San Francisco, California.

WEST SANTA ROSALIA GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, State of Sonora, Mexico.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of August, 1898, an assessment (No. 1) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, No. 310 Pine street, Rooms 15 and 17, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of September, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 26th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. W. FEW, Secretary.

Office—No. 310 Pine street, Rooms 15 and 17, San Francisco, California.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 16th day of May, 1898, an assessment (No. 1) of 14 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 7, fifth floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. L. CHENEY, Secretary.

Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 8th, 1898.

R. L. CHENEY, Secretary.

Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to September 8th, 1898, and the day of sale to MONDAY, September 13th, 1898.

R. L. CHENEY, Secretary.

Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to September 3rd, 1898, and the day of sale to MONDAY, October 3rd, 1898.

R. L. CHENEY, Secretary.

Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 6th day of August, 1898, an assessment (No. 2) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 12th day of September, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 3rd day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CALVERT MEADE, Secretary.

Office—106 Leidesdorff street, San Francisco, California.

GUILD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of July, 1898, an assessment (No. 4) of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 63, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of August, 1898, shall be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 29th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. D. BROW, Secretary.

Office—Room 63, Nevada block, No. 309 Montgomery street, San Francisco, California.

POSTPONEMENT.

The date of delinquency of the foregoing assessment (No. 4) has been postponed to TUESDAY, the 8th day of September, 1898, and the day of sale from the 29th day of August, 1898, to MONDAY, the 26th day of September, 1898. By order of the Board of Directors.

ALFRED K. D. BROW, Secretary.

Office—Room 63, Nevada block, No. 309 Montgomery street, San Francisco, California.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 22nd day of August, 1898, an assessment (No. 4) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 916 Market street, Room 57, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 3rd day of October, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 31st day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

GEO. W. FLEISSNER, Secretary.

Office—No. 916 Market street, Room 57, San Francisco, California.

DELINQUENT SALE NOTICE.

MARGUERITE GOLD MINING AND MILLING Company.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 10) levied on the 20th day of June, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Am't. |
|-----------------------|-----------|-------------|----------|
| G. P. Volz..... | 7 | 500 | \$ 50 00 |
| Franc Schmitz..... | 89 | 250 | 25 00 |
| Chas. Winters..... | 35 | 1,000 | 100 00 |
| M. Baschen..... | 65 | 250 | 25 00 |
| Simon Stiefvater..... | 78 | 500 | 50 00 |
| Marcus Schwab..... | 79 | 500 | 50 00 |
| Marcus Schwab..... | 80 | 500 | 50 00 |
| G. P. Volz..... | 90 | 500 | 50 00 |
| Meta Ecks..... | 102 | 150 | 15 00 |
| A. Wirtner..... | 114 | 250 | 25 00 |
| Henry Knust..... | 115 | 250 | 25 00 |
| G. P. Volz..... | 118 | 500 | 50 00 |
| Wm. G. Loew..... | 127 | 88 3/4 | 88 75 |
| F. M. Freund..... | 137 | 500 | 50 00 |
| F. M. Freund..... | 138 | 500 | 50 00 |
| F. M. Freund..... | 139 | 500 | 50 00 |
| F. Kaysner..... | 145 | 100 | 10 00 |
| B. Egenberger..... | 210 | 100 | 10 00 |
| Jose Dias Soares..... | 204 | 100 | 10 00 |
| Simon Stiefvater..... | 211 | 400 | 40 00 |
| N. Rienecker..... | 228 | 100 | 10 00 |
| H. E. Egenberger..... | 229 | 100 | 10 00 |
| Chas. Kayser..... | 243 | 100 | 10 00 |
| B. Egenberger..... | 257 | 100 | 10 00 |
| F. M. Freund..... | 261 | 100 | 10 00 |
| F. M. Freund..... | 262 | 60 1/2 | 6 00 |
| F. M. Freund..... | 269 | 42 | 4 20 |
| F. M. Freund..... | 298 | 194 | 19 40 |
| F. M. Freund..... | 300 | 100 | 10 00 |
| B. Egenberger..... | 310 | 100 | 10 00 |
| Adam Miller..... | 315 | 125 | 12 50 |
| N. Rienecker..... | 351 | 200 | 20 00 |

And in accordance with law, and an order from the Board of Directors, made on the 20th day of June, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, No. 237 Twelfth street, San Francisco, California, on SATURDAY, the 3d day of September, 1898, at the hour of 4 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

F. METTMANN, Secretary.

Office—No. 237 Twelfth street, San Francisco, California.

AMERICAN AND FOREIGN PATENTS

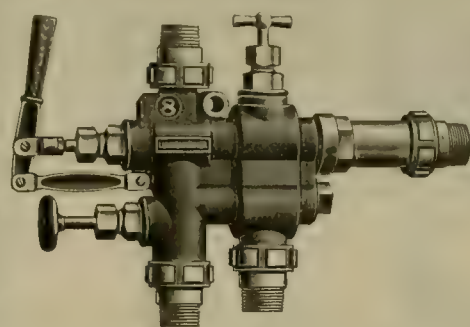
SCIENTIFIC TRADE MARKS PATENT AGENCY

CAVEATS

DEWEY, STRONG & CO. 330 MARKET ST.

•Lunkenheimer's.
AUTOMATIC SINGLE TUBE INJECTOR

For Locomotive, Marine and Stationary Boilers, is warranted the best and



lowest-priced machine of its class on the market. Stops and starts automatically, and has fewer parts than any other make. Simple and practical in construction. Tubes can be quickly replaced at a small expense. Interchangeable with all standard makes. Investigation courted and satisfaction guaranteed. Specify "Lunkenheimer's" and get the best. Write for catalogue of steam specialties.

THE LUNKENHEIMER CO., Cincinnati, Ohio, U. S. A.,
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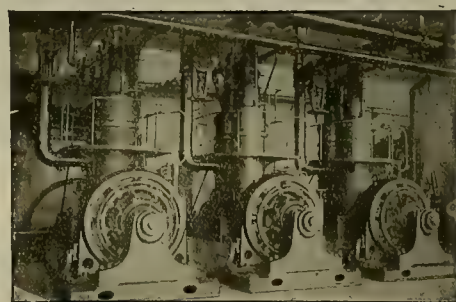
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DELINQUENT SALE NOTICE.

RED CAP MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Red Cap Creek, Humboldt County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the 25th day of June, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Am't. |
|---------------------------|-----------|-------------|---------|
| Harvey M. Binckley..... | 2 | 1 | \$ 2 00 |
| Alice E. Binckley..... | 20 | 4 | 8 00 |
| Alice E. Binckley..... | 23 | 20 | 40 00 |
| Alice E. Binckley..... | 24 | 20 | 40 00 |
| Alice E. Binckley..... | 25 | 20 | 40 00 |
| Alice E. Binckley..... | 26 | 20 | 40 00 |
| Alice E. Binckley..... | 33 | 1 | 2 00 |
| Alice E. Binckley..... | 40 | 2 | 4 00 |
| Caroline S. Townsend..... | 18 | 20 | 40 00 |

And in accordance with law, and an order from the Board of Directors, made on the 29th day of June, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, room 14, Nevada block, 309 Montgomery street, San Francisco, California, on MONDAY, the 29th day of August, 1898, at the hour of 3 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

WILLIAM McPHERSON, Secretary.
Office—Room 14, Nevada block, 309 Montgomery street, San Francisco, California.

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S. K. HOOPER,
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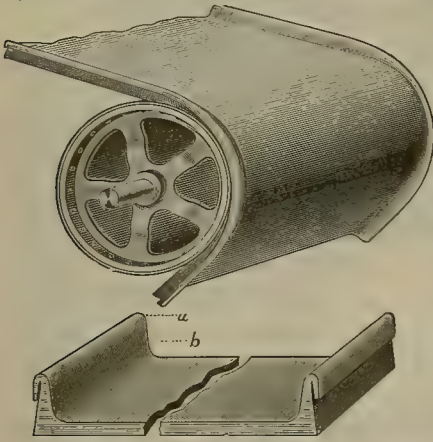
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JAS. S. BROWNELL, ESQ., San Francisco, Cal.—DEAR SIR: The Brownell Patent Lip flange belt for ore concentrators, which I bought of you nearly two years ago, has been in constant use and is in good order and gives us perfect satisfaction. We have several other kinds of belts in the mill, and your belt and flange I consider the best of all. Yours respectfully,

ORIGINAL EMPIRE MILL & MINING COMPANY,
GRASS VALLEY, NEVADA CO., CAL., Feb. 20, 1897.

ROBT. WALKER, Superintendent.

MR. JAS. S. BROWNELL, 132 Market St., San Francisco, Cal.—DEAR SIR: We have in our 20-stamp mill at this place five Frue vanners; three of these are equipped with the Patent Lip flange belt and two with the plain flange belt. We certainly consider the former a great improvement on the latter. They will certainly wear much longer, as cracking now seems out of the question. Any one purchasing the Frue vanning machine should see that it is equipped with the Patent Lip flange belt. Very truly yours,

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MOKELUMNE HILL, March 4, 1897.

Per G. M. WILDE, Acting Superintendent.

For any information regarding Frue Vanner or Belts, call on or address

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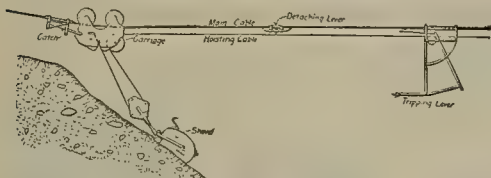
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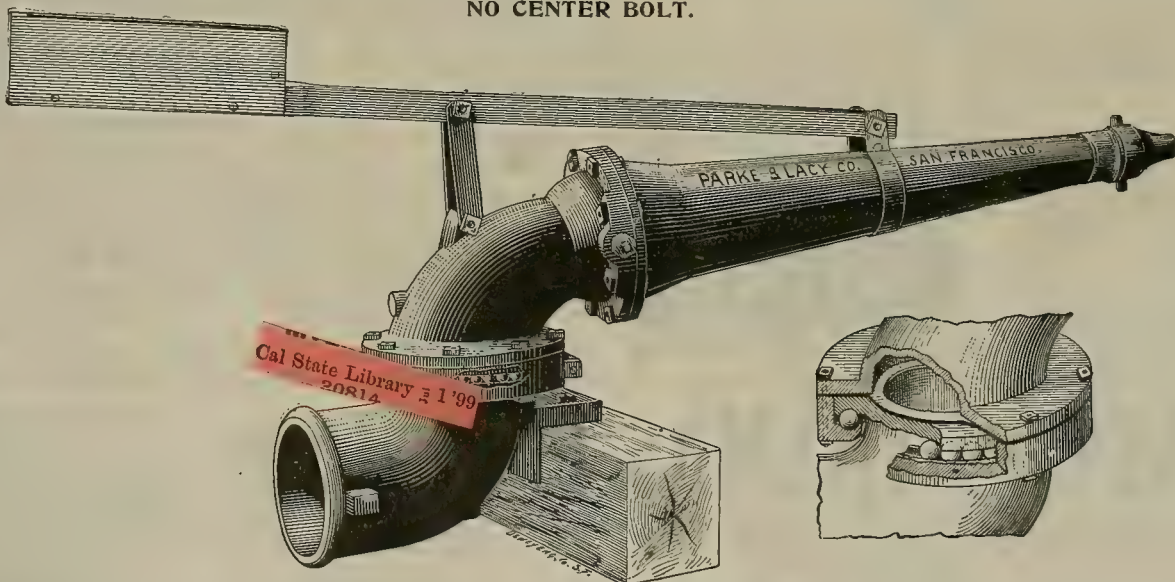
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MINING AND SCIENTIFIC PRESS

AND PACIFIC ELECTRICAL

REVIEW.

No. 1991.—VOLUME LXXVII.
Number 10.

SAN FRANCISCO, SATURDAY, SEPTEMBER 3, 1898.

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Single Copies, Ten Cents.

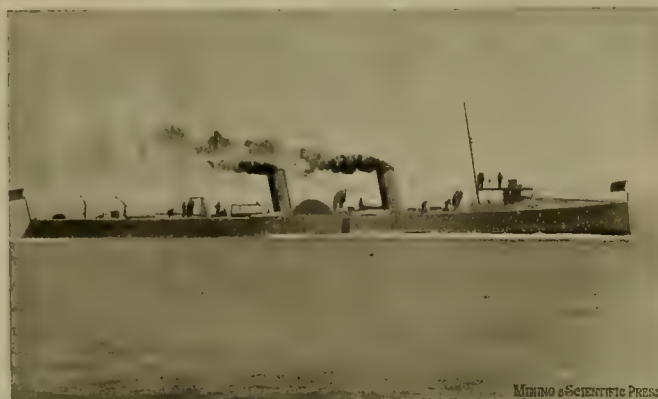
Treating Zinc-Lead Ores.

A Utah subscriber asks three questions: 1. Is there any way in which ore containing the following can be treated at a profit—silver 35 ozs. per ton, lead 14%, zinc 35%? 2. Where is the best lead-zinc smelter and, approximately, what are the charges per ton? 3. What is a good book on the subject?

It would be easier to answer the first question had the questioner sent a sample of the ore. In general, the first question can be answered—Yes. The second is also difficult to answer so that the reply would be of special value. In the first place, it is hard to indicate the best method of treatment without knowing whether the ore our Utah reader has in mind is a sulphide or an oxide. Almost any first-class smelting establishment could successfully treat the ore, but, of course, the treatment charges would be different for a sulphide from an oxidized ore. There is, we believe, a smelter at Canyon City, Colorado, that makes a specialty of that kind of ore; the smelter at Argentine, Kansas, is also prepared to do that kind of work; the Selby Smelting and Lead Co., whose office is at 416 Montgomery street, San Francisco, is also fully fitted for the treatment of such ore. Before doing much, however, in the way of expenditure of money, we would advise the Utah man to be sure of the quality and quantity of his ore, and deal only with reliable people. "Processes" innumerable have been patented to treat zinc-lead ores. There is a great quantity of zincy ores easily procured, but not worth wasting effort on. Some time some smart metallurgist may devise a cheap method of successfully working them. There is a constant demand for such a process and it will be forthcoming. Meanwhile ore carrying such values in silver, lead and zinc, as stated above, ought, in sufficient quantity, to be susceptible of profitable treatment. There is always a good demand for good zinc-lead ore. For an ore carrying, say, lead 20%, zinc 25%, silver 20 ounces, Eastern smelting firms pay \$9 per ton at Denver or Pueblo, Colo., and for lead in excess of 20% or zinc in excess of 25% they will pay. That kind of ore is not plenty in Colorado. Smelter customs differ. We are not authorized to say what the Selby Smelting Co. of California would pay, but probably 95% of the silver, N. Y. quotations, on day of delivery, 90% of the lead, and would deduct \$10 for treatment. Regarding zinc, there would probably be an allowance of 10% and a charge of 50 cents additional for every 1% of zinc over 10, or in the case referred to by our Utah correspondent, $35-10=25\%-\$12\frac{1}{2}$ additional to the \$10 treatment. This is not meant to be specific or exact, nor other than an approximate estimate of what such an establishment in California, Colorado or Kansas would charge. If the ore is oxidized there would probably be an allowance by the smelter of about 15% zinc free, and a charge for the rest as stated above.

It is probable that if the ore in question is a sulphide it could be concentrated at least one-half;

similar to the proposition now successfully handled by the management of the Broken Hill Proprietary, Australia. Those people have spent enormous sums in experiments and "processes."



TORPEDO BOAT DESTROYER FARRAGUT AT TWENTY-SIX KNOTS PER HOUR.

Their ore contains zincblende and galena intimately united, requiring very fine crushing to allow the concentration of the lead to take

are in a similar position that the subject is one of general interest.

So far as we know "Hoffman's Metallurgy of Lead" is the best work on the subject.

The Torpedo Boat Farragut.

In a few weeks the torpedo boat Farragut, built by the Union Iron Works, San Francisco, will have her official trial trip in San Francisco bay. The accompanying engraving is from a snap-shot photo taken on the occasion of a recent preliminary run, when she was making about 26 knots per hour. A larger and better one will be forthcoming herein when she has her final speed trial. Much is naturally expected of the new vessel. Speaking of the vessels turned out by the Union Iron Works, every publication everywhere has the most commendatory terms. The following, from the New York *Commercial Advertiser*, is representative of the general expression: "Every ship built in San Francisco has been the best of its class in the navy. The Charleston is the best of the old cruisers, the San Francisco is the best of the new, the Olympia the best fighting cruiser in the navy, the Monterey the best of the monitors and the Oregon the best battleship of the navy."

A 30-Ton Electric Crane.

Electricity for machine driving is of constant interest to every one who has anything to do with power transmission. As illustrative of the economic advantage of direct connection is herewith portrayed a scene in one of the largest machine shops in the United States, where a 500-volt direct current motor from the Westinghouse Electric and Manufacturing Co., Pittsburg, Pa., furnishes power for a 30-ton electric crane, successfully carrying the huge casting depicted in the engraving.



HEAVY LOAD CARRIED BY A 30-TON ELECTRIC CRANE, OPERATED BY 500 VOLT DIRECT CURRENT MOTORS.

place. They have now achieved commercial success.

If the Utah man will send a fair sample of the crude ore, we will have it subjected to a quantitative and qualitative analysis, and may be able to give some definite conclusions of possible value. So many

to attempt any cheap little tricks that are sure to be found out and are as sure to hurt the whole district. One such transaction often gives a deserving locality a setback that will take years of genuine merit and proved value to overcome.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....Publisher

San Francisco, September 3, 1898.

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Co-Ownership and Forfeiture.

In the issue of August 6th in answer to some questions regarding joint ownership of mining claims, in the States of California, Colorado and Idaho, the "advertising out" of delinquent co-owners was referred to. From several communications received since then it is evident that the method of forfeiture prescribed by Section 2324, Revised Statutes of the U. S., is not wholly considered just, and the claim made with some show of reason that such procedure may be made the means of practicing fraud.

It is possible to imagine how fraud might be wrought by exact legal observance of the statute, but the statute itself contains ground for redress on the part of anyone considering himself aggrieved. "Advertising out" a recalcitrant or delinquent co-owner is in one sense about the same thing as selling stock in a corporation delinquent for assessment. However, the subject is an interesting one, and has been made the theme of considerable judicial decision and legal discussion. The latest and in some ways the best treatment of the question recently observed is that in "Lindley on Mines," pp. 813-820, where, discussing on this subject, the author comments as follows:

The manifest object of these provisions is to afford a speedy and convenient method of taking away the property of one cotenant and giving it to another without the troublesome intervention of either courts or juries. There is no antecedent adjudication of either the fact of delinquency on the part of one co-owner or the making of the required expenditures by the other. THE PROCEEDING BY WHICH THE FORFEITURE IS WORKED IS EX PARTE, EXTRAJUDICIAL AND DESERVES TO BE CLASSIFIED UNDER THE HEAD OF EXTRAORDINARY REMEDIES.

In the case of Brundy v. Mayfield, considered by the Supreme Court of Montana, it was urged that this portion of the Federal statute was repugnant to the Constitution of the United States, as it was an attempt to deprive persons of property without due process of law. The court did not pass upon the question. The exigencies of the case did not require it. Another method, quite as efficacious, was discovered, which enabled the court to declare null and void the proceedings under which one co-owner sought to acquire the title of the other by "advertising out." In this case there was a total absence of any delinquency.

The Supreme Court of the United States, in the case of Turner v. Sawyer, held that the statute was one of forfeiture and should be strictly construed. The estate of the alleged delinquent co-owner in this case was saved from forfeiture for the reason that the person attempting to advertise him was not a co-owner. In deciding the case the court takes special pains to reannounce the familiar rule heretofore referred to, that cotenants stand in a certain relation to each other of mutual trust and confidence; that neither will be permitted to act in hostility to the other in reference to the joint estate, and that a distinct title acquired by one will inure to the benefit of all.

In the case of Black v. Elkhorn, the same tribunal, speaking through Justice Peckham, stated that this est, to-wit, the quasi legal title. The method pro-

vided for in the statute under consideration is wholly *in invitum*. We would not be justified in dogmatically asserting that this process of advertising a co-owner is clearly unconstitutional. But we think we may safely assert that wherever the law is invoked THE COURTS WILL DEMAND STRICT PROOF OF THE FACT OF DELINQUENCY, and of the full and fair compliance with each requirement of the law.

Of course, to prevent a mining claim from becoming subject to relocation, it must be fully represented. A partial performance by one co-owner will not save his interest. Representation is a unit, and as one co-tenant, in order to protect his interest in the location, may be compelled to expend more than his just share, those associated with him should be compelled to contribute their respective proportions. Failing to do so, the one performing the labor, or making the required expenditures, would have his right of action against the delinquent co-owner. The right of one co-tenant to contribution from others for expenditures made in removing a common burthen is well settled. This method of obtaining redress would seem to fully protect the diligent cotenant, and would not be subject to any constitutional objection.

The Federal statute does not seem to provide any adequate method of establishing the jurisdictional facts upon which the right to forfeiture is based, nor of proving or making a record of a compliance by the diligent co-owner with the requirements of the law in securing a forfeiture to himself. An *ex parte* affidavit, made by a co-owner claiming a forfeiture, could not be admitted in evidence, nor would the record of such affidavit impart notice to any one. Constructive notice by recording is wholly a creature of the statute. A record not provided for by statute, or recognized by law, gives no notice. The lameness and imperfections of the Federal statute, to use mild terms, have tempted several of the States to supply the deficiencies by supplemental enactments.

We have heretofore expressed the view that such statutes are not within the legitimate scope of supplemental State legislation. The land department follows the rule, that where one of several co-owners applies for a patent, and in so doing excludes his co-tenants, the latter can only protect themselves by proceedings to determine an adverse claim under Section 2326 of the Revised Statutes. In other words, the department will not try the question of forfeiture nor adjust equities between co-owners. But it is not to be inferred from this that the excluded cotenant is, by a failure to adverse, barred from asserting his rights after patent. If he has been wrongfully excluded, he may have a trust declared at any time. The regulations of the land department, whereby a party may be held to prove his better claim to enter, do not oust the jurisdiction of the courts. A co-tenant excluded from a patent application may adverse, and perhaps under certain circumstances, where the claim is held in open hostility and there is an emphatic and well recognized repudiation of his title brought to the notice of the delinquent, his asserted rights may be jeopardized by failure to adverse; yet, as a rule, his equities may be asserted after patent has issued.

The object of this section is simply to invite attention to that portion of the Federal law which purports to sanction a forfeiture for the benefit of a co-owner. All courts agree that the statute must be strictly construed. Certainly no presumptions of either fact or law will be indulged in when its application is invoked. Drastic punishments for minor offenses frequently secure immunity to the offender. The same principle applies with equal force where unusual and severe methods of redressing private wrongs or enforcing private rights are attempted. The courts are not disposed to deal with them in a spirit of liberality.

CRUEL disappointment has been the portion of many well-meaning men lured to the Klondike in the mad rush of the past fourteen months. This paper has steadily discounted the extravagant stories, has told the exact truth as furnished by expert miners and has thus dissuaded many from losing health, fortune and life itself in the insane scramble. That the Klondike is at present unexcelled anywhere as a great gold producer is manifest; that it is no place for a poor or sickly man is equally manifest; that that whole region will continue to furnish large quantities of gold for many years to come is certain; but no one should think of going there unless fully equipped in every way for the adventure. Strong, young, resolute, hardy men of buoyant temperament, possessing qualities of endurance, not easily discouraged and with abundant means, can, together, win fortune there (or anywhere else); but weakly ne'er-do-weel, inexperienced, disappointed, broken-down men cramped for funds, should stay away. Everything in the way of alleged "news" in the dailies and some of the weeklies should be doubly discounted. Now

was one of the methods by which a locator's estate might be lost; but in that case no question concerning this portion of the statute was involved. The fact was recited to show that the locator's estate was not subject to a wife's dower, because it might be subject to forfeiture.

In Royston v. Miller, one cotenant claimed to have performed the assessment work for 1893, and his co-owner, having failed to contribute, was "advertised out." Judge Hawley held that the performance of annual labor for that year was excused by the act of Congress referred to in a preceding section, and therefore there was no delinquency, and the attempt to create a forfeiture was a failure.

In Billings v. Aspen Mining and Smelting Co., an effort to forfeit the interest of a co-owner was defeated, because at the time notice was published the delinquent co-owner was dead.

In a recent case decided by the Supreme Court of South Dakota, it appears that the Golden Sand Lode was located in 1878 by Havens & Wilsey. Wilsey died the same year. An administrator was appointed, but died in 1888, leaving a vacancy in the administration until 1893. After Wilsey's death, Havens performed the annual work each year from 1880 until 1887. Thereafter and during the vacancy in the administration, Havens published two notices, one demanding contribution for labor performed during the eight years, and one covering the period of 1887. The notices were addressed, "To Rufus Wilsey, his heirs, administrators, and to all whom it may concern." Presumptively this notice was published for the statutory period. There was no personal service. The heirs-at-law were all non-residents of South Dakota. In 1892 Havens sold to one White, by deed purporting to convey the entire claim. White caused the claim to be relocated under the name of North Lode, under which relocation the claim passed to patent, and in 1893 as patented was conveyed to the Horseshoe Mining Company. It was claimed that White, in making the purchase, perfecting the relocation and securing the patent, acted as the agent of this company.

In 1893 Elder, who had been appointed administrator of the Wilsey estate, together with Wilsey's heirs, tendered to the Horseshoe Mining Company one-half of the amount of the annual expenditures required to be made on the claim from 1878 to 1893, and demanded a deed for one-half the property. The tender and demand being refused, Wilsey's administrator and heirs brought the suit to recover one-half of the property.

At the trial the published notices were offered in evidence, and objection to their introduction was made on numerous grounds. The trial court sustained the objection, giving as a reason for its ruling that, "The evidence in this case shows that Rufus Wilsey was dead, and that there was no legal administrator; his administrator was also deceased at the time this notice of forfeiture was published, and that, therefore, his co-owner gained nothing by it," practically following the ruling in Billings v. Aspen M. & S. Co., heretofore referred to.

that the war with Spain is about to be settled, and men's minds again begin to naturally turn to mining as the most elastic and profitable of all industries, there will come renewed notice in news columns of those far-off fields, and often the truth is the last thing thought of in many published statements. Thousands have lost all their money and thousands more their lives through belief in what they read, not realizing that much of it was paid for at so much a line by transportation companies and others interested in keeping up the "rush." As one instance is noted the fate of the 5000 men who ignorantly and foolishly followed the alleged Klondike route by way of Edmonton. Of the 5000, five got through. The greater part of the rest were ruined in health and fortune. That route was widely advertised as being absolutely practicable and free from all the hardships of coast travel. The gold of the Klondike has thus far cost this country as much in blood and treasure as the late war with Spain—much of it unnecessarily.

Concentrates.

The total dividends paid by Utah mines in August amount to \$147,250.

The 520 additional stamps for the Alaska-Treadwell properties each weigh 1050 lbs.

Water at Randsburg, Cal., is now but 25 cents per bbl., as compared with \$3 one year ago.

The De Lamar mine, De Lamar, Nevada, is credited with a monthly gold output of \$100,000.

MOR. F. S. BAILLIE, Baker City, Or., is about to put a \$100,000 gold mill plant on the Columbia mine.

CRIPPLE CREEK, Colo., is finding the value of hand jigs, which are coming into general use in that camp.

The coal exports from Belgium the first half of the present year were 2,234,710 tons, and of iron 302,237 tons.

SILVER 1000 fine from the Ontario tailings was shipped last week from the Marsac refinery, Park City, Utah.

THE Coalinga, Cal., oil producers are at present getting about 85 cents per barrel for their oil at the wells.

BOSTON reports are that the Calumet & Hecla has sold all its copper up to Nov. 15th, and is now out of the market.

At the opening of the late war with Spain, silver was quoted at 54.9 cents per ounce; it is to-day worth 60 cents.

The total July production in the Rand, South Africa, district was 359,343 ounces; it was 242,479 ounces in July, 1897.

TO FIX bolts in stonework is recommended a mixture of sulphur with Portland cement, in the proportion of three to one.

The greatest day's run made by a steamship is that of the Kaiser Wilhelm last July, from Bremen to New York—580 knots.

A DISPATCH from Vienna says that 300 miners were drowned last week by the flooding of the Kasimir coal mines at Nienice, Silesia.

WM. ANDREW, manager Young America Mining Co., Tuscarora, Nevada, wants bids for the construction of a 10-stamp gold mill.

The Arizona Copper Co. at Clifton, Ariz., is erecting a two-story brick building for a library, which will be free to its employees.

In the construction of the Highland Boy smelter at Bingham, Utah, for which work began last Monday, 300 men will be employed.

The *Union-Democrat* says that the Black Oak mine, near Soulsbyville, Cal., though a gold producer, in 1897 yielded 11,917 ounces of silver.

ELECTRIC machinery arrived at Grass Valley, Cal., for the North Star mine last week weighing forty-five tons. The freight bill was \$1100.

For the fourth consecutive time the Homestake M. Co., S. D., paid an extra dividend last month, aggregating \$62,500, a total to date of \$6,931,250.

UNDERGROUND or surface storage of mine explosives both have their dangers. Experience in the choice of two evils favors the surface system.

AN ordinary man with a 6-lb. single hand hammer can strike forty 90-lb. blows per minute; with an 8-lb. hammer forty blows of 125 lbs. per minute.

THE American Placer Mining Co., Oro Fino creek, Pierce district, near Kendrick, Idaho, are spending \$30,000 for a fall run on their placer property.

THE closing down of the Poorman mill, Florence, Idaho, is said to be caused by inability to determine the needed process for profitably working the ore.

QUESTIONS can not be immediately answered herein. Some inquiries require two or three weeks before an answer, even approximately correct, can be given.

THE recent rise in silver has made the exhibit of refined silver bars at the Omaha Exposition worth \$30,000 more than it would have sold for when the exposition opened ninety days ago.

It is a matter of general experience that gold ores to the value of \$40 per ton or over, where not free-milling, are better fitted for some other form of treatment than the cyanide process.

P. H. VAN DIEST says there is no tin, as reported, near Walsenburg, Colorado. The owners have spent about \$10,000, which they probably could have saved by proper preliminary examination.

THE average evaporation of water in open reservoirs is about 60 inches per year. A reservoir of 100 acres area requires an inflow of $\frac{3}{4}$ cubic feet per second to maintain its loss: a 500 acre area about $3\frac{1}{2}$ cubic feet.

THE mean pressure of the atmosphere is usually estimated at 14.7 pounds per square inch, so that with a perfect vacuum it will sustain a column of mercury, 29.9 inches, or a column of water 33.9 feet high at sea level.

EVEN mine managers have their troubles. The Kalgoorlie, Australia, *Standard* says: "A certain Kalgoorlie mine manager had a mine under his control which held out good pros-

pects if opened at a depth. He asked his London Board for a winding engine, and immediately a 10-stamp battery was forwarded to him. As there was no payable lode on the mine the stamps were useless."

THE Oneida mine, near Amador, Jackson, Cal., is believed to be the best equipped for deep hoisting of any in California. The vertical shaft taps the vein at 1750 feet, and the plant can supply an 80-stamp mill with ore from a depth of 2700 feet.

AT Glenwood Springs, Colo., on the 23rd ult., the drilling contest for the State championship was won by N. J. McKenzie of Leadville and J. Lamb of Cripple Creek, drilling a hole 40 15-16 inches in Gunnison granite in fifteen minutes.

THE Kansas Con. Smelting & Refining Co., has bought the Union smelter at Leadville, Colo., built in '91 at a cost of \$75,000. The Arkansas Valley smelter at Leadville, also owned by the K. C. S. & R. Co., will handle its sulphides at Union.

SO FAR as known the highest voltage employed in the commercial transmission of electrical power over a long distance is that which is now operated on the lines of the Telluride Power Transmission Company between Provo canyon and Mercur, Utah.

THE *Echo der Mines* gives the following results of the analysis of a new mineral found in Algeria: Osmiridium, 64.35%; titaniferous iron, 12.15%; copper, 1.79%; palladium, 0.89%; platinum, 9.61 per cent. This mineral is said to be found in nuggets in clay.

TRANSVAAL, S. A., mine managers report increasing difficulty in securing native labor. They suggest an increase of liquor allowance at the close of the day as inducement in getting the Kafirs to work. An increase in wages might be more directly resultant.

IN South Africa the average amount of water used in stamp mills is 6.5 gallons per stamp per minute; in Australia 6.8, which figures seem extraordinarily large on this side of the ocean, where 100 gallons per hour per stamp is usually considered more than sufficient.

SPANISH papers published this week ask if "Americans feel strong enough to change themselves from gold miners into conquerors." Gold miners usually develop sufficient vim to conquer anything else. Acquisition of territory is merely incidental—simply a new location.

A MINING STAMPEDE is reported from Florence, Idaho, to Buffalo Hump, where a ledge of unusually rich gold quartz is reported discovered. Men on the ground write back that drills, powder and fuse are a necessary part of the equipment of anyone coming there to work.

CRIPPLE CREEK, COLO., has a gold bullion production record to date of \$40,000,000. In five years Colorado has changed from being the great producer of silver to the position of chief producer of gold of any American State, and expects to show a gold output for this calendar year approximating \$25,000,000.

W. A. FORD claims to have discovered an unusually large deposit of sodium sulphate "comprising millions of tons"—two miles east of the Okanogan river, on the south half of the Colville, Wash., reservation. He says he has sunk a shaft on it 10 feet deep without reaching bottom and that this deposit covers a wide area.

AT Butte, Montana, four new 20-ton converters are being put into the Butte & Boston smelter under lease to the Boston & Montana. As a result the output of the Boston & Montana will be increased and new converters used to some extent on the Boston & Montana matte. Converting for both companies has been done heretofore at Great Falls.

MINERS and prospectors in the Copper river, Alaska, country held a mass meeting at Lake Telena, July 19th, and appointed a committee to draft resolutions that the creeks from which gold had been found in the sluice boxes had been "salted" with gold brought from California, in the interest of transportation companies—a not unlikely possibility.

IN the Alice mine at Butte, Montana, F. Sando at the 300 level entered the cage, which is protected by sheet iron sides, and gave the signal to hoist to the 100. A second later he stooped over to take up a pick on the station floor; the cage started, and losing his balance, he was thrown into the shaft, falling 700 feet. He was crushed beyond recognition.

EXTENSIVE forest fires, widespread drouth, unusual heat and enforced cessation of mining operations was the untoward record of California for the month of August. So far as the California miners are concerned, the fall rains cannot begin too quick. For the last ninety days water in some parts of California has been almost as expensive to a California mining man as an introduction to a British nobleman.

A PRESENT estimate of the gold production for 1898 is \$275,000,000. The money stock of gold on Jan. 1, 1894, in the world was \$3,965,900,000—the supply accumulated since gold began to be used as money. The five years' production since, including the estimate for 1898 would, on Jan. 1, 1899, be \$1,097,000,000, coinage value, or 27 per cent of the accumulated gold money stock of the world as it stood five years before.

IN the mineral deposits of Chili iron ore occurs in abundance and usually in favorable conditions for working. The ore is generally pure and contains but little silica. M. Wiener, in the *Annales des Mines*, says that in most of the provinces the ores run about 67 per cent. They are used only as fluxes in silver smelting. No iron works exist there, though the consumption of iron and steel in Chili amounts to 40,000 tons annually.

THE temporary suspension of the Utica mine at Angels, Cal., lays off nearly 400 men. Cessation of bullion production by such large California mines as the Utica will materially reduce California's gold output for 1898, but is the natural result of the unusual drouth, which has necessitated stoppage of mining operations in many parts of the State. During the enforced idleness in the Utica the flumes and ditches will be rebuilt and the entire plant overhauled.

FROM the Klondike comes the same complaint so universally heard in California this season—lack of water. On El Dorado creek as elsewhere miners say the water was never before so low, and that the work of sluicing out the gravel heaps cannot be done this season. They console themselves by saying that it only means another year, and that, meanwhile the gold cannot get away. They also hope that by the working season of '99 the present obnoxious royalty will be lessened or abrogated altogether.

A. F. STAHL, in the *Chemiker Zeitung*, describes the petroleum fields between Baku and Petrovsk, Russia. His examination tends to show that the district between Baku and Petrovsk, excepting the west of the Apsheron peninsula, and

the low-lying lands at Kayakend, is not likely to prove a productive oil field. Owing to the demand for crude petroleum for fuel, and the success of the business at Tagieff, recently sold to an English company, oil lands were eagerly sought in that country.

NOR more than fifty men are now working in the Virginia City, Nevada, mines. Hundreds have gone to Butte, Montana, where a Comstock miner can usually find employment. The mine owners say that they could put a good many men to work at \$3 a day on low-grade ore and make it pay, but they cannot at \$1. The miners say that the reduction of wages should be shared by the superintendents. The superintendents say that the men who insist on \$4 a day in Virginia City accept \$3 in other localities.

CHROME iron ore is found in thirteen California counties, considerable deposits existing in Sonora, San Luis Obispo and Tehama counties. The only chrome works in present operation are in San Luis Obispo. That county has produced about 25,000 tons. The Tehama Co. Chrome Deposit Co., Red Bluff, Cal., has a large body of chrome ore, averaging 47%. The present low price hinders the development of the industry, gold, copper and quicksilver being the metal products of California in greatest present demand.

BOSTON papers announce that an Eastport, Me., man is about to buy the plant of the Electrolytic Marine Salts Co. at North Lubec, Me., for use as a sardine factory. This is the outfit put in by the people that were going to clear \$1000 per hour by "accumulating" gold from sea water. The company want \$40,000 for the property which cost a great deal more originally. The Eastport man thinks that the property would be most suitable for a sardine plant, as thousands of herring could be kept alive in the "accumulators."

A LETTER from Lake Lindeman, Alaska, dated Aug. 8, about the Pine Creek stampede, says that it was not then determined whether the new diggings were a fraud or genuine, but that everyone who could get away was going. "The steamboats are doing big business, charging \$25 for fifteen hours ride." Men who prospected their claims say they got \$3 to the pan on bedrock about 6 feet below the surface, that the ground does not freeze, and there is plenty of water. It is not yet determined whether Pine Creek is in the N. W. T., or British Columbia.

AT Pitkarantka, in Finland, magnetic concentrators have been in use several years for the treatment of fine iron ore slimes. The *Wormlandska Annaler* says that the crude ore is pulverized in water in a ball mill that treats thirty to sixty tons of 2-inch ore of medium hardness daily, with a consumption of 15 H. P. The fine powder thus obtained, containing 25 per cent of iron, is brought up to 66 to 68 per cent, while the tailings contain only 1 per cent of iron. The ore powder is molded into bricks without the addition of any foreign material. These are burnt at 800°, and smelted in the blast furnace.

THE crushing capacity of a battery depends largely on the efficiency of the stamp, the character of the ore and the discharging capacity of the mortar. The weight of stamps is a subject on which the final word has not yet been spoken. At the Big Canyon mine, El Dorado Co., Cal., the stamps weigh 1400 pounds each. At the Homestake, S. D., they weigh 850 pounds each and drop 9 inches eighty-five times per minute, developing 78,030 foot-pounds every twenty-four hours, crushing four and one-half tons ore, or one ton for every 17,340 foot-pounds developed. There are 540 stamps dropping at the Homestake.

THE statement that "the \$500,000 appropriation for the building of restraining dams in the hydraulic mining regions of the Sacramento watershed may not suffice for the construction of a single dam," is a little premature, to say the least, and also the additional assertion that "further appropriations must be made before work can begin." There is now appropriated and available the sum of \$500,000, and when the plans of the California Debris Commission have been approved by the Chief of Engineers, and Secretary Alger, the work of excavating and masonry can begin. It is believed the amount on hand will build the required wall or dam at the Narrows in the Yuba river.

AN Act of Congress, approved February 24, 1897, provides that any person who wilfully or maliciously sets fire to timber or underbrush on the public domain, or carelessly leaves fire to burn unattended near any timber, or inflammable material on such domain, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined not more than \$5000 or be imprisoned not more than two years, or both; and that any person who builds a camp fire, or other fire, in or near any forest, timber, or other inflammable material upon the public domain and fails before breaking camp or leaving said fire to totally extinguish the same, may, upon conviction, be fined not more than \$1000 or be imprisoned not more than one year, or both.

It is estimated that more than half the world's supply of manganese is obtained from Russia, and that Chili ranks next in its production. A. Pourcel in the *Annales des Mines*, describing the manganese deposits of Tschiatour, in the Caucasus, says that the extraction of ore is estimated to cost 8.88 francs per ton, and, adding freights, costs 42.97 per ton at Marseilles, France, excluding the profit of the mine owner and terminal charges. Samples of the ore analyzed gave 55.70, 54.83 and 55.60 per cent of manganese, and 0.18, 0.17 and 0.15 per cent of phosphorus. In Chili the deposits of manganese are mined in the district between Valdivia in the south and Atacama in the north. As a rule the ore yields upwards of 50 per cent of manganese. It contains phosphorus and little silica. In 1888 the production was 25,000 tons, and in 1893 it reached 80,000 tons.

THE report of the State Mining Engineer to the Government of the South African republic for the year ending Dec. 31, 1897, shows that the total nominal capital of the companies engaged in active mining operations on Dec. 31, 1897, was £22,188,225. Twenty-eight gold mines and two coal mines paid dividends during the year amounting to £2,943,831 in the former case and £57,500 in the latter, or about an average of 30 per cent on their issued capital. Calculated upon the issued capital of all the 218 working mines, half of which are still in the state of development and have not yet reached the producing stage, this would give an average of about 5 per cent, which, the report says, may be considered satisfactory. In 1896 the total dividends amounted to £1,793,783. The total expenses for 1897, including direct and indirect State revenue, was £12,005,345. The total gold production for the year represented a value of £11,653,725, an increase of £3,049,904 compared with 1896. The average yield of the ore was 39.79 shillings per ton.

Mines of Kalgoorlie, Australia.

TO THE EDITOR:—With the exception of Butte, Montana, Kalgoorlie is the most prosperous mining town in the world. The gold yield of Kalgoorlie for the month of September, '97, was 39,000 ozs. from 18,000 tons of ore. During the present month the yield will be 25 per cent greater and each succeeding month will see an increase until enough batteries have been erected to keep the stoping at a jump to supply them. At present there are 180 stamps in operation and most of these have been put up in the last six months. The population of Kalgoorlie is now 15,000, most of whom live in tents, humpies and houses of corrugated iron. It is safe to say that in twelve months there will be 40,000 people here, housed in comfortable dwellings. With thirty mines whose reefs will yield over 2 ozs. of gold per ton and average 3 feet in thickness, Kalgoorlie within three years may be producing more gold per month than Johannesburg.

The principal Kalgoorlie mines have an aggregate capital of over £10,000,000 (\$50,000,000), and the dividends paid on this at the rate of 12 per cent per annum. The most important companies are the Lake View Consols, with £250,000 capital (promoters, London and Globe Finance Corporation); Harquahala, with £300,000 (promoters, Mining and Financial Trust Syndicate); Hannan's Proprietary, £500,000; Great Boulder Proprietary, £175,000; Ivanhoe, £500,000; Golden Link, £90,000, and Hannan's Brownhill, £110,000. The best mines are the Harquahala, Golden Link, Lake View Consols, Great Boulder Proprietary, Ivanhoe, Golden Horseshoe, Hannan's Proprietary, Great Boulder Perseverance, Hannan's Associated, Block 45 and North Boulder. The most remarkable crushings have been 3000 tons from Hannan's Brownhill for 24,000 ozs.; Hannan's Associated, 3000 tons for 14,000 ozs.; Great Boulder Proprietary, 40,000 tons for 120,000 ozs.; Lake View Consols, 30,000 tons for 70,000 ozs.; Ivanhoe, 12,000 tons for 25,000 ozs.; North Boulder, 5000 tons for 12,000 ozs.; Great Boulder Perseverance, 10,000 tons for 25,000 ounces; Great Boulder Main Reef, 4000 tons for 12,000 ozs., and Golden Horseshoe (three months' return), 3000 tons for 15,000 ozs. Crushings from these mines never vary. These are figures which will convince anyone of the future of Kalgoorlie.

The Brownhill reef development in the 200-foot level and its fine returns from the bulk trial crushings stamp it as one of the king mines of the field. The main shaft is down 310 feet. In the 60-foot level the reef has been driven on 800 feet north and 500 feet south, and shows gold continuously. All the ore crushed has been taken from the drives here and stoping has not yet been commenced. At the 200-foot level the lode is faulty. Here it is driven on 600 feet south and 300 feet north. The fault was caused by an iron bar, which, on being followed slightly westerly, changed into "gold stone," the crosscutting showing splendid gold. One hundred thousand pounds have been spent on this mine and, notwithstanding faulty machinery, the ore raised has sustained the company. A misunderstanding of the cyanide process handicapped this mine. The cyaniding of a ton of ore has cost £2 8s (\$12), sixteen pounds of cyanide being required, at a price of 2s 6d (60 cents) per pound.

The Ivanhoe, which was recently purchased by Charles Kaufman for £800,000 for the London and Globe Corporation, lies parallel to the Great Boulder. The Ivanhoe ranks third on the field in returns and second to none in probabilities. Three lodes run through the property and the country rock is payable, which is the most remarkable thing about the mine. The crosscutting pays for itself. Most of the ore crushed so far has been raised from the middle lode and has averaged over 2 ozs. per ton. Two hundred tons from the eastern lode have yielded at the rate of over 6 ozs. per ton. At the 100-foot level this lode has been driven on 400 feet and averages 10 feet in width. The middle lode has been driven on 700 feet at the 100-foot level and the reef has an average width of 4 feet 6 inches. The trend is north-west and the formation mullocky quartz. Some stoping has been done on this level of no practical use. The main shaft on the middle lode is now down 300 feet. This is the first shaft that reached 300 feet on the field, and in proving the existence of the lode at that depth put heart into the other companies to sink. The Ivanhoe's previously rich yields have been secured with very little exploratory work, and there is no doubt it has a long life before it. The eastern lode has thrown the middle lode into the shade and given the mine a greater future than ever.

The Lake View is one of the greatest gold mines in the world. It consists of two blocks of twenty-four acres each. At the 100-foot level the reef, which traverses the easterly block from end to end, has been run on to the boundaries of the claim and is worth over 3 ozs. per ton the entire length. At the 200-foot level, or water level, the reef has been driven on to within 100 feet of the end lines, and is of the same value as in the upper level. The lode is talcose schist and the walls diorite. The lode has an average width of 12 feet and stands almost perpen-

dicular, so that the company need have no fear that it will dip through the side line before the 1000-foot level. At the 300-foot the lode has been proven to be equally as rich as above, but it is contracted to an average width of 7 feet and the ore is refractory. Rich shoots of tellurides are being opened up from this level. One shipment of telluride ore has resulted in an average yield of 24 ozs. gold per ton. I think the shipment consisted of 50 tons. Mr. Charles Kaufman secured the Lake View for the London and Globe Finance Corporation, Limited, for £80,000. There are 250,000 shares in the company now, and each share is worth £12. No doubt if Kaufman continues his policy of erecting mills as levels are opened up the shares in this mine, unless doubled, will be worth £50 each inside of three years. Under the supervision of H. C. Callahan, a Colorado man and Kaufman's general manager, the most successful cyanide plant in that part of the world has been erected on the Lake View. By means of this 99½ per cent of the gold contents of the ore is being saved. The regular monthly output of the Lake View is now about 11,000 ozs. About 500 men are employed, at an average wage of £4 per week, on the property. During the present month a dividend of 10 shillings per share has been declared.

The Great Boulder is the central figure in Westralian mining enterprises. Other great mines there are and have been, and are likely to be, but take away the Great Boulder and a serious blank would be left in the Coolgardie gold fields. But, notwithstanding and perhaps because of the greatness of this mine, I must condemn the policy—typically Australian—under which it is guided. With enough ore in sight to keep a 50-head battery going three years, and a lode proven to be as strong and rich at the lowest level (300 feet) as above, the company running the mine are satisfied with the returns of a 20-head mill, without a cyanide auxiliary, although their tailings assay over an ounce per ton, and a neighboring mine has proven how almost perfectly cyanide will work for them. It took the Great Boulder Company a full year before deciding on the addition of the last 10 head to their mill. A year ago the company reckoned on running 50 head as soon as they secured sufficient water, but this they now have and the 50 head are as far off as ever. There has been about five miles of sinking, driving, etc., done on the mine, which consists of eighty-five acres. At the 100-foot level there is a drive 3000 feet along the lode, while at the 200-foot driving has been carried along the lode (800 feet) to the southern boundary and 400 feet north. Dividends are being declared, machinery erected and development work carried on out of the proceeds of the mine.

The Associated Gold Mines are amongst the most valuable on the field and are managed by energy and intelligence in everything. The Australia group, consisting of the Australia, Australia East, Australia South and the Adelaide, is the mainstay of the company. On the Australia a main shaft is being sunk to the 1000-foot level. This shaft is in the center of the main ore body, which is 12 feet wide and of an average value of 3 ozs. per ton. This ore is talcose schistose and in treating it is roasted, broken, crushed in a ball mill, cyanided, and pulverized and amalgamated in a Huntington mill. In the Australia East is another lode 10 feet wide and averaging 3 ozs. gold per ton down to the 200-foot level. At the 300-foot level this lode was proven 14 feet wide and an average assay of 10 ozs. per ton was obtained from the lode where cut. Under the control of N. G. Brookman and James Irwin, whose policy is strictly American, these mines inside a year should have no superior on the fields.

The Kalgurli is a mine whose possibilities are beyond comprehension. Promising but always disappointing in the upper levels, this mine has come to the front in an astonishing manner as depth and settled country were attained. Last December a small vein of telluride no thicker than the blade of a knife was struck in the drive on the middle lode at the 100-foot level. This was followed down and gradually widened out into a magnificent body of ore. There are three parallel lodes at the 100-foot level. In one of them the celebrated jewel chamber was met with, where the ore was so rich that it had to be banked. At the 200-foot level these lodes are each about 17 feet wide and of good value, separated by bands of country carrying gold in small quantities. On the middle lode a winze is being sunk and is now down about 30 feet below the 200-foot level in good ore. So far very little has been done to prove these lodes in length, but there can be little doubt but that they are a continuation of the Australia lode.

The Boulder Perseverance has a lode of sulphide ore of good value, 50 feet wide at the 100-foot level, while splendid developments have recently taken place at the 300-foot.

Other good mines are Hannan's Oroya, Kalgoorlie Mint, Kalgurli, South Kalgurli and the Brookman Brothers' Boulder.

Hannan's Reward is, as the name implies, the pioneer mine of the field. Little is known by the public of this mine, but it was one of the first on the field to prove a gold-bearing lode at a depth of 300 feet. This took place in June last year, yet little or no development has taken place in the mine at this depth. On the upper levels an immense amount of work has

been done and a very large quantity of ore exposed. It is a sad reflection on the management that practically no work of importance has been done in the mine for over twelve months, and it is a sorry sight to see a puny 10-head battery battling away on a property that should by this time have had fifty or sixty heads running. That the ore is of fair value the 1.7 dwt. to 1 oz. returns demonstrate, and the larger the battery the greater would be the profit in treating this so-called low-grade ore.

There are a dozen mines at Kalgoorlie that may reasonably be expected to turn out on an average over 40,000 ozs. per month when fully equipped, or, say, 500,000 ozs. per annum, and more than a dozen more that on present prospects may very reasonably be expected to become regular gold producers, and as developments at a depth in the past twelve months have added so greatly to the value of the field, is it not more than probable that further development will reveal more wealth in this wonderful mineral belt? A remarkable illustration of what may be revealed at depth took place in the Kalgurli, as already told, and away three miles north of the Boulder a development of a somewhat similar nature has recently taken place at the Reefer's Eureka. In this mine, from the surface to a depth of 190 feet, a vein of oxidized ore was followed, fairly rich all the way, but small. At about 190 feet it pinched away and changed into a small vein of sulphides, which in 15 feet of sinking widened out into a nice body of ore from 4 to 5 feet wide, assaying from a few pennyweights up to 5, 6 and 9 ozs. per ton. At this stage it was found necessary for purposes of ventilation to connect the winze with the main shaft, and in driving on the lode it has become poorer in character. There is no doubt, however, that the drive is too high for the better class of stone, as latest assays clearly demonstrate this stone has gone underfoot. That the lode is continuous is proven by the developments in Hannan's North, the south adjoining claim. These developments have stimulated work in the north end of the field.

Many people look askance on the high values placed on Kalgoorlie mines, but when it is realized what has been done in so short a time under great difficulties and poor equipment, and that there is every reason to believe the lodes will be just as valuable in depth as in the shallow levels, then it can be understood that the mines cannot be valued too highly. Nevertheless, it is a question whether the market has gone ahead of the development and equipment of the mines, particularly the latter, or not. As to their ultimate value no one can form a reliable estimate. It is beyond all comprehension and far and away exceeds anything hitherto known in gold mining in Australia, if not in the world. That Kalgoorlie will yet supply the greatest boom ever seen in Australia I have not the slightest doubt, but the time has not yet arrived. Not until the mines generally are turning out the great quantities of gold foreshadowed by the last six months' development will the great boom come. Then Kalgoorlie alone will be turning out more gold than any colony in Australia.

JOHN DWYER

TO PREVENT the engines of a vessel from racing when the screw rises above the water, Sig. E. Putalo has invented an electrical regulator. It consists, according to *Industries and Iron*, of two vessels of mercury, connected at the bottom by a tube, and mounted fore and aft in the ship. The vessels are about half full at normal depth. When the ship pushes forward so as to raise the screw the rods connected with the resistance are submerged one after the other so that an electromagnet is brought into play, the whole resistance being short-circuited when the screw is quite out of the water. The electromagnet operates a throttle valve in the main steam pipe, which is thrown open by another magnet. By this arrangement the steam is turned off and on. From experiments it has been shown that the mercury vessels need not be more than 34 inches apart on a ship 300 feet long.

THE production of phosphorus by means of electrical furnaces in various ways has proved commercially practicable, and is considered an important chemical achievement. One of the methods pursued in this direction, and known as the Ginn & Leleux process, consists in simply heating a mixture of phosphate of lime and coke in a suitable electric furnace, the two ingredients to be first finely powdered, and the mixture is to be completely homogeneous. On the mass becoming pasty under the action of the heat, all the openings of the furnace are hermetically sealed except that for the passage of phosphorus vapor, this being distilled and collected in the usual way. According to another process—the Boublieque—iron phosphide is decomposed by electrolysis, this salt being produced by the simple fusion of phosphates of lime with a salt of iron.

IN waterproof gelatine paper the paper is coated on both sides with a solution consisting of 1 part gelatine, 4 parts water and 1 part glycerine. Coagulate the gelatine and immerse the paper in a solution of 750 c. cm. of formol in 5 liters of water. The paper thus treated is, after drying, impervious even to steam.

History of a Mine.

TO THE EDITOR:—I recently read in a local paper a statement that E. Merrifield, the discoverer of the Merrifield mine at Nevada City, Cal., after making millions out of it died very poor. Merrifield did, some time about 1870, become an owner in and manager of a mine at Nevada City, to which he gave his name. He was not its discoverer. He did not make millions out of it, but he did die poor.

Nearly twenty years before Merrifield saw the mine, Warren B. Ewer of the MINING AND SCIENTIFIC PRESS, T. H. Rolfe, I. J. Rolfe and others owned the mine and erected on it a twelve or sixteen old-fashioned stamp mill. Failing to get returns expected, they brought in on pack mules English fire bricks and built a cupola furnace. At the same time they brought from San Francisco two iron pans or moulds large enough to hold a year's product of the Klondike, in which to catch the melted gold, but they had no use for the moulds. They worked only the surface outcrop and that contained little or none of the precious metal. At this time and for years after the mine was known to all outsiders as the Bunker Hill mine, in consequence of the resemblance of the furnace flue to the monument of that name.

After being idle for several years (and probably abandoned and relocated, of that I am not informed) the property came into the hands of Nelson Soggs, an old sea captain. Soggs ran the mine several years, making some money out of it but not millions. He died leaving only a small estate.

Again the mine was idle for years; the next one to work it is forgotten, but Merrifield did not come upon the stage until about the time mentioned. After Merrifield's day several parties tried the old mine with varying success, until finally it came into the ownership of the Champion Mining Co., which company now owns and operates it, and with their large plant of improved machinery and late methods are reported to be making money.

It is not out of place here to state that Nelson Soggs, on this mine, introduced the first automatic ore concentrators in the State. He had twenty-four of them, called the Bradford vanner. They were small, simply constructed machines and did good work. It was the product of these concentrators that encouraged Maitman & Deetken to perfect and make practical the chlorination process.

JNO. PATTON, 725 Mission St.
San Francisco, Aug. 27th, '98.

The Treatment of Argentiferous Lead.

The extraction of silver from lead has been effected in the past by a process entirely metallurgical in character. The lead was melted with zinc and the molten metals intimately mixed. The silver, owing to its greater affinity for zinc, passed into solution in the latter metal, and the alloy of silver and zinc thus obtained was then distilled to separate the silver from the zinc. A modification of this process, known as the "Rossler Edelmänn" process, differed only in the addition of a small percentage of aluminum to the molten metals. The aluminum combined with the oxygen present as zinc or lead oxide, and in this way produced a better separation of the zinc-silver alloy from the molten lead by increasing the fluidity of all the metals. The electrolytic separation of the zinc from the silver, in the alloy obtained by the Rossler Edelmänn process, was proposed many years ago, and has been repeatedly the subject of experimental trials. The tendency of the zinc to separate at the cathode in spongy form has, however, rendered the electrolytic process unsatisfactory, and though it was introduced at Hoboken, in Holland, and at Lautenthal, in Germany, the latest information from these works is to the effect that the electrolytic parting process has been dropped. Hasse, in a recent article, however, states that the experiment work with an 8 H. P. installation at Friedrichshutte, O. S., has been successful, and that estimates based on the results obtained with the plant show that the process can be worked to yield a large profit. The zinc-silver alloy used contained 10 to 12 per cent silver. It was cast into plates weighing about twenty-five kilogrammes, and was used as anode in a neutral or slightly basic solution of zinc sulphate. Thin plates of rolled zinc were used as cathodes. The deposit of zinc was all that could be desired, when care was taken to keep the electrolyte free from impurities. Spongy zinc at once formed when this condition was not fulfilled. Hasse considers that purity of the electrolyte is the principal factor in obtaining metallic deposits of zinc, and he attributes the success attained at Friedrichshutte largely to the purifying effects upon the electrolyte of a specially designed "cascade," by means of which the liquid passing through the depositing vats was systematically aerated, and the metallic impurities precipitated as oxides. The silver passes into the anode slimes and is recovered by a chemical and metallurgical treatment. As a result of these experiments, Hasse is inclined to doubt whether the electrolytic separation of zinc from its solution can

be made to yield a profit, excepting when dealing with zinc and silver alloys. Pure zinc commands no higher price than ordinary zinc in the metal market, and hence it is the recovered silver which bears the extra costs of the electrolytic treatment. These results, and the opinions based upon them, should receive the careful consideration of all interested as experimenters and investors in the electrolytic processes for the extraction of zinc from its ores.

Alloys of Aluminum.

The industrial alloys may be broadly separated into two kinds: "light" alloys, containing 90 to 99 per cent of aluminum, with 10 to 1 per cent, or even less, of some other metal or metals; and "heavy" alloys, containing 1 to 10 per cent of aluminum, with 99 to 90 per cent of other components. They can, therefore, be regarded as either pure aluminum, strengthened by the addition of some other metal, or as one of the older metals improved physically and chemically by the addition of aluminum.

Light Alloys of Aluminum.—In its purest form aluminum is very soft and not of great service in those arts in which much rigidity and strength are required. For this reason a metal containing only 98.5 to 99.8 per cent of aluminum, the impurities being silica and iron in almost equal proportions, is preferred to metal of 99.6 per cent purity. One casting alloy, having a specific gravity of 2.9, is largely used just now, and is known as "No. 6." Its composition is still kept secret. It has been found to produce remarkably clean castings, which require very little machining to finish up; it takes a high polish, and so far has given complete satisfaction. Another alloy is "No. 4," which contains nothing but aluminum and a small proportion of copper; it is not one of the materials generally recommended, though it has some good qualities. There is a strong suspicion that when aluminum is alloyed with copper galvanic action is set up between the two, especially when the alloy is exposed to salt water; therefore, this is not recommended in any quantity for outside positions. The two alloys particularly recommended, as among the best yet made, are called Wolframium and Romanium. These are both tenary alloys, and next to the aluminum, tungsten is the leading ingredient in each. In one of them copper is present to a small extent, in the other nickel; and both have given astonishing results as regards strength and elongation. Samples of rolled sheet or rods made of these alloys have shown as much as twenty to twenty-two tons tensile strength per square inch, with 5 to 10 per cent elongation in 4 inches, which is remarkable when the low specific gravity of the material is taken into consideration. The above are so-called "light" alloys, that is, alloys containing a preponderating percentage of aluminum with only a small quantity of another metal or metals.

Heavy Alloys of Aluminum.—There are many "heavy" alloys of aluminum, in addition to the well-known bronzes; some of these have not yet reached the development to which their valuable qualities entitle them, and which they will ultimately attain when better appreciated by mechanical engineers. Aluminum bronzes are undoubtedly superior in strength to most of the copper-tin bronzes now in use; and they are especially suitable for marine engineering. Propellers of aluminum bronze have been successfully made for most of the 26 and 30-knot torpedo catchers; also, a large number for the French Government. The two classes of bronze most frequently employed are marked R3 and R4; the difference between them is simply in the proportion of aluminum they contain. The following tests show their maximum, minimum, and mean breaking:

| Mark. | Breaking load, Tons per square inch. | | | Elongation, Per cent in 2 inches. | | |
|-------|---|------|-------|--------------------------------------|-------|-------|
| | Max. | Min. | Mean. | Max. | Min. | Mean. |
| R3 | 43.7 | 39.6 | 41.8 | 13.00 | 6.50 | 9.75 |
| R4 | 39.6 | 39.6 | 34.0 | 35.00 | 15.50 | 23.30 |

Agreeably with which R3 has a guaranteed tensile strength of thirty-five tons per square inch, with 25 per cent elongation in 2 inches; and when cast R4 breaks at forty tons per square inch, with 10 to 12 per cent elongation also in 2 inches. These have the advantages of being considerably cheaper than other bronzes, and are easily employed for any foundry work without special appliances or tools.

ACCORDING to *Electricity*, an interesting fact has come to light regarding the recent explosion of three submarine mines in the Potomac river, which was brought about as was supposed by lightning having struck the switchboard or some of the connections. It now appears that neither the switchboard, cable nor electrical connections show marks of having been struck, and General Wilson, who has been investigating the matter, believes that one of the mines was directly struck by lightning through four feet of water and that the others were probably set off by concussion.

The latest development in field telegraphy and telephony consists in a two-horse wagon equipped with four folding tables, which, when thrown up, forms desks, upon which are placed telephone and telegraph instruments. Batteries are carried be-

neath the seats, while coils of wire are so arranged as to run out as fast as the wagon is driven. Twenty such vehicles have been ordered by the Government.

Is Darwinism True?

W. S. PROSSER.

NUMBER II.

Rabbits in Australia multiplied not from less competition—for there was more—but because the increase was not checked by their natural enemies. When bison roamed the plains in immense herds the Darwinian idea of competition would require us to find most of them in a lean and miserable condition, many degenerating and dying, only those in advance (the strongest) fat. Hunters found no such thing. All—front, middle or rear—were practically the same, and all fat. Take any kind of animal, carnivorous or herbivorous, preyer or preyed on, it is the same story; the increase is limited not by internecine struggle, or a struggle for food, with survival of the stronger, but by agencies entirely foreign, which pay no attention to slight individual differences. The African lions are few in numbers, though for thousands of years scattered over a continent, with unlimited game before them and no superior enemies. So of large and small carnivora everywhere: seldom in large numbers, yet seldom ever seriously diminishing the food supply. Salmon, herrings and many other fishes keep together in great numbers, showing that they feel no such competition as imagined. They find food in plenty, and to spare. Fish are nearly always fat and in good, eatable condition, unless after spawning. If the imagined struggle for food were a fact, it would be common—indeed, the rule—to find fish and game of all kinds in a poor and uneatable state. Fifty thousand shrimps have been caught at one haul, and all good. Mackerel and cod on the Grand Banks have thriven by the million for centuries. Oysters in large beds seem to do as well as in small. The wild denizens of the forest and plain seldom seem to approach the limits of their food. Of nuts, berries, grass, etc., more seems to go to waste than is used. In the Sierras, squirrels eat most of the sugar pine nuts, but of the much greater number of other pine nuts very few. So in the redwoods, and in oak forests—there is a waste. Australia supports tens of millions of sheep and hundreds of millions of rabbits; nearly all of this grass food must have been wasted in old times. California, hundreds of years ago, was covered with wild oats and grasses, thick and high, and nothing, worth mentioning, to eat it. The earth seems to have all the flora it can comfortably support, but not all the fauna. Every few years the grasshoppers prove to us that there is room for several hundred millions more. There may be as many animals on the earth as desirable, but not as many as possible, according to the food supply. Everywhere in wild nature we find the adults well fed and comfortable, and food to spare for many more; and hence that species are limited in numbers not by a struggle for food, and not by slight internal differences, but by powerful outside enemies, to which every considerable difference in speed, etc., of their victims would be of no moment.

This argument is far greater if we remember that according to the evolution theory the differences must have been infinitesimal.

I believe, therefore, that a candid consideration will allow that there are no sufficient grounds for believing that there is, in actual, bona fide operations, any such thing as an evolutionary process by "survival of the fittest" or "natural selection."

Second—As to the introduction of new ideas and novel devices into animal mechanics; some of these separate genera, while others run through whole classes. These inventions were first mental conceptions, and as such could not possibly have originated outside of mentality, and a mentality coupled with knowledge. Their actual embodiment in many intricate and dependent parts cannot have grown up by chance, nor gradually one by one, but must have come into existence as a whole. If a part only, it would have been meaningless and useless, yet natural selection would require that it be made the basis and reason for ages of development along a line, finally leading to a useful result. No less unreasonable is it to invoke the aid of chance to form a device of many parts. Throw a bushel of type into a wagon and drive a few miles over a rocky road. Would they shake themselves into a treatise on geometry? Or would some bits of steel and brass by agitation develop into a watch? Only a directing mind could achieve these results, and only then if that mind had a clear prior idea of intended results. The idea of the tongue and groove in flooring has two parts, yet make but one whole idea, which came into existence as a whole. The wheel, as a means of locomotion, includes the two parts of a circular body and turning on an axis, supporting the load. Neither separately would have been anything. Together they make a wagon wheel. An idea is a complete entity in itself. Other ideas and much knowledge may lead up to it. Other ideas may be added afterwards, but it is one and indivisible—born in a moment, but imperishable.

(To be Continued.)

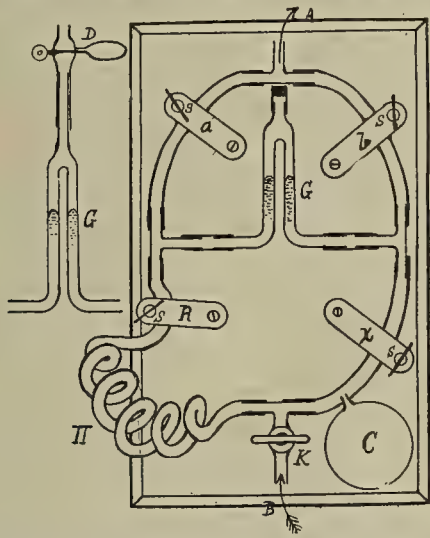
Hydraulic Illustration of the Wheatstone Bridge.

Although it is undesirable to push the analogy between the electric current and the flow of water too far, or to get the idea of an actual current too firmly established in the student's mind, still a hydraulic illustration is often useful to point out how the results may follow.

To show the action of the Wheatstone bridge by flowing water is usually complicated by the effects of gravity, and illustrates the conditions of pressure rather than those of resistance to flow. Moreover, the question of the galvanometer is a troublesome one, inasmuch as most devices require such a flow of water as to interfere with the bridge effects which it is desired to bring out.

The arrangement described below, says Wm. Hallcock in a recent issue of *Science*, has proved quite satisfactory in showing the simpler resistance effects in the bridge, but especially useful in making clear the effects of capacity and self-induction and how the two may be balanced and compared.

The accompanying sketch is taken from a simple home-made bridge which was constructed as an experiment. Upon a board about 30×50×4 cm. are fastened four glass *T*'s of about 5 mm. inside diameter. Two of these *T*'s have their side projections turned inward and are connected, by short pieces of rubber tubing, to the galvanometer *G*. The other two *T*'s have their side projections turned outward, and these connect by long pieces of tubing with two large aspirator bottles, not shown; *a*, *b*, *R* and *x* are brass strips held under a screw at the



inside end and resting over rubber tubes which can be compressed and closed by the screws *ssss*. These screws are made by soldering a piece of brass about 15×25×1 mm., with corners rounded, into the slot of a common wood screw. Under *R* is a piece of tubing several feet long when self-induction is to be shown; otherwise a short piece is used, like those under *a*, *b* and *x*, just long enough to connect the corresponding *T*'s. *C* is a pint aspirator bottle, with its small side tubulure inserted into the side of the rubber tube. The galvanometer is a *T* of peculiar form, as shown, closed at its top by a rubber tube and plug or pinch cock, as shown at *D*. It is really an electrometer, as it shows difference of pressure (potential) instead of current. In operation the board lies horizontal on a table and the tube *G* is stood up perpendicular so that it becomes a manometer. To start the apparatus fill the large bottle connected with *B* and set it higher than the board, tilt the *A* end of the board up to ten or fifteen degrees, place the *A* bottle lower than the *B* one and open the stop cock (key) *K*. The water will flow through the tubes, driving out the air, and a little manipulation of *D* will bring the water in the manometer to a convenient point. The board is then to be placed horizontal again. By compressing *a* and *b* about equally resistance to flow is introduced into these two arms of the bridge; then compressing *x* will require a corresponding compression of *R* in order to balance the pressure in *G*. It will be readily seen that the qualitative effects can be thus shown, but for quantitative relations it would be necessary to replace the crude compressors by graduated stop cocks. The capacity can be regulated by closing *K*, raising the *A* bottle and taking the cork out of *C*, allowing it to fill more or less and then replacing the cork; the capacity is proportional to the air left in *C*. When *C* is full there is no capacity in *x*. Self-induction is proportional to the length and curvature of the long tube, *II*, under *R*. Self-induction and capacity are shown by a manometer difference in level in the manometer upon opening and closing *K*, the throw (ballistic galvanometer) being in the opposite direction on closing *K* to that upon opening *K*. Changing the levels of *A* and *B* bottles will show that the results are independent of the direction or value of the pressure (electro-motive force). The manometer (galvanometer) may be made more and

more delicate by turning it down more and more nearly horizontal, and by projecting the image of *G* upon a screen its operation may be shown to a large class.

Individual ingenuity will devise many variations and improvements in details and experiments; the fancied merits of the apparatus lie in the galvanometer device and in the elimination of the effects of gravity pressure in the bridge itself, as well perhaps as in the self-induction and capacity elements.

The Fire Resistance of Structural Iron.

As a building material, iron or steel is in many respects far superior to wood. It is true that the former is exposed to destruction by rust, but the visible parts can be kept free from rust by painting them with a suitable material from time to time. The invisible, or rather inaccessible, parts can also be protected in a like manner at the start, but such coats of paint cannot be considered permanent preventives of rust.

Experience has shown that the best protector of structural iron is cement. By exposing pieces of iron which had been embedded in cement for a long time, it was proven that rust cannot assail iron thus protected, provided the cement surrounds the iron on all sides and so that no hollow spaces exist between the latter and the cement coat. Slag cement would not be suitable for the purpose, as it contains acids. The expectations entertained from the application of iron as a fireproof building material have only been partially fulfilled, however. In the beginning it was believed that by the exclusive use of iron in connection with other refractory materials, the problem of erecting actually fireproof buildings had been solved. The destruction by fire of numerous iron and stone buildings, however, which were deemed fireproof, showed that they had no claim to this distinction. They often fell in shortly after the outbreak of the fire. The collapse, as was later ascertained, was due to the fact that the metal parts, then mostly cast or wrought iron, had lost their carrying power. It was recognized from this fact that something had to be done to protect the iron from the direct action of the fire, so as to prevent its loss of carrying power and expansion. That the carrying power of cast and wrought iron decreases at higher temperature was shown as early as 1886, but the city government of Hamburg was the first to have exhaustive tests made, which corresponded in every respect with the conditions met with in a great conflagration. These tests included cast and wrought iron as well as wooden supports.

The supports were placed upright into an iron frame, and hydraulic pressure, amounting to about 15,000 pounds per square inch, put on. For heating the supports a furnace, lined with firebrick and provided with gas burners, was used. The furnace consisted of two parts, arranged on an upright shaft: the two parts could be closed and opened at will. The supports passed through the furnace so that a little space was left between support and top and bottom of furnace, permitting the introduction of air from below and exhausting the gasses of combustion above.

It was shown that unprotected iron supports lost their carrying power in from 17 to 59 minutes, according as the heat was increased faster or slower. Supports filled up with mortar or trellested showed hardly any better results, but proved again the necessity of encasing the supports by a fireproof or non-conducting material. The duties of the latter are to delay the advance of heat to the iron, and to possess sufficient strength to resist the shock of falling debris and the attack of the stream of water thrown by a fire engine. In the subsequent tests the supports were encased in slabs of plaster of paris, xylite or stone-work, asbestos, cement, etc. The results were remarkable. Provided with such casing the iron supports retained their carrying power for as long as 3 hours and 56 minutes. An oaken support without casing withstood a similar pressure in the fire for only 1 hour and 21 minutes. The heat of the flame at which the tests were made ranged between 1100 and 1300 degrees Centigrade.

A "BREATH FIGURE" may be obtained by pressing a coin or like object against a plate of washed glass for a few moments, and then bringing out the image by breathing upon the spot. During the visit of the Czar of Russia to Paris, "magic glasses," showing the Czar's portrait only when breathed upon, were sold in the streets. These were made by applying to the glass for a certain time a rubber stamp moistened with fluorhydrate of ammonia and fluorhydric acid, the glass being so slightly etched by this process that no trace is visible until moistened by the breath.

ASBESTOS LEATHER—the subject of an English patent by a German inventor—is made by dividing asbestos into very fine fibers, immersing and thoroughly coating with a rubber solution, and then evaporating the solvent. The fibers cohere perfectly. The mass may be pressed or rolled into any desired form, and the product is said to resemble leather very closely in peculiarities and structure.

The New Wide Tire California Law.

TO THE EDITOR:—Please inform me the width of tire for a wagon of one ton capacity according to the new California law.—E. A. JENKS, Harris, Humboldt Co., Cal.

The new law, which will go into effect January 1, 1900, does not prescribe tires in terms of weight capacity, but in dimensions of skeins and axles, as follows:

SECTION 1. The width of tires for wheels upon wagons or other vehicles to be used upon public highways of the State of California shall be, for the following styles of wagons, as follows: Two and three-fourth-inch steel or thimble skein axle, 1½-inch tubular steel or iron axle, not less than 3-inch tire; 1½-inch steel or iron axle, 2½-inch tubular or iron axle, not less than 3½-inch tire; 3-inch steel or thimble skein, 1½-inch steel or iron axle, 2½-inch tubular steel or iron axle, not less than 4-inch tire; 3½-inch steel or thimble skein, 1½ or 1½-inch steel or iron axle, 2½-inch tubular steel or iron axle, not less than 4½-inch tire; 3½-inch steel or thimble skein, 2-inch steel or iron axle, 2½-inch tubular steel or iron axle, not less than 5-inch tire; 3½-inch steel or thimble skein, 2½-inch steel or iron axle, 3 or 3½-inch tubular steel or iron axle, not less than 5½-inch tire; 4-inch and larger steel or thimble skein, 2½-inch and larger steel or iron axle, 3½-inch and larger tubular steel or iron axle, not less than 6-inch tire. Other styles of axle shall have tires of same width as those of equal carrying capacity above specified. All intermediate sizes shall have tires of the same width as the next larger size above specified.

To translate these dimensions into weight capacity, has been secured the following table of equivalents from one of the best authorities in the vehicle trade on this coast:

| Size. | Width of tire. | Capacity, pounds |
|---------------------------------|----------------|------------------|
| 2¾-inch steel or thimble skein. | 3 -inch. | 2500 |
| 1½-inch steel. | 3½-inch. | 2500 |
| 2½-inch tubular. | 4 -inch. | 3000 |
| 3 -inch steel skein. | 4½-inch. | 4000 |
| 1½-inch steel. | 5 -inch. | 5000 |
| 2½-inch tubular. | 5½-inch. | 7000 |
| 3½-inch steel skein. | 6 -inch. | 9000 |
| 2 -inch steel. | | |
| 2½-inch tubular. | | |
| 3½-inch steel skein. | | |
| 2½-inch steel. | | |
| 3½-inch tubular. | | |
| 4 -inch and larger steel skein. | | |
| 2½-inch steel. | | |
| 3½-inch tubular. | | |

This would seem to indicate that our correspondent must use a 3-inch tire, as that seems to be the minimum requirement. The law does not state that the law shall only apply to wagons of certain capacity, and there might be a strong question as to whether there is to be any requirement whatever for vehicles only capable of moving less than 2500 pounds.

A European Magnetic Ore Separator.

The Dellvik-Grondal magnetic separator for enriching fine iron ore slime has been employed for some years at Pitkavanta, in Finland. According to the *Wermlandska Annaler*, the raw ore is ground in water by means of a ball mill, which is capable of converting daily, with a force of 15 H. P., from thirty to sixty tons of moderately hard iron ore of about 2-inch gauge into the finest powder. The material appears to be worked with great difficulty; but nevertheless it is enriched from an iron content of about 25 per cent to one of 66 to 68 per cent, while the effluent only contains 1 per cent of iron, not including iron silicate. The separator has the appearance of two rather high drums, or barrels, which in one place are cut off by vertical planes and brought together. In one barrel revolves the separator, consisting of a vertical shaft fitted with cast-iron sheaves placed 2 inches apart, which derive their magnetism—strongest at the upper sheave—from electric winding; and in the second barrel, corresponding with the cast-iron sheaves, small iron plates revolve at the distance of from 1½ to 2 millimeters from the sheaves. The ore, formed into slime by water, runs directly from the ball mill, and trickles off from the upper conical portion of the separator on to its periphery. Particles not containing iron are washed away directly by a further quantity of water, allowed to flow into the separator; while the ore is attracted by the periphery of the sheaves, to which it adheres. The sheaves set up magnetism of the opposite name in the small iron plates of the barrel, owing to which the grains of iron ore leap over and immediately afterwards fall to the bottom, because the magnetism decreases with the distance from the separator sheaves. The iron ore thus obtained in the form of powder is made, without any addition, into briquettes, which are burnt at a temperature of 800 degrees Centigrade and melted in the blast furnace.

THE Denver, Colo., *Daily Mining Record* says: "A commercial test is about to be made in Chicago of a process for converting crude iron ore into the finest steel at one operation without the use of spiegel and manganese or intermediate processes. The inventor—a Toronto, Canada, metallurgist—made the discovery by accident, and as laboratory tests seemed to prove the much-sought-for process a success, he has decided to make a commercial test. A Cripple Creek man is interested in the invention and will furnish the money."

MICROSCOPIC INVESTIGATION is said to prove that the pores of wood invite the passage of moisture in the direction of the timber's growth, but repel it in the opposite direction.

Coast Industrial Notes.

—Los Angeles, Cal., is about to build an \$800,000 hotel.

—Portland, Or., is now credited with a population of 92,375.

—The sugar factory at Alvarado, Cal., started up this week.

—At Union, Oregon, grading was begun last week for the Union, Cornucopia & Eastern R. R.

—Nelson, B. C., has borrowed \$65,000 to spend for an electric light plant and water works.

—At Heppner, Oregon, have been sold this season 475,000 pounds of wool at 12½ cents a pound.

—It is estimated that this season's wheat crop at Pullman, Wash., will reach 600,000 bushels.

—The San Joaquin Valley, Cal., Road's rails are laid to Tulare. The first train arrived Aug. 31st.

—The Napa, Cal., Insane Asylum will build four miles pipe line, costing \$15,000, for an increased water supply.

—In the Marysville, Cal., cannery 450 employees are working fifteen hours a day. The payroll amounts to \$3000 per week.

—To St. Louis, Mo., from Albuquerque, N. M., was shipped last week a train load of wool, 1000 bags, containing 250,000 pounds.

—From Everett, Wash., the steamer Rlojun Maru last week carried 300,000 pounds of lead for the Japanese Government. Over 1,000,000 pounds are yet to be shipped.

—There are now over 2000 men at work on the construction of the Robson-Pentiction branch of the Columbia & Western railway, now building from Robson to Midway, B. C., a distance of 105 miles.

—The Blue Lakes Water Co. of Alpine Co., Cal., propose to put in new dams, clean and enlarge their ditch so that another possible dry season will not find the company without sufficient water to operate all of Amador's interests.

—"The Klondike" and that whole region is a good country for the investment of surplus money that the owner is able to gamble, but it is no country for a poor man or a man who must realize profitably on his investment or be forever ruined.

—The Columbia & Western railway is boring a tunnel near Brooklyn, B. C., 2000 feet above the Columbia river, that will be 3000 feet long, 21 feet high and 16 feet wide. It will require the excavation of 28,000 cubic yards, or \$5,000 tons, of rock. A \$22,000 compressor plant has been installed to do the work.

—A Seattle, Wash., paper asserts that when President Hill of the Great Northern railroad was there he admitted to a reporter that he had been compelled to refuse 60,000 tons of steel rails and 15,000 tons of cotton for Asia, which he might have received had there been a suitable merchant marine on the Pacific coast.

—Standing merchantable timber in western Washington officially figures up as follows:

| Variety— | Feet. |
|--------------|-----------------|
| Pir..... | 66,308,861,000 |
| Spruce..... | 6,403,405,000 |
| Cedar..... | 16,192,276,000 |
| Hemlock..... | 14,699,834,000 |
| Total..... | 103,504,376,000 |

—The California State Fair opens at Sacramento next Monday and continues till the 17th inst. Makers of mining and irrigation machinery find this a good center for exposition of their products, and the fact that the San Francisco Mechanics' Institute will hold no exhibition or fair this year is an additional reason for utilizing space at the State capital exposition.

—W. H. Hammond is at Porterville, Cal., from England, where he went to obtain financial backing for a scheme to develop electrical power in Tulare county. He is making contracts to furnish power for irrigation and other purposes. The plant will be established twenty-nine miles east of Visalia, on the Kaweah river. The estimated cost of putting in the plant and extending the system to Visalia, Tulare, Porterville and Lindsay is \$250,000.

—The Pullman Palace Car Co. is reported to have made the War Department a liberal offer to purchase Fort Russell, Wyoming, with its entire reservation, buildings and water system. The proposal was made as a standing offer to be considered and acted upon by the Government at its pleasure. The object of the company in making the proposal is to establish a great Western repair shop system centrally located between Chicago and the Pacific coast.

—The contract for the construction of the new electric light plant for Healdsburg, Cal., has been awarded to James Stanley of San Francisco, his bid being \$31,643. The California Bridge Co. of San Francisco was awarded the contract for the construction of the municipal water system, its bid being \$31,700. The Oakland, Cal., Bank of Savings' bid of \$32,650 for the bonds to be issued by the city of Healdsburg for the payment of the cost of these plants was accepted.

—Pres. C. H. Foote of the Illinois Steel Works has been visiting San Francisco and other coast points, and in an interview this week is reported as saying: "The great obstacle to the extensive manufacture of steel in California is the scarcity of fuel, of coal suitable for making coke. Steel works would pay well in California. Some of the richest manganese ore I have ever seen has come from this State. There is good iron ore here. We ship a great deal of steel material to the Union Iron Works. It can be delivered here at less cost than the iron ore of this State could be turned into steel here by the use of

imported coal. The absence of fuel is the only obstacle to the extensive making and marketing of steel in California. While I was in the State of Washington on my way to San Francisco I saw some coal mines. There, if any place on this coast, steel might possibly be manufactured. The certainty of an enlarged navy promises well for the steel business."

—Just now, when so much interest is being taken in the possibilities of the Pacific coast as a location for glass factories, the *American Manufacturer* thinks that the following statement recently made by Joseph Engomar, Sr., of Ottawa, Ill., will be of weight. Last year he went to Los Angeles, Cal., to start a flint bottle factory: "I was instructed to go to Los Angeles, Cal., and there build a factory containing two tanks to make flint bottles, if it were feasible to make all ends meet," said Mr. Engomar. "I did not find it so, which was the cause of my return. Figuring on the cost of raw material to make glass with in comparison with the East, I found bottles selling for less on the coast than in our home market, which indicates the coast as a dumping place for Eastern surplus. After producing figures to the Chamber of Commerce and head of the Santa Fe railroad, they informed me they had wondered why they could not have a glass factory on the coast, and that many glass men had been there to investigate, but left as they came. They said that I was the first man who ever produced figures to explain why glass could not be made there, and they were satisfied, and so was I. When you pay more for raw material than in the East, and glass sells for less, there is no business that can prosper. Five large agencies located in Los Angeles supply the wants of the southern coast. F. W. Braun & Co., jobbers in drugs and glass bottles, 401-407 North Main street, Los Angeles, carry alone half a million bottles in stock. This is but one company out of five in Los Angeles. San Francisco is full of similar ones. Towns being greatly scattered along the coast, Pacific railroad rates will eat a man up, to say nothing of raw material and cheap glass."

Personal.

E. DONNELLY becomes Supt. George Washington mine, Sugar Loaf, Colo.

J. R. DE ROJAS, Supt. Texas M. Co., Nevada City, Cal., is in San Francisco.

J. D. TREGLOAN has taken charge of the St. Helena mines, Sonora, Mexico.

B. F. HARTLEY, Supt. Zentgraf mine, Newcastle, Cal., is in San Francisco.

ROBT. WALKER of Salt Lake City becomes Mgr. Omaha M. Co., Mercur, Utah.

W. H. MARTIN, owner Mayflower mine, Nevada City, Cal., is in San Francisco.

CURTIS H. LINDLEY has returned to San Francisco from a visit to Nevada Co., Cal.

P. KERWIN of Virginia City, Nevada, is at the Allison Ranch mine, Grass Valley, Cal.

A. McDONALD, Supt. Kanaka mine, Groveland, Cal., has returned from San Francisco.

O. P. POSEY, Mgr. Cochiti G. M. Co., has returned from Denver, Colo., to Bland, N. M.

J. R. TREGLOAN JR., Supt. South Spring Hill mine, Amador City, Cal., is in San Francisco.

J. A. LIPMAN, Supt. Eaglebird mine, Maybert, Cal., has returned from San Francisco.

E. J. POINGDESTRE, managing owner Johnson mine, Forbestown, Cal., is in San Francisco.

P. WOODS, Gen. Mgr. Eaglebird mine, Maybert, Cal., is in San Francisco for a month's sojourn.

E. C. VOORHEIS, Gen. Mgr. Lincoln mine, Sutter Creek, Cal., has returned from San Francisco.

M. W. MATHER, Supt. Croesus G. M. Co., Moore's Flat, Cal., has returned from San Francisco.

SUPT. BUZZO of the Alice M. Co., Walker-ville, Montana, left for a vacation trip to California.

P. L. SCHUMAN, Supt. North Star Con. mines, Happy Valley, Cal., has returned from San Francisco.

O. O. HOWARD JR. has returned to San Francisco from the Viznaga mine, near Alamo, Lower California.

R. A. F. PENROSE JR. of Prescott, Ariz., has left Salt Lake City, Utah, for the Camas Belt, near Hailey, Idaho.

J. C. WRIGHT of Indianapolis, Ind., principal owner Grand Victory mine, Placerville, Cal., is in San Francisco.

I. A. FOORMAN of San Francisco, secretary M. & C. S. Canal Co. of Calaveras Co., Cal., is at Mokelumne Hill, Cal.

C. E. GRUNSKY, C. E., of San Francisco has returned from a professional trip to the Blue Lakes, Adirondack Co., Cal.

N. D. RIDEOUT, owner Magalia mine, in Butte county, has returned to Marysville, Cal., from San Francisco.

JNO. F. DALY, Secy. and Treas. of the Union Gas Engine Co., is again at his post after a four months siege of typhoid fever.

A. B. FRENZEL of New York is examining a copper property at Kingman, Ariz., whence he will reach San Francisco next week.

C. A. HAMILTON, San Francisco, is in Shasta and Trinity counties, Cal., with several New York capitalists investigating mines.

W. R. CRABBOURNE, Gen. Mgr. Mikado mine, Leadville, Colo., is in San Francisco from the Lindsay mine, Maybert, Cal.

J. EDWARDS of New York City is in San Francisco en route to Mexico to close a deal on a mine for London, England, capitalists.

WM. R. BEALL of San Francisco left this week for London, England, to report to his company on an extensive mining property in

Shasta county, Cal. He expects to return in five weeks.

M. P. BENNETT of Placerville, Cal., Superior Court Judge of El Dorado county, and a mine owner at Garden Valley, Cal., is in San Francisco.

F. T. NILSON, Superior Court Judge of Nevada county and mine owner at Nevada City, Cal., is in San Francisco, en route to Catalina island.

F. H. HALL of San Francisco has returned from Shasta county, Cal., where he has been examining mining properties for a San Francisco capitalist.

J. B. ELDRIDGE of San Francisco has returned from Lower California, where he examined a mining property for a London, England, company.

F. W. BRADLEY, Mgr. Bunker Hill & Sullivan mine, Wardner, Idaho, and the Spanish mine, Washington, Cal., left Salt Lake City for San Francisco.

C. NIGEL STEWART of London, England, is en route to San Francisco on his way to Mexico to conclude negotiations for a mining property for the S. J. T. Co. of Scotland.

F. P. KING, Gen. Mgr. Blue Gravel mine, Yreka, Cal., owned by the Colorado Exploration Co., has returned from San Francisco, where he bought mining machinery.

CHAS. BUTTERS is at Salt Lake City, Utah, giving attention to the experimental metallurgical plant he is erecting there. He expects to return to San Francisco after thirty days.

EDWARD N. LINDSAY has gone to San Diego Co., Cal., to examine some copper and gold prospects. If the weather is not too warm, he expects to visit the Colorado desert before his return.

C. D. LANE, who has large mining interests on the Pacific coast and in Nevada, Arizona and Mexico, writes from Kotzebue sound that he expects to reach San Francisco the middle of October.

BERTRAM HUNT, late local Mgr. for the MacArthur-Forrest cyanide process, left for western Australia, via New York, last Thursday, to assume charge of the property of the Eureka G. M. Co., Ltd.

THOS. CLARK, managing owner Landecker mine, El Dorado, Cal., and Pres. El Dorado County Miners' Association, has returned from San Francisco and Pacific Grove to Placerville, Cal.

F. LEONARD, Pres. of the Comstock Tunnel Co., has gone to New York. The meeting of the stockholders will be on Oct. 1st. Among other propositions, will be one to drain the mines of Silver City through an extension.

R. M. ECKART JR., Asst. Mgr. Allison Ranch mine, Grass Valley, Cal., is expected home to-day from Honolulu, where he has been superintending the installation of Riedler pumps on several sugar plantations.

MAJOR WALSH, the retiring gold commissioner of the Yukon, is back again from Dawson. He says the Klondike is "all right," but that people going to that region should "scatter out" and not all go to Dawson. He estimates this season's gold output at \$11,000,000. Major Walsh is on his way to Ottawa, to report, where he says he will recommend that Parliament clear the White Horse rapids and Thirty-mile river of the rocks that have done so much damage this year. He also recommends a telegraph line from Dawson to the provinces, and thinks one will be constructed before the year closes. He believes that Dawson will be a permanent camp.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

RETORT OIL BURNER.—G. H. Larkin, San Francisco, Cal. No. 609,552. Dated Aug. 23, 1898. This invention relates to an apparatus which is especially designed for the combustion of crude or other oil as a fuel. It consists essentially of a vaporizing chamber or retort, a means for supplying and delivering oil thereto, a surrounding superheating chamber with means for supplying steam to this chamber surrounding the oil vaporizing retort, means for finally delivering the steam to mingle with the vaporized oil and in a novel construction of the apparatus and in a means for supplying various burner tips through which oil and steam are discharged into the combustion chamber.

AUTOMATIC PRESSURE EQUALIZING BEER FAUCET.—C. R. Martin and L. A. Spinelli, San Jose, Cal. No. 609,554. Dated Aug. 23, 1898. The object of this invention is to provide a faucet by which beer or other effervescent liquid may be drawn in a comparatively solid condition and without a great mass of foam or froth caused by the escape of gas from the liquid when the pressure is relieved and to so regulate the pressure by an automatic operating mechanism that the gas pressure can be retained within the cask or receptacle until the liquid has all been withdrawn while the reduced pressure is maintained in connection with the drawing faucet. It consists of an expansion chamber having at one end a draw-off faucet and at the opposite end an inlet passage connecting with the cask or source of supply. Within the expansion chamber is a float, and a valve controlled by the rise and fall of the float serves to close or open the inlet passage so as to keep a supply of liquid within this chamber. An elongated tapering valve closes outwardly upon a corresponding seat and a spring serves in conjunction with the pressure within the cask to keep this valve closed. When connection is made between the part containing this valve and the expansion chamber this tapering valve is

forced backwardly from its seat and leaves a narrow channel around itself through which the liquid flows and passes thence into the expansion chamber, the pressure being thus regulated so that, while it maintains the beer or other liquid in a perfectly sharp condition, it prevents too great an escape of gas with the liquid.

ADJUSTABLE HYDRAULIC NOZZLE.—A. B. Eastwood, Newcastle, Cal. No. 609,578. Dated Aug. 23, 1898. This invention is designed as an attachment for hydraulic nozzles to which water is brought under a high head, these nozzles serving to direct the water into the buckets or wheels which are driven by its momentum. It is often necessary to vary the power of the wheel and regulate it to the load which is to be lifted, and by reducing the jet of water as the power required is diminished a considerable saving of water results. The device consists of a transversely movable slide having a line of nozzles of varying diameter projecting from one side, a casing within which said slide is movable having a slotted cover through which the nozzles project on one side, while the supply pipe connects with the opposite side, and a means connecting with the slide enables the operator to move it instantly so as to bring either one of the nozzles in line with the supply pipe.

REVERSIBLE DISK HARROW.—C. T. Settle, San Jose. No. 609,560. Dated Aug. 23, 1898. The object of this invention is to provide an apparatus for a more thorough and complete cultivation of land, and especially the working of land between rows of trees beneath projecting branches thereof and in other places outside of the line of travel of the team. It consists essentially of a main frame having supplemental extension bars adjustably attached transversely thereto, vertical boxes adjustably fixed to the ends of the extension frame and revolvable disks mounted in groups upon axes which are journaled in the lower ends of standards turnable in vertical boxes so that the disks may be adjusted with relation thereto. A horizontal shaft is journaled transversely upon the bed of the machine with crank arms at the ends and rods connecting the crank arms with the ends of the swivel beam, and by means of an actuating lever and pawl and rack mechanism the shaft may be turned and locked at any desired point.

VOTING MACHINE.—Salomon Ducas, San Francisco, Cal. No. 609,576. Dated Aug. 23, 1898. This invention relates to mechanical voting machines, and its object is to so construct the apparatus that it may be easily changed or altered to accommodate it for use at elections, in which different numbers of candidates are to be voted for while at the same time maintaining a simple, cheap and effective apparatus. Within the frame or casing are a series of pins which correspond with the names of the different candidates, and which, when operated, would cast a vote for the particular candidate, and with these are a means to prevent the operation of more than one of said pins for a single candidate or the operation of any one pin more than one time by a single vote. These voting pins carry type, and paper strips are arranged to move under the types with reels upon which the strips are carried so that each vote is imprinted and properly recorded. In connection with this is a mechanism by which straight party ballots may be voted without going through the operation of voting for each particular candidate.

FOLDING TENT.—A. B. Lloyd, San Francisco, Cal. No. 609,553. Dated Aug. 23, 1898. The object of this invention is to provide an easily transportable shelter tent combining in one structure the covering material and extending framework, the whole being so arranged and connected that it may be folded into a very small compass for transportation. The framework consists of rods pivoted at one end to common center pieces, which are separated transversely to a distance equal to the desired width of tent. These rods radiate outwardly and each pair is connected by transverse bars with transversely jointed hinges. Over these bars is fitted a covering which is attached to the side and transverse bars so that it may be extended or folded in unison with these bars and the whole packed when required into small dimensions for transportation. The covering material may have side and end flaps extending inwardly when the device is set up and the mattress or bed lying upon these inwardly projecting flaps will hold the contrivance firmly in place. Openings are made in the side and an open-mesh fabric inserted which serves for ventilating purposes.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING AUGUST 23, 1898.

609,576.—VOTING MACHINE.—Ducas, S. F.
609,578.—HYDRAULIC NOZZLE.—A. B. Eastwood, Newcastle, Cal.
609,580.—CHART TABLE.—Greenleaf & Barker, Hoquiam, Wash.
609,582.—RETORT OIL BURNER.—G. H. Larkin, S. F.
609,583.—FOLDING TENT.—A. D. Lloyd, S. F.
609,581.—RAZOR SHARPENER.—A. C. Mack, Portland, Or.
609,554.—BEER FAUCET.—Martin & Spinelli, San Jose, Cal.
609,595.—FRUIT PRESS.—J. R. McKee, Bardsdale, Cal.
609,580.—DISK HARROW.—C. T. Settle, San Jose, Cal.
609,713.—FLOW WHEEL BOX.—C. P. Wakefield, Livingston, Cal.
609,721.—FAUCET.—W. Zoller, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

A 2000 I. H. P. Triple-Expansion Mill Engine.

A new set of triple-expansion mill engines for driving an extension of the mills of the Belfast Ropework Co., Ltd., is of sufficient mechanical interest to warrant illustration and description. This company is said to own the largest rope and twine works in the world; the extension just completed covers an area of eleven acres, and is capable of producing 150 tons of twine per week.

The illustration shows the engines to be of the inverted triple-expansion type. The cylinders are 24", 38" and 50" in diameter respectively, the stroke being 24". All the cylinders are bolted together above the tops of the supporting columns, forming a rigid arrangement and securing great steadiness on the upper platform. The receivers are arranged between the cylinders with the steam and exhaust valves directly connected, avoiding all connecting pipes. The valves are arranged at right angles to the center line of the engine, thus permitting the withdrawal of any valve by simply removing the back covers, leaving all the other gearing intact. The steam valves are actuated by a cut off motion, the high-pressure being automatically controlled by the governor, while the mean-pressure and low-pressure are adjusted by hand while the engine is running. Metallic packing is fitted to the piston rods and valve spindles. The cylinders are supported on six cast-iron columns, three of which form the guides and support the rocking levers for the valve motions. The eccentric rods are carried diagonally to the front of the engine directly under the vertical rods, to the cut-off gear and valves, thus avoiding undue strain on the center pins and giving great accessibility to the working parts. The bedplate is of massive design, and is made in three sections, each carrying two of the columns. The crankshaft bearings (six in number) are lined with white metal, provided with vertical adjustment, while special provision is made for removing the brasses whenever necessary. The crankshaft (15" in diameter) is of the built-up type, being made of twelve parts, all the parts having been bored right through, so as to ensure soundness of the forgings. The fly-wheel shaft is coupled to the end of the crankshaft in the usual manner, having bearings 16" and 36" on each side of the flywheel, also lined with white metal. The flywheel is 20 feet in diameter and is made in four segments, each weighing about thirteen tons and arranged as two wheels in halves side by side. The wheel is grooved for forty-two 1½" ropes, and is hooped at the bosses and keyed on the shaft by four keys. The total weight of the wheel alone is about fifty tons.

The air and circulating pumps are at the back of the engines, being worked by rocking levers of low-pressure and high-pressure engines respectively. The air pump is single-acting, 30" in diameter by 18" stroke, with feed pumps 4" in diameter and 18" stroke, arranged on each side. The circulating pump is double acting, 30" by 18", drawing from a reservoir and discharging through the condenser, either back to the reservoir or direct to the river. The surface condenser placed outside of the engine-room is of circular form, having 4500 square feet of cooling surface, with brass tubes and plates. A special arrangement is provided for working jet condensing, if required, which can be resorted to without delay.

A special design of double-cylinder barring engine is provided, working into teeth on the rim of the flywheel, and this automatically throws itself out of gear when the main engine starts. The steam pipes are of wrought steel, and fitted with a water catcher. The stop valve on the engine has been fitted with an electrical stop motion, operated from various parts of the works, as a special safeguard, in addition to the knock-off valve. A supplementary governor is also fitted, which, combined with the main governor, ensures very steady driving.

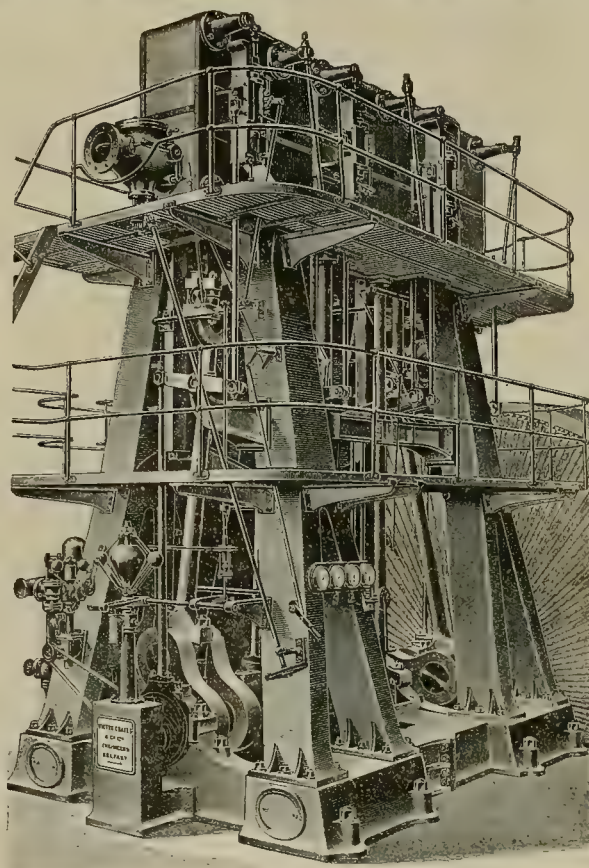
In the boiler house are six boilers,

made by the same company, for a working pressure of 300 pounds. These are of the two-flued type, 8' diameter by 30' long, each weighing about thirty-five tons, including fittings. The flues are 3' 2" in diameter. The shell of each boiler is made in six rings of plates to the length of the boiler, each ring being in one plate, having the longitudinal seams made with double butt straps. These are treble-riveted, six rows of rivets in each strap, giving a high percentage of strength to the joint. The circular seams are double-riveted lap joints.

The front end plates are attached to the shell by an external steel angle welded into a solid ring, and double-riveted to the shell and end plate. The back end plates are flanged inwards to connect to the shell and are attached by a double row of rivets. Both end plates are very substantially stayed by diagonal plate stays, attached to double steel angles on shell and plates by a double row of rivets in each angle, due

by a rattlesnake, take a sharp knife and cut through the fang wounds just deep enough to make it bleed, then take some mud and make a dam around the wound, break a cartridge and pour some of the powder on the wound, then touch it off with a match and the explosion burns the poison and kills its effect. If there is no mud convenient or water to make it, put on the powder and fire it all the same. The mud dam is simply to confine the powder so that it will not burn a larger space than is necessary."

WARNINGS by sound to vessels in fog are unreliable on account of the curiously uncertain effects of air currents, which often render inaudible the signals of nearby foghorns, while distant sounds are plainly heard. To detect approach to danger with greater certainty, H. Herberts, of Newark, N. J., proposes the use of the thermopile. This apparatus is capable of registering a change of temperature as small



A 2000 I. H. P. TRIPLE-EXPANSION MILL ENGINE.

provision being left round furnace openings on the plates for the expansion of the flues. Each flue is composed of sixteen steel rings, formed of plates bent truly to a circle and welded along the length, and then flanged to connect to each other, a flat bar being inserted between the flanges for caulking, thus ensuring the rivets being kept out of the fire and providing an expansion joint. All the edges of the flue rings are turned up by machinery. The flues are attached to the front end plate by an end plate having openings flanged outwards to suit the external diameter of the flues, and at the back ends by similar flanged openings, the flanges, however, projecting inwards. Each flue is fitted with five parallel cross tubes, each being made from a single steel plate rolled to a circle and welded along its length, and afterwards welded into flue rings, thus dispensing with any riveted joints. Wrought steel stand pipes are riveted on the boilers to take all mountings, while the man-hole openings in the top of the shell and the bottom of the front end plate are provided with wrought steel compensating rings, having faced joints to receive stamped steel doors.

THE following cure for rattlesnake bites is guaranteed by a U. S. Army surgeon in Arizona, who says it never fails if used in time: "When bitten

as a millionth of a centigrade degree, detecting the heat of a candle at a distance of a quarter of a mile; and by using two horizontally rotated thermopiles, the two heat-collecting funnels pointing in opposite directions, it is believed that not only would the proximity of a vessel be shown by its heat radiations, but nearness of an iceberg, and even of land or a sunken wreck, which would be indicated by the same laws of radiation.

DUODECAPLEX telegraphy has been receiving the attention of M. Mercadier, a French electrician, for many years. In experiments now being made on the Paris Bordeaux line, twelve Morse transmitters are worked simultaneously on a single wire, each sending its signals to the proper receiver at the end of the line. This result is attained by means of interrupted currents. Each transmitter receives its current through an electrically vibrated tuning fork, whose vibrations are of the period necessary to cause resonance in the proper receiving circuit, which has its self-indication and capacity correspondingly adjusted. The receiver, called a monotelephone, is also acoustically adapted for damping out undesired signals, the combination effecting so complete a sifting that only a slight and not troublesome murmur comes from the unintended signals.

Riveted Pipe Steel.

At the recent Detroit meeting of the American Society of Civil Engineers, President Fteley in his annual address reviewed the work of the past year in different branches of the engineering profession. Concerning steel pipe construction he said: "Construction has been favored by the decreasing price of iron and steel. The price of cast iron pipes, especially, has never been so low as it is at present. Steel riveted pipes, for the conveyance of water from the source of supply to the point of consumption, in recent years, have been introduced more liberally in the East. For long distances, with large diameters, under heavy water pressure, especially when few connections have to be used on the way, these pipes are as much superior to cast iron pipes as the steel substitute is to the old cast iron tension member of a bridge and it is not doubted that they will be ultimately used to the exclusion of others, but, unfortunately, although similar pipes made of wrought iron have been successfully used for years on the Pacific coast and elsewhere, it cannot be said that the coatings used to preserve the metal from oxidation are entirely satisfactory.

"The rivets used for fastening the pipes and the tapping joints impede the flow to a certain extent, and a pipe has been devised the fastenings of which are entirely outside and provide the pipe with a smooth bore. The great improvement in steel welded pipes of large diameter will also remedy that defect to a large extent. An order is reported of several thousand tons of welded pipes to be made of Siemens-Martin mild steel, 24 feet long and 42 inches in diameter, for the Birmingham Water Works. The possibilities of steel pipes are well illustrated by the proposition to convey a much-needed supply of water of 5,000,000 gallons per day, to a mining district of Western Australia by means of a pipe 30 inches in diameter and 328 miles long."

THE stability of the solar system, demonstrated by Laplace from Newton's law of attraction, is shown by M. H. Poincare to be a mistaken inference, overlooking the modern conception of energy. Everywhere energy is being dissipated, work taking the form of heat, and instability is the law of all natural phenomena. Even the heavenly bodies do not escape the law tending toward final repose. Their energy is being slowly dissipated through the friction of the tides, and we are approaching a state in which the sun, the satellites and planets will all revolve with the same speed about a common axis. The condition cannot be permanent. Even if there is no resisting medium in space, the planets' magnetism will continue to have a retarding effect, and in the end all planets will fall to the sun.

A COMPILATION by the *Scientific American* shows that at the present time the various maritime powers of the world possess about fifty first-class armored cruisers, either completed or under construction. England has eleven of these swift and formidable crafts built and building. France has fourteen. Spain has nine. The United States has precisely two. We are far behind other nations in war vessels combining the speed of racing cruisers with ample armor protection and heavy batteries. These vessels have a function all their own in warfare. Their place can never be taken by sixteen-knot battleships.

EVEN seasoned floors will sometimes open at the joints, making ugly cracks, harboring dust and disease germs, besides admitting more air, etc., than is desirable. A ready and cheap way of filling these openings is to cut up and shred a large quantity of old letters, newspapers, etc., and pile them into a large pot with water, adding a handful of gum arabic to each quart of mixture, and let the whole simmer to the consistency of thick cream. While hot, fill up the cracks, pressing same down, and finish smoothly. When cold, it as hard and tough as the wood flooring itself and ready for a coat of floor paint.

Mining Summary.

ALASKA.

The first consignment of gold dust from the new Pine Creek district has arrived—300 ounces. The gold is a bright yellow, similar to the Little Manook gold, and free from silver and rust found in Klondike gold.

Another stampede is reported to the Hoota-linqua, and from \$20 to \$40 per day to the man is what the pay dirt is said to be running. Many have already left Glenora and Telegraph creeks for the new diggings, and more will follow as soon as provisions can be rushed over to the Teslin.

More finds are also reported from the Stokene. William Reed of Chicago, owner of the discovery claim of the placer find made on the river, has returned to Wrangell. He says his claims are worth from \$5 to \$8 a day to the man.

Pres. P. B. Weare of the North American Transportation and Trading Co. has had a special investigation made this summer of the coal deposits on the Tanana and Yukon rivers and the copper ledges on the Koyukuk river. He brought down rich specimens of both ores and pronounces the Koyukuk copper samples to be the finest he has ever seen. Weare says mines of both minerals will soon be developed on the Yukon, with every prospect of great profit.

A recent report was published in many papers that 3000 Americans were starving on the Teslin trail, between Telegraph creek and Teslin lake. The U. S. Government asked the Canadian Government to investigate the matter. This has been done and a report received saying only 1500 people altogether are on the trail and that they are well supplied with provisions.

The steamer Roanoke arrived at Seattle, Wash., Aug. 30th, from St. Michael, Alaska, with 458 passengers and about \$1,000,000 in gold dust. Most of the passengers were men who went to Dawson in last year's rush. They have no gold, but lots of experience. The fortunate passengers numbered about seventy-five. Of these probably twenty-five had over \$1,000 each. The amounts held by the remaining fifty ran from \$500 to \$5000.

ARIZONA.

Progress is satisfactory at the Table mountain, Pima county, copper camp. There is said to be about 150,000 tons of ore on the dump, including 20,000 tons of high grade. A large stamp mill will be erected there shortly. —E. E. Greenwood worked twenty-two tons of ore from the Sunrise at Placitas, from which the returns were seventy-nine ounces in gold, or an average of \$50 per ton. —Work on the Planet-Saturn mine in Fool's gulch, Yavapai county, which was suspended on account of the flooding of the mines, will soon be resumed. —The plant of the Mammoth G. M. Co. at Mammoth is in operation on 200 tons of tailings. There are twenty men employed. Fifty stamps are dropping.

It is said that three new steam hoists will be erected on mines at Chloride, Mohave county, this fall. —The new furnace of the United Globe mines was blown in recently and is making a good output of copper. —The Chicago mill at the Jeff Davis ranch has started on 250 tons of ore from the Jersey Lily mine. —F. Nagel cleaned up gold bullion weighing seventy-nine ounces from thirty-two tons of ore from his Sunrise mine, at Placitas. —The Storm Cloud mill in Yavapai county is crushing \$25 rock from the Storm Cloud mine. —Development at the Elkhardt mine in Mohave county is going forward. Water has been struck in the mine in sufficient quantities to run the concentrator ten hours a day. It is proposed to sink the shaft 500 feet. —Business at the sampling works at Tucson is resumed by C. B. Wores.

Yuma Sun: The smelter at Kingman has reduced its rates to \$5.50 per ton for ores which run under \$50 per ton, and \$7 for ores running higher. —Ore from the Gunboat mine near Peoria, Maricopa county, will be reduced by the cyanide method. About a three-ton plant will be erected to start with. —The output of Mohave county's mines is computed to be \$200,000 per month. —Considerable ore is being taken out of the Loudon-Galley group of mines, in the Whetstone mountains, Cochise county. O. B. Hardy, of Nogales, has a bond on the property. —From the Prince Albert mine, of White Hills, two tons of ore smelted ran 1600 ounces silver and an ounce gold to the ton. The balance of a shipment went 200 ounces silver and half an ounce gold. —A small cyanide plant is being erected at Fortuna, and experiments being made to determine what is needed to reduce the immense pile of tailings which has accumulated from the 20-stamp mill. It is estimated that the tailings contain in the neighborhood of \$750,000. —Some time between September 10th and 20th smelting will be resumed of the ores of the Old Dominion Copper Co.'s mines at Globe. A large force has for six weeks been making repairs and improvements at the smelter and hoisting works.

The increased business of chloriding in the mining districts contiguous to Tucson, is evidenced by the ore received daily at the sampling works. —The West Oro Bonita mine, in Tiger district, is said to be showing well. A tunnel driven on the vein nearly 200 feet exposes an ore streak of \$40 gold rock 2 feet in width.

CALIFORNIA.

Amador.

Republican: At Jackson the Zella mine is being worked to a great extent in the 1000-foot level. The shaft is continued deeper. About one-half the usual force is employed. —The scarcity of water has not affected the Argonaut mine. Work is going on as usual, and it is very likely to continue, as it has secured the first right of water by getting a twenty years' lease on it. —Work at the Amelia

mine is progressing. The shaft is down 750 feet. —Supt. Truscott of the Oneida says that the result of the mill test made at the Zella was encouraging. Since drifting commenced on the ledge he has run 1000 feet, and the ore tested was taken from these drifts, without stopes or upraise. On the north end a body of ore about 300 feet in length and varying in thickness from 3 to 30 feet has been found, and, although its grade is not high, it is fair, and sinking will be commenced soon. —The Central Eureka at Sutter Creek is experiencing some financial trouble. The shaft is down 1150 feet and a good ledge is reported.

Dispatch: At the Amador gold mine sinking continues. Supt. Dye thinks there will be no occasion for a shut-down. He is putting the shaft down as rapidly as circumstances will permit. No drifting is being done, so the mill is not running. The shaft is down 1075 feet and the rock continues hard. It is the intention to sink the shaft to a depth of 1500 feet before drifting again.

Butte.

On Butte creek near Chico Marsh & Co. are taking out from \$40 to \$60 a day, working four men.

The Oroville Register says that the Banner mine, which has been idle part of the summer, has put on seventy-five men, part of whom are bringing in water from Cherokee and others taking out quartz. —Owing to the low stage of water in the several branches of the Feather river new mining claims have been opened up, many of which paid fair profits. —At the R. M. mine near Buckeye the tunnel has reached 165 feet, running on the ledge. A mill run yielded \$15 a ton, exclusive of sulphurates.

Calaveras.

The drouth has occasioned cessation of work in nearly all of the principal mines. Water is a scarce commodity. It is sold in Valley Spring by the bucket.

Work is active in the Lightner mine, near Angels. The mill is running night and day, and the ore is good grade.

Chronicle: The Machu mine at West Point will be unwatered and resume operations shortly under the superintendence of R. Wilkins.

Prospect: The Lightner mine will run their plant by electricity. The California Exploration Co. have begun to set poles to run their wires into Angels.

The Mokelumne & Campo Seco canal is being cleaned and enlarged. The canal is being made a foot wider. It is estimated when completed it will carry 2000 inches of water. About fifty men are employed.

El Dorado.

(Special Correspondence). —The domestic troubles of the old Strable Slate Co. at Kelsey have been adjusted and work will resume within a few weeks. The property has been idle nearly four years. The new company has incorporated with a capital of \$50,000 and is composed of San Francisco men. There are 360 acres in this quarry and the slate is of superior quality.

Kelsey, Aug. 30th, '98.

(Special Correspondence). —The leasers of the Hill Ranch mine near El Dorado are meeting with success in the development of the property. A ledge of high-grade ore has been found which far exceeds in its output the cost of machinery and development of the mine.

There has not been at any time in the history of the county such thorough and extensive prospecting done as is going on in all parts at this writing. The shortness of water has had a beneficial tendency in this respect and the outcome will be of advantage.

The miners in the American river bed are meeting with good success. There are about 150 men working between Coloma and Kelsey, a distance of seven miles.

Placerville, Aug. 29th, '98.

Nugget: Notwithstanding the drouth, a great deal of development work is being done in the county. —At the Rose Kimberly they are drifting on the ledge on the 200 level. —It is said that the Jasper Con. has been bonded to a San Francisco company and that development work is to be resumed at once. The Jasper has been idle for a year. —At the Boulder they are drifting on the ledge in the lowest tunnel. An air compressor is being installed for three drills. A 20 H. P. engine is also being added. Ten stamps are to be added immediately to the 10-stamp mill. —At the Houx mine near Rescue they are cross-cutting on the 100-foot level. —Hayward & Lane are developing the Boneset under bond. The tunnel has been driven in on a 4-foot ledge 120 feet. —Unwatering the Pine Hill G. & S. Co.'s property near Granite Hill is under way and development work will soon be resumed. J. Eddy of Grass Valley has been appointed Supt. —In Weber creek district the Japanese is having a test crushing of fifty tons made. —Raymond & Tanner have bought the Sampson quartz mine near Diamond. —Kipp Bros. discovered a pocket while digging a well on their place in Jay Hawk from which they have taken over \$3000.

Kern.

The Eureka mill at Johannesburg is running on ore from the Kinyon mine. The tanks for the cyanide plant will soon be completed.

A ledge running from 12 to 14 feet in width is reported discovered in the Rebecca mine near Randsburg. The ore is said to horn well and shows specimens of free milling gold. —A strike is reported in the Buckboard mine in the Stringer district, Randsburg. The owners of this mine have worked steadily on it for eighteen months. —The Little Butte mine is said to be keeping well up to the expectations of its owners. Some rich ore is being taken out 300 feet from the surface. —At the Windy claim, owned by J. Singleton, Pres. of the Yellow Aster M. Co., the shaft has been enlarged and made a double-com-

partment shaft. They are now sinking a second shaft on the property.

A strike is reported in the Blackhawk mine of a ledge from 12 to 14 inches wide. It is estimated that the ore will run from \$300 to \$400 per ton. The gold saved from the hornings amounted to several dollars the first day. Beginning the first of the next month they will have a mill run made at the Johannesburg Reduction Works.

Mono.

Last week's Standard Mill statement reports ore crushed for the week, 206 tons; average assay vanner tailings, \$9.85; concentrates produced, 2 tons; assay value, \$196.95; amalgam produced, 1089 $\frac{1}{2}$ ounces; value per ounce, \$2.81. Tailings plant No. 1 treated 299 $\frac{1}{2}$ tons tailings for the past week. Plant No. 2 is still in course of construction.

Nevada.

(Special Correspondence). —The Washington district of this county, which years ago had several productive mines, none of which were worked to any great depth, is again becoming the scene of resumption of work on these same properties.

The Eaglebird mine at Maybird is a fair illustration of success, showing that the mine was not exhausted of its treasure.

Work on the Ormonde has also shown that early work had not been to the last depth of the paying portion of the property.

The prospecting of the old Lindsay mine by a St. Louis company that has acquired wealth in the mines of Leadville will be thorough and will show what remains in this long abandoned mine, which yielded well in earlier years of its history.

The Gaston Ridge near Graniteville, abandoned at 400 feet, in which a 2000-foot tunnel has since been run, cut the ledge at nearly 700 feet depth, and the milling capacity of the ten stamps has been doubled.

The German mine near Washington, which for several years sought a market, is not for sale now, but work will be pushed by the company to ascertain its worth.

The St. Patrick mines, a large low-grade property, are receiving attention, and further development will be pushed.

The formation from Washington toward Maybert for three miles is slate, and then changes to granite.

Preparations are being made in this section to guard against possible future contingencies in power, and another year, judging from present indications, will see the mining properties of this section well advanced in their work, and among these named two will be dividend-paying in their output.

Washington, Aug. 29th, '98.

The shaft at the Odin mine, near Nevada City, is nearly 100 feet deep. It is expected to reach gravel at 500 feet.

The Champion M. Co. has finished the new dam and the reservoir is being filled with water. This will enable the company to run both mills and all the seventy stamps, a portion of which have been hung up because of a breakage at the reservoir. The dividends which have been passed for several months and that for several years had been of a regular monthly occurrence will soon again be a feature in the company's workings. —The Nevada County Electric Power Co. will build an independent line from the power house to Grass Valley, a distance of nearly eight miles.

At the W. Y. O. D. mine, Grass Valley, overhauling the mill, retimbering the shaft, and putting the machinery in first-class order has been finished, and the full complement of men will be put to work by Supt. Simmonds without delay. —Some rich ore, such as used to come out of the mine in former days, was struck in the Phoenix recently. —Maroney & Webb, at French Corral, have bonded the Slide quartz mine, and work will soon begin for developing the property.

Union: M. Von Reichbach, Supt. Golden Gate mine, near Grass Valley, at a depth of 350 feet has found a ledge which averages over 1 foot wide. The company operating the property will next month commence the erection of a 5-stamp mill, which will be run by electricity. —D. Voss, who took a bond on the Lecompton mine, near Nevada City, has found good ore which gives indication of permanency. The ledge is from 2 to 12 inches in width, free milling and heavily mineralized.

Placer.

Herald: At the Cash Rock mine on the American river, near Forest Hill, Supt. Waterhouse has two shifts at work and expects to reach bedrock in a few days. They have found pay dirt and look for a good body of pay gravel when the bed of the river has been reached. Owing to the great scarcity of water in the mountains this has been a favorable season for river mining. Mr. Waterhouse is employing 150 men at the Cash Rock. —Supt. McAulay is working twenty men at the old Mayflower mine. —Grenell & Roush, lessees of the Breeces & Wheeler claim at Bath, are employing thirty men and the mine is reported paying. —Ten men are employed at the Spanish Queen mine near Forest Hill.

Leader: The boundaries of the Golden Rule mine have been established by a survey, and at an early date improvements will be made on the property, which is an extension of the Zentgraf mine, near Newcastle. E. W. Chapman is at the head of the enterprise.

Plumas.

Bulletin: Work in the tunnel of the Bald Mountain drift mine near La Porte is being pushed. —The Red Slide M. Co., P. T. Turner Supt., has its tunnel in 725 feet in bedrock. During the last 50 feet much water has been encountered. Six men are employed.

—At Whisky Diggings, near Gibsonville, Schofield Bros. are driving a tunnel, which is now in 1000 feet. They have struck gravel.

—The La Porte Con. M. Co., the principal stockholders of which are residents of Duluth, Minn., own the Dutch hydraulic mine near La Porte. A. H. Holgate is Supt. The com-

pany is putting in a debris dam and lowering the cut. Two flumes on the Feather river ditch are being constructed preparatory to active operation of the mine next season.

San Bernardino.

The Grable mines near Old Baldy, which were bonded a year ago for \$20,000, have been bought at the price named and are being developed by H. C. Oakley of Ontario, Cal. They are running tunnels and showing up a quantity of good ore, which is being sacked. Arrangements are being made to erect a mill there, on the completion of which the ore will be treated by the cyanide process. The ore assays from \$10 to \$100 to the ton.

San Diego.

The Union hears that operations will be resumed in the near future on the Stonewall mine, at Julian, the owners of the mine, the Sather Banking Co. of San Francisco, having contracted with a San Francisco firm to work the tailings on a percentage. There are about 20,000 tons on the dump, and it is thought they will yield at least \$5 to the ton. The cyanide process will be used. The Stonewall is one of the biggest mines in southern California and was at one time valued at \$2,000,000. The mine was closed on account of litigation several years ago and no work has been done on it since.

Shasta.

Lowden & Friday, owners of the Lowden group of copper mines at Mary's Fork, have bonded the same to W. Kemp, Supt. for Lewishon Bros. of New York, for \$50,000.

Free Press: At Harrison Gulch the Midas M. Co., controlled by J. H. Roberts of Sacramento, is running a 10-stamp quartz mill. The chlorination works, recently destroyed by fire, is being rebuilt. The company's payroll amounts to over \$9000 per month. The most extensive improvement being made by the company is the construction of about four miles of ditch and flume. The water will furnish power for the operation of the entire plant. Steam is the motive power now in use. The cost of constructing the ditch and flume is estimated at \$10,000, and the work is almost completed. The company has a large force employed on the improvement work, the rebuilding of the chlorination plant and in the mine and mill. Everybody has money, business is good and the camp is prosperous.

Sierra.

(Special Correspondence). —There is a reasonable probability that the Feather Fork Gravel Co.'s property, commonly known as the Thistle shaft, will resume work. A proposition has been submitted to the company in Scotland, which, if accepted, will soon see this section in its old-time activity. The property has a covered dump-house of 10,000 tons gravel capacity and a reservoir capable of 30,000 gallons. When the mine became flooded about a year ago and was unwatered, all the drifts were found filled with sand and fine gravel, to clear which would have involved heavy expense, and the company concluded to cease operations. The people now trying to negotiate with the owners for a bond propose to operate upon a new plan and utilize the old shaft. It is thought the matter will be decided within a few weeks.

Gibsonville, Aug. 28th, '98.

W. W. York, who has been developing his quartz property for some time near Downieville, is putting up a 5-stamp mill.

The Clay Bank tunnel at La Porte is being pushed and the pay channel is expected to be reached this fall. The property is operated by M. L. Regua of San Francisco.

W. York is having ten tons of rock crushed in the mill at the Sierra mine.

Siskiyou.

The mill at the King Solomon mine near Yreka has temporarily closed for want of water, but the force in the mine has been increased. —Wyke Bros. working the river bed near Sawyers, have had good success this season. —At the Great Western, Eddys Gulch, a 5-stamp mill is kept busy crushing the output. —The Cheery Creek and Wheeler mines have been sold to Fry & McCauley, who will at once put a force on development.

Work on the Hoboken mine near Fort Jones is being pushed.

On the Cherry Hill group work is being pushed day and night, the winze being down 75 feet, showing a 4-foot vein of good quartz. This winze develops the property to a depth of 400 feet.

The Big Two and Lost Leonore mines, near the Klamath, owned by White & Musgrave, have been bonded for eighteen months to Conklin & Snowgoose of Utah for \$10,000. Development work will begin at once.

The Gold Run M. Co., in the Salmon river country, has completed a flume and ditch at a cost of about \$150,000, and are running ten stamps. The Aromas M. Co. has also built a new ditch, costing \$28,000. The Know Nothing M. Co. is running three stamps with success. On the whole, the district presents a prosperous appearance, and the indications for the future of that section are encouraging.

Trinity.

The Tip Top M. Co. at Dedrick has started work with ten men on the Ralston group of mines and will develop them. The vein has been traced by cuts and prospect holes for 700 feet on the surface.

There is more activity among the miners of Trinity county at present than there has been for some time. At the Brown Bear mine, near Deadwood, an 8-foot ledge of rich ore has been struck in the lower tunnel, but, owing to great length, an upraise is being made to connect with an upper tunnel, so that there will be good air when the company starts to drift on the ledge. —At the Lappin mine the owners are taking out rich ore. The ledge in this mine is from 3 to 8 inches wide.

A strike has been made in the Enterprise mine, on the North Fork of Trinity river, of a

3-inch seam which yields rich values. Besides this seam leasers are working on a ledge from 8 to 10 inches wide which mills \$100 per ton.

Tuolumne.

The recent advance in Santa Ysabel stock from 4 1/2 to 5 1/2 on favorable reports from the mine. The Santa Ysabel has got its water supply back and will be enabled to run the mill full time.

The Jumper mine, at Stent, has an annual production of \$400,000 to \$500,000, and is owned by a Scotch Co., incorporated as the Jumper Gold Syndicate of California, Ltd. The main working shaft is an incline and a little over 700 feet deep, with levels at every hundred. Drifts from these points aggregate in length 3000 feet. A new shaft has been started a short distance from the old, and so far off the vein that it will require sinking on the perpendicular to a depth of 2000 feet to effect a contact. The old shaft may also be driven deeper, but at present no sinking is being done; miners are now crosscutting at the 700. The property is equipped with a 20-stamp mill and an additional twenty stamps will be added the coming fall. Fifty tons of ore are put through every twenty-four hours. Preparations are also being made to put in a cyanide plant at once. The Jumper mine proper also includes the New Era, a north extension. Ninety men are on the payroll; M. D. Kelly is Supt., and P. G. Gow is Pres. and Gen. Mgr. In the Dutch mine, at Quartz, the main shaft is down 755 feet, with sinking still progressing. It has a good body of high grade ore. All the underground workings are exhaustive, with the result that drifts of an aggregate length of 5800 feet have been run. To expedite work, an additional 10-drill compressor has been put in. The 20-stamp mill is crushing day and night, and is run by steam, although a change to electricity is contemplated. A. Trittenbach is Supt. Sixty-eight men are employed.

Democrat: Although the pocket mines continue to turn out gold, almost all of the big properties are hung up for lack of water. Prospectors are doing well in every direction, and the coming rainy season will mark a greater activity in mining than ever existed before.

Yuba.

Democrat: Since the stockholders of the Good Title Co. at Indiana Ranch decided to not purchase the mine under the option, the former owners have been taking out quartz and milling it and making good wages, besides the operating expenses.

COLORADO.

BOULDER COUNTY.

Three carloads of ore shipped from the Wirth mine at Ward gave returns of 6 ounces in gold for the first class and 3.64 ounces for the second class. The lot netted \$120. Eight carloads of mill dirt shipped from the same mine gave a general average of \$20 per ton in gold. J. McCorkle has sold his Little Alice mine at Rowena for \$100,000 to H. E. Blair, a Cincinnati millionaire. Mr. Blair has ordered a \$30,000 plant of machinery for the mine. A lot of 300 pounds of ore from the Great Britain, on Gold Hill, leased to Knott & Co., yielded at the rate of \$81 a ton without sorting.

Boulder News: The Delano mill and the Regiona mine at Magnolia changed hands last week, the Venture corporation of London, represented by State Geologist T. A. Rickard, taking possession, but whether on a lease or by actual purchase is not known.

CHAFFEE COUNTY.

The Arctic mine of Winfield district is shipping 100 tons of ore per day which runs \$15 per ton.

CLEAR CREEK COUNTY.

The Con. Alunde mines at Idaho Springs have opened an ore body 3 feet wide on the tenth level, of which 8 inches is high grade.

EAGLE COUNTY.

Twelve carloads of ore were shipped from Battle mountain section last week, which is the best record this year. The working force on the properties is being increased and the output will soon be greater.

EL PASO COUNTY.

The big dump of the Strong mine at Victor has been leased by V. Baum. He expects to install four concentrating tables. Samples from four experiments on the concentrates gave values from \$90 to \$95 per ton. The royalties are 15 per cent on all concentrates, and 25 per cent on all rock saved. The lessees operating on a portion of the Matos's Gold Hill property produced 964 tons in July, worth \$36,000, at a cost of about \$13,000, leaving a net profit of over \$23,000. Returns from a carload of stuff saved from the dump of the Lillie on Bull Hill, by Lessee Pettie, gave a return of \$114 a ton, while screenings yielded \$80.

Cripple Creek News: Three carloads of ore, estimated to be worth \$1000 a ton, was sent out from the Portland mine. It is thought that returns from this shipment alone will bring \$100,000.

The rich ore which the Portland people are shipping in such quantities is not coming from the strike made some months ago on the Hidden Treasure claim, but from a more recent find. It is not a discovery of an ore body previously unknown, but is an increase in values and dimensions of the shoot which the men have been following. It is the junction of the two veins known as the Portland and the Portland No. 2 veins. They have joined each other at an angle, and at this junction the ore body is 50 feet wide, and in some places a little more. At the last regular meeting of the directors the manager was instructed not to take out more than \$100,000 per month. But when a body of high grade ore was found the production advanced to such an extent that before the middle of the month the production had reached the figure above which he did not wish to go, and this single three-car shipment will double the amount. The Vindicator is shipping ore from seven

different shafts. In July the company made a net profit of 2 1/2 per cent on its entire capitalization. A strike on the Lucky Guss was made of a 15-inch lead running from \$195 to \$600 per ton. The Simmons lease on the Zenobia sent out twenty-two tons of ore that returned from \$140 to \$700 per ton. Five tons gave the higher figure.

The weekly clean-up of the Florence cyanide mill amounted to \$135,000.

Lessees on the Vindicator mine, Cripple Creek, are making money for the company. One set of lessees is outputting twenty tons per day, averaging \$50 per ton. Another is shipping fifty tons per week of low grade. Another is shipping fifty tons per week of \$30 ore, and saving screenings that run from \$50 to \$100 per ton.

GUNNISON COUNTY.

At Crested Butte the Plouvis Bros. have a good lead property in the Iowa and are taking ore out for shipment. A 4-foot vein has been opened on the Augusta, which carries about 60 per cent lead and will be concentrated at the Pittsburg mill, which is to start soon. Whipp & Samsel have cut the vein they have been tunneling for near Gothic. It is said to be 7 feet in width and assays 500 ounces in silver. A fine body of ore has been opened in the Sylvanite at Gothic and shipments continue as usual. Everything at the Yankee Blade is being put in shape for the continuance of work the ensuing winter.

GILPIN COUNTY.

The lessees of the Notaway shipped ten tons, which gave returns of eighteen ounces for one one lot and nineteen ounces gold for the other lot, or \$339 and \$359 per ton.

HINSDALE COUNTY.

At Lake City, the Lillie shipped a car of copper galena which returned about \$600 net. This property is being worked by Boston people who recently purchased it. The Ute & Ule at Henson is shipping twenty tons of concentrates daily. Hampson Bros. of Chicago will work the tailings from the Ute & Ule mill at Henson.

LAKE COUNTY.

A. V. Hunter has sold the Union smelter near Leadville to the Arkansas Smelter Co. Shipments from the Ibox averages nearly 1700 tons per week. The Mahala mine is again on the shipping list. This property, embracing about eight acres, has been shipping sulphide ore, some months as high as 200 tons a day.

The output of the Leadville mines over the various railroads to the smelters of the State is as follows: The Rio Grande 300, South Park 300 and the other road 150 tons, making a total of 750 tons. The Arkansas Valley smelter receives 900 tons daily. The Bimetallie smelter receives daily 250 tons from Leadville mines, making the daily output of ore 1850 tons per day.

The *Herald-Democrat* says the pumps of the down town mines at Leadville will soon be contributing 1,000,000 gallons of water per day to the Arkansas.

The Dolly B. mine of Leadville is limited in output to forty tons daily of gold-lead ore, the balance of the time being taken up in hoisting the waste that accumulates in development work.

LA PLATA COUNTY.

In the East Mancos district a 30-inch vein of decomposed matter has been found in the Sundown lode, which runs \$40 in gold per ton. It is so soft that it is shoveled directly from the vein into the sacks.

MINERAL COUNTY.

Creede is shipping an average of 300 tons of ore per day and working 500 men.

OURAY COUNTY.

Ten tons of milling and concentrating ore is the output from the Shoemaker mine near Ouray. On the plates the values saved are \$30 per ton. The concentrates are also good value and furnish occasional carloads for shipment.

PARK COUNTY.

A big placer property will soon be in operation near Fairplay. A ditch for the operation will be nine miles long, and a contract for five miles of ditch 9 feet wide has been let, the contract to be completed in thirty days. The remaining portion will be completed this fall; washing gravel will commence early in the spring.

PITKIN COUNTY.

The mill of the Aspen Concentrating Co. is running night and day on Bushwhacker ore, and giving satisfaction in saving values. Ore running from five to seven ounces in silver is being concentrated and the value raised to \$35 to \$40 per ton.

SAN JUAN COUNTY.

At Mineral Point the Vermillion mine struck a vein of gray copper running \$96 per ton in gold and silver. The title to this property has been tied up for more than twenty years, and last fall G. L. Stevick undertook to unravel the legal complications. After a year he succeeded and the mine is now on a paying basis. The Vermillion, San Juan Chief and Ben Butte were originally silver properties and large mills were built for treating their ore, but in the past year gold has been found on them. The San Juan Chief and the Ben Butte are shipping ore running from four to five ounces. Denver and Chicago capital has taken hold of the Idaho claims on Kendall mountain, and men are at work cleaning out the tunnels and other openings, repairing the mill and machinery and getting ready to crush and concentrate 100 tons of ore per day. There are large bodies of ore to be broken down and it will require about sixty men to operate the mine and mill.

The contract for building 1000 feet of flume for the Silverton & Boston M. Co. at Silverton was last week completed and R. F. Baker, president of the company, left for Boston, taking plans and specifications for a proposed

50-stamp mill and several bids received from contractors for its erection, all to be submitted to the company he represents. The Sioux City mine, an old property that has in years past been worked to a considerable extent, is again being tested. A sample of ore was taken from a large quantity on the dump and assayed 1.08 ounces gold, sixty ounces silver and 11 per cent copper. The Juno, an old-time shipper of a good grade of grey copper and lead, has resumed work.

SAN MIGUEL COUNTY.

At Telluride the U. S. & B. C. M. Co. has taken a lease on the Little Maud and Agnes lodes for \$55,000 in several payments. Work on the properties, which carry gold exclusively, is to begin at once. It is this company that is developing the Liberty Bell, and has control of most all of the other claims in Cornet Creek basin.

The Meldrum tunnel has reached a depth of 1000 feet on the Telluride end and about 400 feet on the Red Mountain side. Work on both sides is going steadily forward. The work on the San Miguel side is not yet out of the conglomerate formation, in which progress is slow, the ground being hard to drill and breaking short. On the Red Mountain side the ground is loose and needs to be timbered.

SUMMIT COUNTY.

At Kokomo the Sellers mine is shipping large quantities of ore, the Nettie B. is putting out two loads of lead carbonates a day and the Ida L. has opened a 2 1/2-foot vein of ore with a 10-inch pay streak.

IDAHO.

The Golden Fleece mill at Centerville has started up. A shaft was recently sunk on the Golden Fleece 108 feet and a drift run to tap the ledge 60 feet below the old tunnel. The vein is 8 feet wide, and two veins—one 1 foot and the other 2 feet wide—carry high-grade ore.

At Long Valley one hundred men and several teams are at work on the nine-mile ditch for large placer ground about to be worked. The ditch is 7 feet wide on the bottom and will be completed before fall. The dredge on Moore creek near Idaho City is running day and night.

Near Hope, a strike has been made on the B. F. & H. mine. The ledge has been tapped at a depth of 125 feet with a tunnel 225 feet long, and an ore body is exposed, carrying gray copper and native wire silver. Ore of shipping quality is being taken out.

Wallace Press: A new ore crusher is being put in the Standard mill, East Wallace. The Black Cloud tunnel is in 950 feet; 450 feet more should take it to the ledge. The Morning mill began running full capacity last week. So far only one side has been in operation, there being not enough water power to run the entire plant. A 190 H. P. engine has been installed. The Mother Lode mill has been dropping stamps during the week, so have the two Chest mills, and the Daddy. The King mill will also drop stamps and the Granite Co. is ready to start its mill.

Avalanche: The Empire mine at Silver City has been unwatered to the eighth level and rock is being hoisted. On the Cumberland Supt. Easton reports development work progressing. No stopping is being done, but ore is taken from the drifts and winzes. He expects to resume sinking soon. Scales & Smith, owners of the tailings near De Lamar, will enlarge their mill capacity this fall about double. W. H. Townsend is erecting a mill and flume. At the Trade Dollar the new pump has arrived and is expected to handle the strong flow of water with ease.

MICHIGAN.

The output of the Osceola Con. M. Co. for July was 800 tons of ore, yielding 80 per cent copper, being 640 tons. The copper is stated to have cost not over 80 per pound, leaving a net profit to the company of 40 per pound. By an invention of Capt. Parnell, which is applicable to jigging, the efficiency of each stamp is locally reported to have been increased as follows: Maximum capacity per stamp conglomerate rock, heretofore 225 tons per day, by Capt. Parnell's process 390 tons per day; maximum capacity per stamp on amygdaloid rock, heretofore 300 tons per day, by Capt. Parnell's method 495 to 500 tons per day. The Osceola is using five stamps and has commenced the erection of two more stamps. At the rate of July's production, each stamp turned out 160 tons.

MONTANA.

(Special Correspondence.)—Libby Creek is a noted placer camp that has been worked in a small way for years. The creek is about thirty-five miles long and has numerous feeders. The mineral belt known as the Carbonate Range runs parallel with the creek on the west side. The three principal quartz mines are the Buzz Saw, Snow Shoe and Silver Cable. The Buzz Saw ore is a gold, silver and lead carbonate assaying as high as \$70 in gold. There are two ledges, one from 4 to 6 feet, the other from 18 inches to 3 feet in width. The group consists of six claims, four of which are patented. Several carloads of ore have been shipped; smelter returns from which were \$43 per ton. There is 200 feet of development work done, consisting of tunnels, shafts and upraises.

The Snow Shoe was idle for some time, but was sold this spring to an English syndicate for \$175,000. It lies twenty miles from Libby in the Carbonate Range. The company has a concentrator of 100 tons capacity and is a steady shipper. The ore values are lead, silver and gold.

The Silver Cable has recently built a 50-ton concentrator. The ore is an iron sulphide and galena, principal value gold, it carries values in silver and lead.

Libby, Aug. 23rd, '98.

At the Montana M. Co. the total output for July was: Gold, 2740 ounces, and silver, 14,010 ounces, obtained from 6500 tons of ore

crushed in the mills, and 11,636 tons of tailings from the dams brought under treatment. The estimated realizable value of the produce of crushings is \$39,300; the estimated realizable value of the produce of tailings is \$23,300; total, \$62,600. Expenditure.—Working expenses on revenue account, \$28,700; outlay on developments, \$8,500; extraneous expenses, \$300; permanent improvements and machinery, \$100; treatment of 11,636 tons of tailings, \$13,128; redemption of cost of tailings plant, \$4,072; total, \$54,800. Estimated net profit, \$7,800. The 50 and 60-stamp mills were in operation for twenty-eight and twenty-nine days respectively. The tailings plant was in operation for thirty days.

The Ontario mine near Rimini will be sold by the Merchants' National Bank of Helena for \$65,000, by an order of court, to T. E. Collins and W. J. Clark. The purchasers pay the following installments: Ten thousand dollars at the end of six months, \$15,000 at the end of twelve months, \$20,000 at the end of eighteen months, and the remainder at the end of twenty-four months, making in all \$65,000. In addition they are to expend not less than \$10,000 for machinery and improvements in the mill, which is to remain a part of the property in the event of final forfeiture. The Ontario property includes the Ontario, Blue Bird, Gladstone and Millie quartz lodes and two others unnamed, and also a water right of 50 inches.

Ore hauling to the mill at the Gilt Edge mine near Lewiston was stopped last week and the crew is engaged in cleaning up the mill preparatory to its abandonment. The cause of this is that a deal has been closed for the Phelps-King interests to a syndicate with which A. R. Ledoux and A. R. Deveroux, capitalists of New York, are connected. Phelps and King retain large interests and Mr. King will continue as Gen. Mgr. Machinery for a new 150-ton mill has been ordered, which will be one mile nearer the mines than the present mill. Work will be commenced on the new mill at once.

Butte Miner: The matte of the Butte & Boston and Boston & Montana runs about 50 per cent copper and when it is run through the converters is nearly pure copper, running from 95 to 98 per cent, but having in it still the gold and silver values carried by the ore of the Butte camp. The Helia Consolidated at Glendale is employing 200 men, with two furnaces running. New bodies of ore have been discovered and opened in the Atlantis, Helia, Trapper and Clive mines, and this new supply of lead ore will enable the company to continue the smelting of the high grade ore, of which they have had heretofore a large supply. The July payroll was \$30,000, or twice the amount for July, 1897. At Phillipsburg, after a week of inactivity the Bi-metallic mine has resumed operations. The pending disagreement has been adjusted and the miners have gone to work.

NEVADA.

(Special Correspondence.)—There is a certainty of a revival of old-time activity at Candelaria, Columbus mining district. The Holmes M. Co. own a large quantity of tailings at Belleville, amounting to several hundred thousand tons. These tailings are accumulations from the time the Northern Belle was discovered in the sixties. The Northern Belle ran forty stamps most of the time until 1884, when the Holmes Co. took over the property until 1892. After 1892 seventy stamps were run on this ore. It need not be stated that these were silver mines. The value of these tailings, taking silver at 60 per ounce and gold at standard value, is computed at \$7.13 per ton, of which \$3 is in gold. These tailings were originally the result from rebellious ores and had to be roasted for the purpose of destroying the sulphur in the sulphates, and a considerable percentage of salt had to be used in the roasting. After the ores were roasted the values were saved by the process of pan amalgamation. For a long time it was considered impossible to work these tailings successfully by any of the best known leaching or cyanide processes, but the management now feels satisfied that they have arrived at a process of working these tailings by other means and independent of pan amalgamation, and while they are not divulging their process it may be surmised that it is similar to the cyanide method—that the pulp is treated first to a strong solution of cyanide in agitating pans, the liquid being drawn off, and then the pulp conveyed to a second system of vats, where it is leached a certain number of hours in a mild solution of cyanide mixed with caustic soda, and then drained into tanks for saving the silver. The reason for working these tailings first in agitating pans is that 78.01 per cent is so fine as to pass through a 70-mesh screen and the pulp would lie so close in an ordinary cyanide process as to prevent percolation through it, so that part of the pulp must be agitated to bring the particles of gold and silver in connection with the cyanide 13.0, and 5 per cent remains on the top of the 70-mesh screen, 8.6 per cent from the top of a 50-mesh screen, and 8 per cent remains on the top of a 20-mesh screen. The chief value in gold remains on the part lying above the 20, 50 and 70-mesh screens. The chief value in silver passes through the 70-mesh screen.

It may be taken for granted that the management have arrived at a definite plan for working the tailings, as they have given orders for machinery to work them.

It is understood that the savings will amount to something over \$5 per ton, and that the cost of working will not exceed \$2 per ton. The Holmes Co. and the Georgine Co. have a large amount of from twelve to twenty-ounce silver ore developed and on the dumps, and their ore carries with it not less than \$2 per ton gold; and by the process about to be inaugurated these low grade ores can be worked at a cost not exceeding, for mining and reduction, \$3.50 per ton.

Within a short time a plant for treating 100 tons per day will be completed at Belleville,

and this within a few months later will be increased to 500 tons daily capacity.

The Holmes mine contains a large amount of sulphuret ore. A shipment has been made to Virginia City to ascertain what percentage of the sulphurets can be saved on the Willey concentrator. Much of the ore in the Candelaria district is heavily sulphuretted, and this test will demonstrate to what extent the sulphurets of these ores may be saved by this method. If successful, prosperity for this district is ensured, as it will give occasion for the employment of many men and the camp will become a prosperous section.

It has been contended by some of the old time mill men that there is no process for working the ores of the Candelaria district outside of roasting and pan amalgamation. These men in their generation no doubt used the best known methods for handling these ores, but it should be borne in mind that other districts having rebellious ores, which could not be worked ten years ago, now successfully treat their ore and its products by either the cyanide or leaching process, and that tests can be approved or condemned only after a trial on a systematic and extensive scale, and no mine owners possessing either tailings or low-grade ores can arrive at a definite result unless they work or try the same, inasmuch as neither tailings nor low-grade ores lying idle will solve the problem.

This company has continued experiments on low-grade ores since their mines closed down in 1891, and they are now satisfied that they have arrived at a practical solution for working their property. If the result is satisfactory, this camp will become again one of the best in the State, ranking second only to Virginia City in the heyday of its prosperity.

Hawthorne, Aug. 28th, '98.

It is locally reported that J. W. Nelson has practically retired from the Charley Ross group of mines at Deerlodge and that in future it will be handled by the Eastern owners. Only a short time ago the camp was visited by a representative of the Eastern shareholders, who, after inquiring into affairs, paid off claims amounting to \$15,000, the remainder to be discharged in a short time, when arrangements will have been perfected for the resumption of work upon the group.

The Virginia City Enterprise reports from Cherry Creek a strike in the Egan mine of ore running \$60 in gold and \$110 in silver to the ton and that it is a large body.

The White Pine News says that work at the Chairman mine has temporarily suspended, awaiting the return of C. D. Lane to install a new system of pumping plant, after which it is expected that sinking the shaft will be resumed.—The tailings from the Brunswick mill, also from the Chollar, Virginia City, are to be worked by the Eureka Cyanide Co. at Eureka mill.—The Dexter mine at Tuscarora last week shipped \$11,000 in cyanides and \$4000 in gold bars.

The Glasgow & Western Exploration Co. contemplate the erection of further furnaces at Golconda and a general extension of the plant. They are also erecting a 100-stamp mill at Cherry Creek, White Pine county, the concentrates from which will be brought to Golconda for smelting.

The Hope mill at Silver City is to have an addition of five stamps and will crush custom rock at \$2.50 per ton. This ought to increase the bullion output of the district.—The Young America mine, at Tuscarora, is to have a new mill and concentrating plant. From Aurora 600 pounds of cyanide tailings were shipped to Gold Hill for refining.—A gold nugget valued at \$100 was found last week in the Dun Glen placers, by Chinese, four of whom average \$10 each a day in sluicing when water is plenty.—The mills in Union canyon, Nye county, are running constantly on good ore.

Elko Independent: An effort is being made to prospect the Owyhee river bed, near Mountain City. Harris & Co. have a big sinking pump working night and day to reach bedrock. The impression has prevailed among mining men for years that the gravel of this stream is rich. As high as 15 cents to the pan was obtained some years since on the rim rock, but bedrock has never been reached in the main channel.

NEW MEXICO.

At Cooks, on the Inez claim, S. Lindauer makes regular shipments of a good grade ore.—The Kansas City S. & R. Co., has sixty men employed and is shipping forty tons of ore per day from the Othello and Desdemona mines. These mines have produced 12,000 tons of ore a year for three years.—The Commodore mine shipped two cars of lead ore, running 65 per cent lead and ten ounces of silver per ton.

The strike of \$70 per ton ore at the Tripp mine, near Hillsboro, has widened to 4 feet, and the output has increased to forty tons per week.—Fifty tons of ore from the Mastodon mine is being hauled to Collard's mill this week. It assays \$45 per ton.

Wheeler & Co., leasers on the K. K., made a shipment of sixty tons to the smelter.—The Snake and Opportunity mines employ thirty-five leasers, all of whom are making over \$4.50 per day.

OREGON.

Urie & Brewster will build a dredging plant on the river near John Day. It will have a capacity of 2000 yards of gravel per day, employing from twenty to thirty men. The boat will be 24 feet wide by 80 feet in length, and will be required to sustain a weight of seventy-five tons of machinery apparatus for washing gravel.

Nine and one-half tons of rock from the Gold Bug mine near Ashland in a mill test yielded \$23 to the ton.—Application has been made for a receiver for the Greenback mine near Grants Pass. The Greenback mine it is reported has yielded Browning & Hannum \$20,000 the past twelve months, working by crude methods only. It is under bond to Car-

ton & Sutherland of San Francisco for \$100,000.

Grants Pass Journal: Hull & Beck's 5-stamp mill will be completed next week. There are several hundred tons of high grade ore on the dump.—Sisby, Carr & Co., who have the Green ledge under bond, are running an upraise to connect with the tunnel.—J. T. Clark & Son of Grave creek sold a half interest in their hydraulic mine to J. O. Booth. The ditches and plant are to be enlarged for this season's operations.—The Eagle Creek D. Co. of Duluth, Minn., which has been building ditches and flumes for placer mining on Eagle creek near Union and on which they have expended \$20,000, have turned on the water. There is one giant ready and two others will soon be ready. The pressure is 200 feet, and each giant throws 700 inches of water and washes 1000 cubic yards a day. When completed, the plant will handle 3000 yards in twenty-four hours.

In the Collateral at Baker City much development has been done. The crosscut tunnel 230 feet from the Blacksmith tunnel in the Virtue to the Collateral ledge will be completed about September 10th. The Virtue mill is being overhauled preparatory to a continuous run on ore whose values are good.

SOUTH DAKOTA.

From Deadwood it is reported that the gold output of the Black Hills for the current year will reach \$8,000,000. The Homestake made the following monthly cleanup during the fiscal year ending June 1, 1898, the figures having been copied from the report of the superintendent:

| | |
|--------------------|--------------|
| June, 1897..... | \$172,396 80 |
| July..... | 186,092 60 |
| August..... | 238,807 51 |
| September..... | 169,031 62 |
| October..... | 187,137 99 |
| November..... | 195,845 26 |
| December..... | 233,390 16 |
| January, 1898..... | 210,308 38 |
| February..... | 196,935 77 |
| March..... | 211,301 84 |
| April..... | 188,057 37 |
| May..... | 264,180 32 |

The total earnings for the year were \$2,494,374.53, the product of 548,890 tons of ore. The total dividends paid by the property up to date is \$6,787,500, and the report is concluded with the statement that there are twenty years' ore in sight. The report further states that on the 1st of May the mine began furnishing ore to 140 additional stamps, making 540 in all dropping on Homestake ore.

UTAH.

Last week's shipments from Tintic were 124 cars of ore, 6 of concentrates and 233 bars of bullion.—The finding is reported of a 10-foot ledge of ore in the Reck Rabbit, at Mammoth, which goes \$29 gold, eighty-eight ozs. silver and 14 per cent copper.

From Silver City forty carloads of ore were shipped last week.—A strike is reported in the old Oregon near Alta at a depth of 375 feet in the shaft which was begun many years ago. Recently work was resumed by putting the shaft down a few feet deeper, uncovering a streak of steel galena which, it is said, will run high in silver and lead. Work will continue throughout the season.—The Grizzly at Alta has begun the delivery of ore that showed over 30 per cent copper, in addition to other metals.—At the Regulator ore has been exposed that shows 40 per cent copper. Everything indicates steady improvement as work progresses in the old camp that for many years has been neglected.—Last week the Marsac refinery shipped nine bars of silver to New York that was 1000 fine. The product was from the Ontario tailings.—The shipments of ore from Park City last week were: Silver King, first-class, 708,000 pounds; Silver King, concentrates, 510,000; Ontario, first-class, 78,000; Anchor, concentrates, 429,000; Loring Bros., concentrates, 10,840; total, 1,735,840 pounds.—The Copper King made a trial shipment of ore from their property in Big Cottonwood. The shipment sampled 11 per cent copper, between \$2 and \$3 in gold, and a few ounces silver.—The McGregor mill started last week. About sixty-five tons of crude ore are worked every twenty-four hours. Aside from several hundred tons of ore on the platforms, a thousand tons of leasers' second-class ore is being brought to the mill.—The Brooklyn at Bingham has good ore in the 250 and is making a shipment. Ore is also showing in the 110 and 300 levels.—The Queen in Butterfield expects to deliver 150 tons of milling ore at the Dewey mill within thirty days.—In the Erie is a streak varying from 16 inches to 2 feet 7 inches of good pay ore, assaying 25.2 per cent copper, 30.6 ounces silver, \$2 gold and 25 per cent iron.

The Joe Bowers of Silver City made a shipment, the first class of which yielded 122 ounces silver, 8.6 per cent copper, 10 per cent lead and 80 cents in gold.—The Chloride Point at Mercur made its first shipment of cyanides amounting to 400 pounds.—The Omaha Co. at Mercur has begun prospect work by starting four shafts. They expect to sink them at a cost of \$3.50 a foot. R. Walker is Gen. Mgr.—Latest shipments of ore from the Blue Bird mine, owned by the Golden Star M. Co. of Gold Mountain, show 12½ ounces in gold and 58 ounces in silver, with a valuation of \$276.54 per ton.—Ore from the Buckeye at Silver City yielded 50 per cent lead, 30 ounces silver and nearly \$10 in gold per ton.—The Creole at Park City marketed its first lot of concentrates, consisting of about fifty tons, that will be followed by regular shipments the remainder of the season. A short time ago the management decided on the erection of a set of jiggers to determine whether or not the proposition would concentrate. The experiment was a success, and now the company will follow up the present plant with an up-to-date concentrating plant, on which work will begin in a short time. The concentrates, in which two and one-half tons of crude ore are being put into one, show a valuation of 35 per cent lead, 25 ounces silver and \$2.50 in gold.

The Mammoth Record says that at the

Snowflake a winze is being sunk from the 300 level through a fine body of quartz.—A shipment of ore is being taken out from the new strike at the Lower Mammoth. A new body of ore has been found in the North Star at the 300-foot level, and assays show good values in silver, lead and gold.

Mercur Miner: C. E. McEntire has secured a bond on the Glencoe for Eastern people and is developing the property extensively will at once begin. The bond is for \$30,000. The claims adjoin the Overland, upon which a mill will be in operation by Oct. 1st. Nearly 2000 feet of work has already been done on the property, and three gold veins have been uncovered.

Mercur Mercury: The unusual drought is causing fears of a water famine at some of the mills. It is reported that the Sunshine mine and mill will be started up in September.—At Marysville, on Gold Mountain, all the older properties are working steadily and continuing to improve. At the Mammoth and Breckenridge there is scarce a doubt that the erection of the proposed mill will be undertaken early next spring.—At the Blue Bird, owned by the Golden Star Co., Capt. Egan is achieving good results, and an impression prevails that it will put up a mill.—A shortage of water has prevented operating the mill at the Holland group as long as reckoned on, but the work done during the year has been satisfactory.

Tribune: The Golden Gate mill and refinery is working satisfactorily and at times 600 tons of ore pass through them, with an average of 500 tons daily.—The management of the South Swansea announced that the unloading of the bins would commence at once. For some time the South Swansea has been experiencing trouble in the getting of ore cars. In addition to the heavy shipments from the Grand and those from the Bullion-Beck, that refrained from shipping for so long a time, there is the usual amount to be moved from the old producers, and everything appears to be booming as in old days.

WASHINGTON.

In the Gold Bug mine near Garfield a strike of good ore has been made in a 235-foot tunnel. The ledge is 2 feet wide and assays \$111 a ton.

FOREIGN.

BRITISH COLUMBIA.

(Special Correspondence).—J. Pinkerton has bonded his hydraulic on Lowhee creek to an English syndicate, represented by a Mr. Bremner, for \$4000 cash and \$40,000 in deferred payments. Mr. Bremner has also bonded the Consolidated Eleven of England gravel property, owned by W. H. Woolcock, H. Jones, F. J. Tregillus, W. S. Beedy, A. H. Beedy and A. Johnston. The terms are not known, though the amount is large and a cash payment was made. The property comprises about one mile of Lightning creek, just below the town of Stanley. The creek from two miles above Stanley down to the upper end line of the Eleven of England has yielded \$10,000,000. It seems that the only means of opening the Eleven of England is by a long drainage tunnel, requiring much more money than local people can afford. If this is done a very valuable mine will be developed.

The Lightning Creek Gold Gravel & Drainage Co. has begun a tunnel on lower Lightning creek near Windham Hill, about fourteen miles below Stanley. The scheme, which was promoted by a Major Moore, is being industriously boomed by a British Columbia mining journal. It is locally viewed as a wildcat. There is no known or probable pay drift diggings on Lightning creek within ten miles of where this company's tunnel will reach bedrock. The flotation of this operation contains a feature somewhat new: stock is not sold, but bonds, secured by the stock, are offered the public with apparent success.

A subsidiary company of the new Slough Creek Co. is opening a bench hydraulic on Slough creek near Burns creek. Some heavy development work is being done, including five miles of ditch. S. Medlicott is Mgr.

At Slough creek drifting continues steadily under the efficient management of J. Hopp.

The Cariboo Gold Fields elevator on Williams creek near Barkerville has made a good beginning in rich gravel. The water supply having been found insufficient, the trouble is being partially remedied by the construction of a dam at Ground Hog lake. With an adequate supply of water this will be a very profitable mine. About \$400,000 has been expended to date. L. A. Bonner is Mgr. vice J. Champion, removed.

The Cariboo and Yukon Gold Fields, Ltd., is prospecting for the deep channel of Upper Antler creek near Saw Mill Flat. A tunnel has been driven 150 feet at a right angle to the creek, and a blind shaft sunk 25 feet. As the tunnel is only 4 feet above bedrock at the entrance, it appears that the channel has been found. H. Boursin is in charge during the absence of Mr. Carry, who is in the Yukon country.

The Olsen bucket ladder dredge is working smoothly in pay on Quesselle river, twenty-one miles above Quesselle.

At the Waverly hydraulic on Grouse creek a reservoir is under construction. The heavy rainfall this summer has made this an unusually prosperous season for the hydraulics.

The Big Valley Creek Mines, Ltd., is to be reorganized and work will soon be resumed. Barkerville, B. C., Aug. 17th, '98.

J. Monaghan, Pres. and Gen. Mgr. Cariboo M. & S. Co., of the Cariboo mine, Camp McKinney, reports for the year ending July 1, 1898, that the mill crushed 6770 tons of ore during the year and yielded \$121,270 in bullion and \$17,943.64 in concentrates.

At Vancouver on August 31 was discharged with costs the appointment of the receiver of the Le Roi mine at Rossland, recently made by Judge Spinks. Application was immediately made to Justice Irving for the appointment of a receiver, but he decided to only

grant an injunction of the mine from shipping more than 100 tons of ore daily.

From Rossland shipments from the mines the past week were 970 tons.

At Whitewater about 100 men are employed at the Whitewater mine, 40 by the Whitewater Deep, 20 at the Northern Belle and 12 by the Charleston. The wages are \$3 to \$3.50 per day in all the mines.—The Eureka, near Nelson, has been sold to W. H. Watts for \$30,000. The Eureka is a free milling proposition, traversed by two leads, one of which is 5 feet wide, assaying from \$15 to \$20 in gold.—The improvements at the Trail smelter, recently undertaken by the C. P. R. R., are nearly completed. They represent an expenditure of \$150,000 and make the total value of the plant between \$300,000 and \$400,000. The capacity of the works will be 500 tons of copper ore daily; the lead stack will handle between 150 and 200 tons. The name of the plant since it was acquired by the C. P. R. R. is the Canadian Smelting Works. There are over 20,000 tons of ore, valued at half a million dollars, thrown up in long piles, each of which burns for two months and a half to rid itself of the sulphur. The rate for treating the Rossland ores at the Trail plant is \$7.50 per ton, which includes a freight charge of 50 cents per ton. Shipments to the smelter average between 250 and 260 tons per day. The principal shippers are the War Eagle, Center Star, Iron Mask, Sunset No. 2, Deer Park, Giant and Monte Christo. There are about 200 men employed and the payroll is \$15,000 per month.

ITALY.

The mineral production of Italy in 1897 was as follows:

| | No. of works. | Tons. |
|--------------------------|---------------|---------|
| Pig iron..... | 6 | 8,393 |
| Wrought iron..... | 24 | 149,945 |
| Steel..... | 12 | 63,940 |
| Copper, crude..... | | 2,980 |
| Copper, manufacture..... | | 8,545 |
| Zinc..... | | 250 |
| Lead..... | 4 | 22,407 |
| Antimony..... | 1 | 404 |
| Mercury..... | 2 | 192 |
| Mineral fuel..... | 22 | 567,000 |
| Sulphur, crude..... | 673 | 496,158 |
| Sulphur, refined..... | 24 | 86,372 |
| Rock salt..... | 72 | 429,253 |
| Asphalt..... | 3 | 18,034 |

There were also produced 316 kilogrammes of gold and 45,315 kilogrammes of silver. The number of men employed was 25,695.

MEXICO.

It is locally reported that F. M. Alzpuru has sold the Providencia iron deposits and foundry at Guanajuato to an agent of the Rothschilds for \$1,500,000. The purchasers will build a line to Ciudad Guzman for the development of the property. Mr. Alzpuru bought this property four years ago for \$50,000.—The new 20-stamp mill of the Yolo M. Co., near Baviacoran, is in successful operation.

C. G. Codeman, at his mine in the Panuco district, Durango, reports everything satisfactory. He has cleaned out the shaft of an abandoned Spanish mine, finding at 180 feet a 14-foot vein of ore averaging fifteen ounces of silver, and carrying a 10-inch streak of 200 ounces of silver ore. He is securing other properties in the same locality. J. W. Sharpe, Mgr. Gonzales mine, reports a large deposit of ruby silver ore in the lower level, which assays 1600 ounces silver per ton.

ONTARIO.

At Seive River the Golden Star mine has reached a depth of 336 feet and is showing good ore. The mill will be in operation Sept. 15th. One hundred men are employed. Building an electric road from the mine to the mill is in progress.

SERBIA.

At the Dobro coal mine, which until recently yielded only lignite, a seam of good coking coal has been discovered. With a view to developing Serbian metallurgy, a company with a capital of 2,000,000 francs has been formed for the manufacture of coke from this coal. Another company has been promoted by French capitalists for working the antimony mines at Losnica, the silver and lead mines of Uranja, and the gold mines of the Timok valley.

Recent California Mining Incorporations.

Golden Treasure M. Co., Grass Valley; capital stock \$100,000; subscribed \$3500; C. R. Eager, E. Dubedat, C. W. Taber, E. R. Gray, W. Kenrie, F. DuImaine, J. E. Sterns.

New Manzanita G. M. Co., San Francisco; capital stock \$15,000; subscribed, \$10,000; F. Korbel, T. Korbel, C. Gretz, T. Ruiz Rojas, J. Hass.

Summit Con. G. M. Co.; capital stock, \$20,000; subscribed, \$4000; S. Clark, F. B. Bull, W. H. Routledge, R. Armstrong, C. W. Edgemube.

Mead G. M. & M. Co., San Francisco; capital stock, \$200,000; subscribed, \$55,000; U. H. Jens, G. Gall, N. Hansen, A. M. Jones.

App Con. M. Co., San Francisco; capital stock, \$750,000; subscribed, \$125; H. Wadsworth, S. P. Smith, W. M. Weighel, S. J. Hendy, G. H. Waggoner.

Gold Reserve M. Co., San Francisco; capital stock, \$100,000; subscribed, \$50; J. A. Thompson, F. Reichert, J. H. Moss, C. B. Larabee, J. H. Barnard.

Leviathan Copper M. Co., Loepe, Cal.; capital stock, \$1,000,000; subscribed \$600,000; D. Bari, P. & H. W. Curtiz, E. E. Brooks, P. N. Packard.

Recently Declared Mining Dividends.

Yellow Aster, California, July dividend, declared Aug. 17, \$35,000.

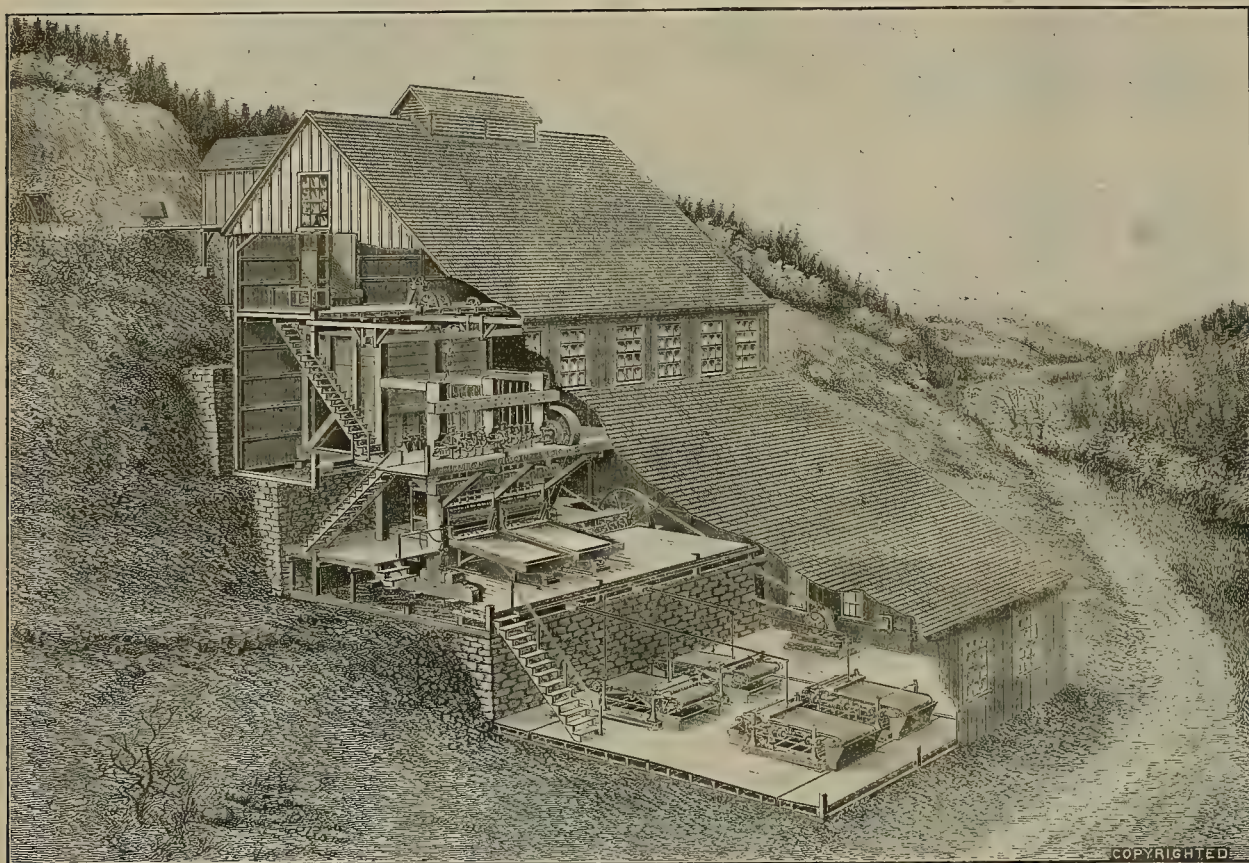
Geyser-Marion, Utah, 2 cents per share, \$6000; Aug. 31.

Cariboo M. Co., B. C., \$16,000; payable immediately.

Wolverine, Michigan, \$1 per share, \$60,000; payable Oct. 1.

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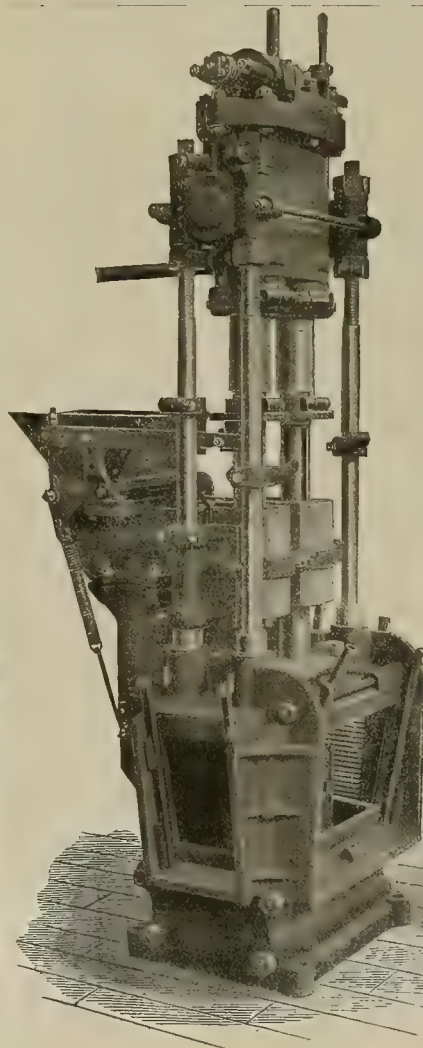
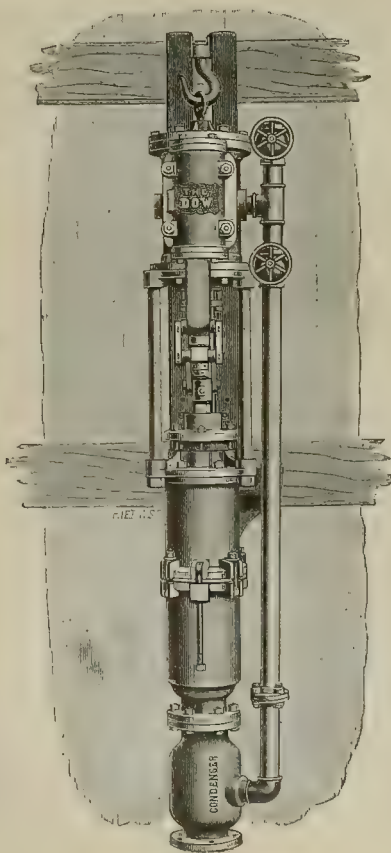
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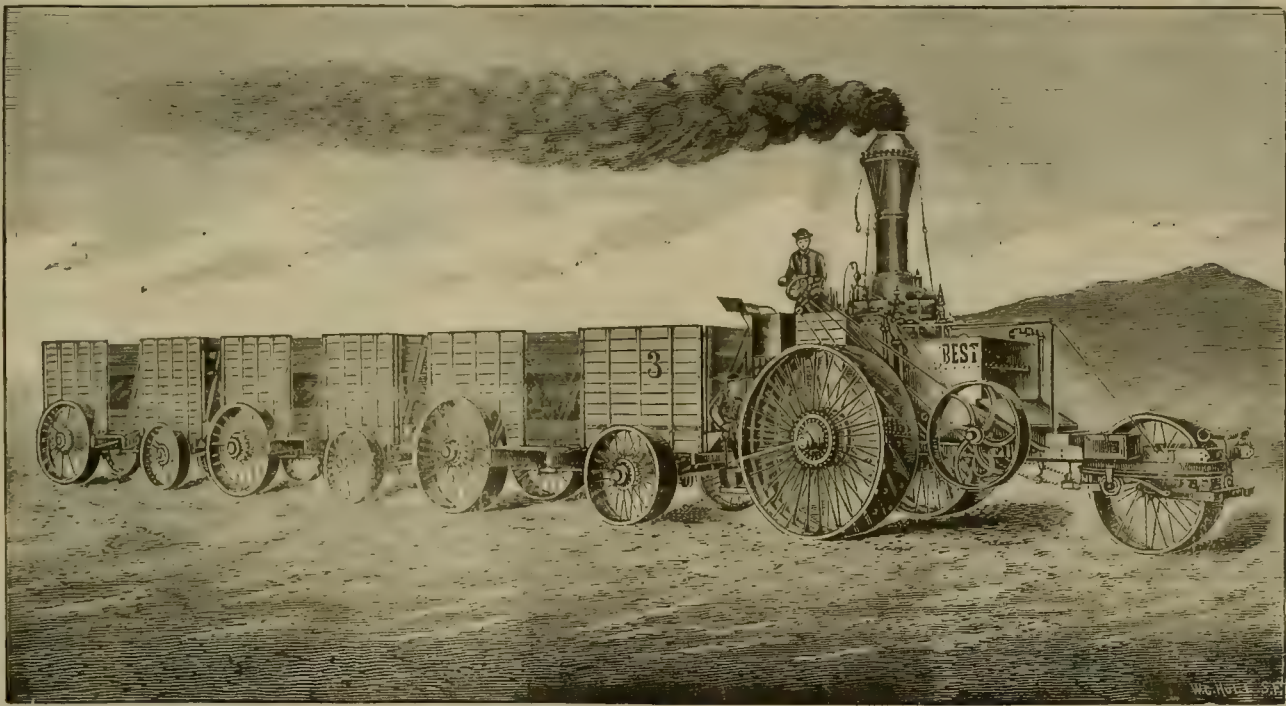
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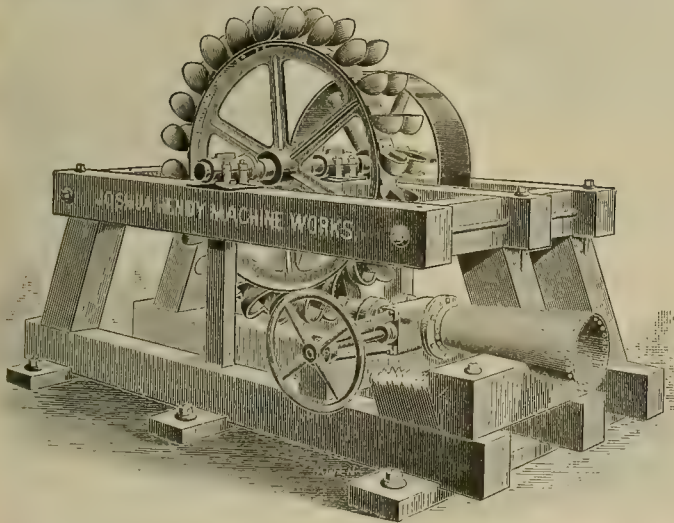
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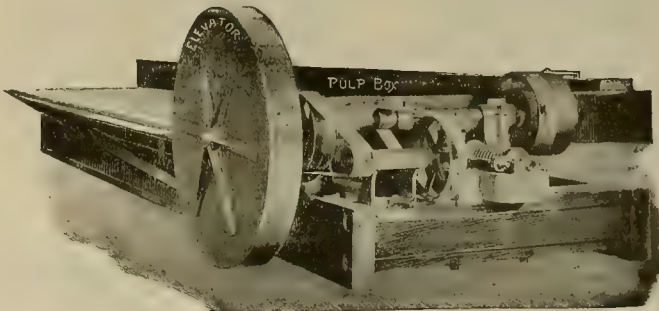
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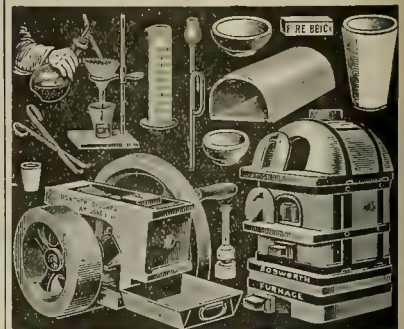
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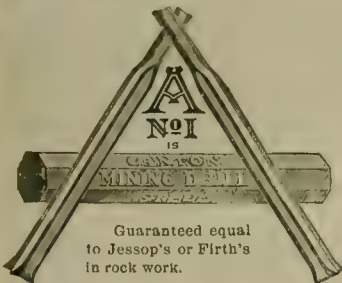
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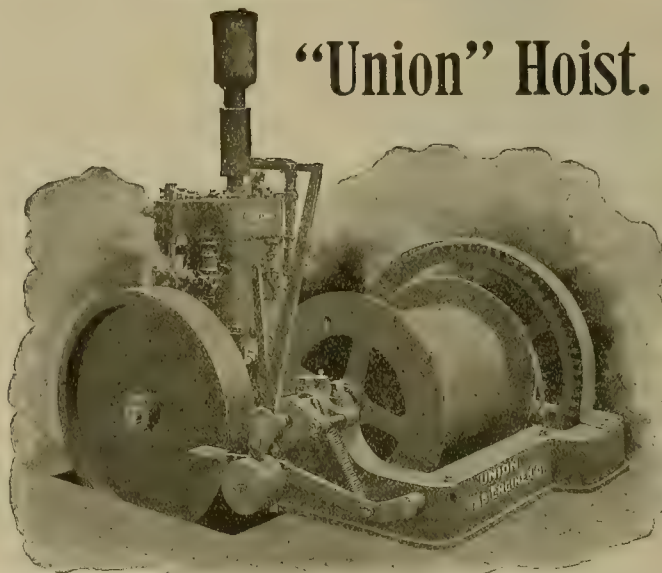
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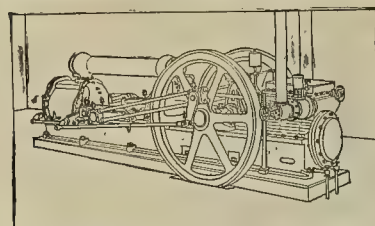
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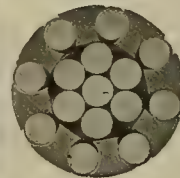
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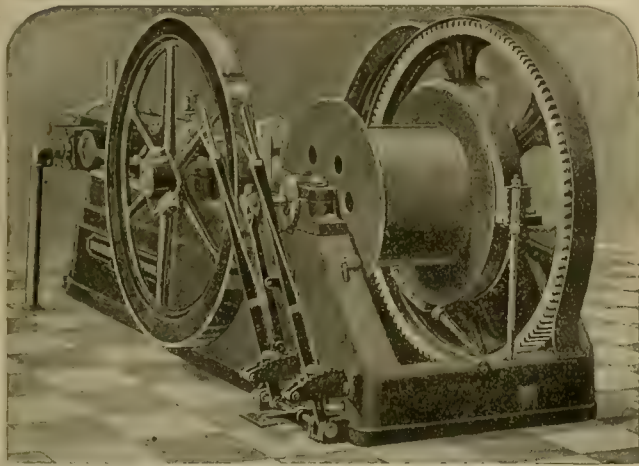
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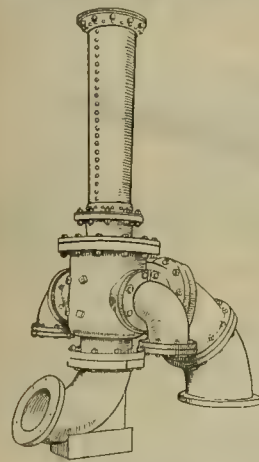
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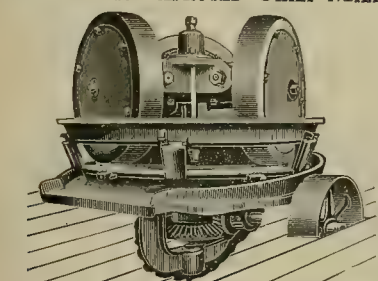
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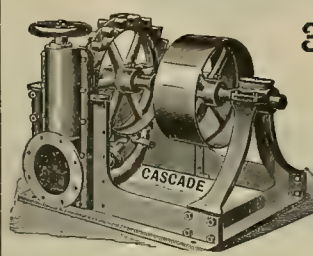
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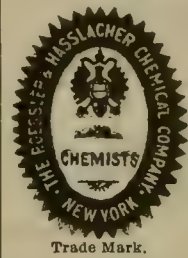


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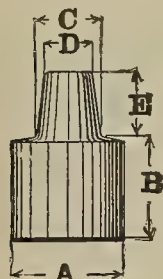
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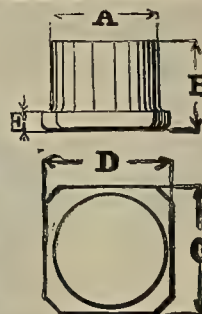
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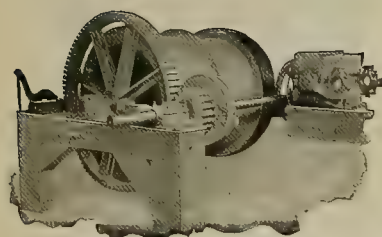
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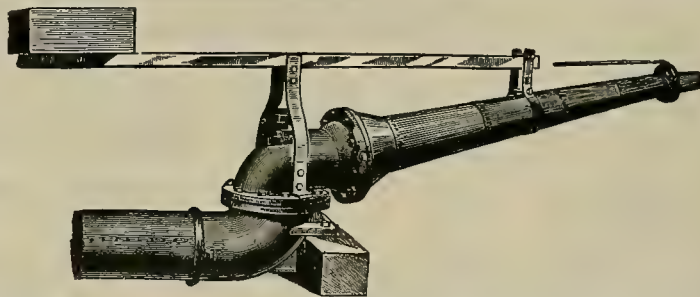
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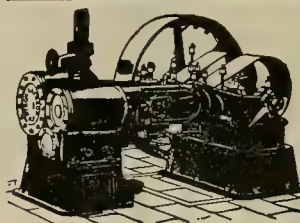
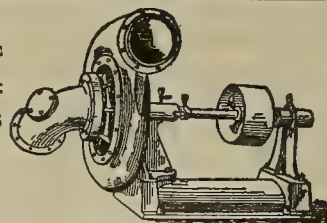
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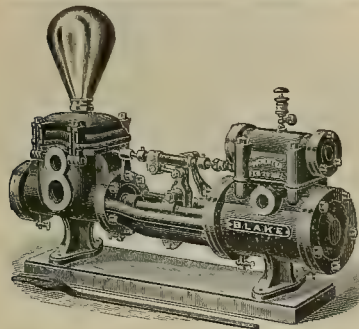
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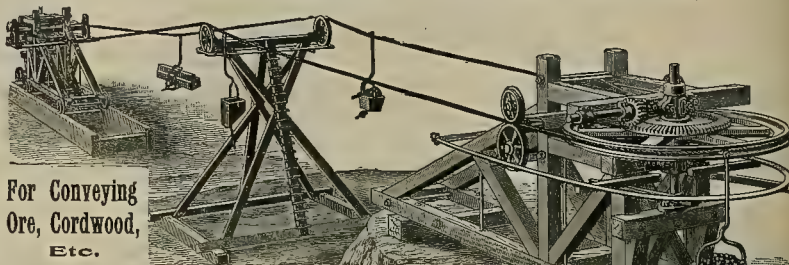
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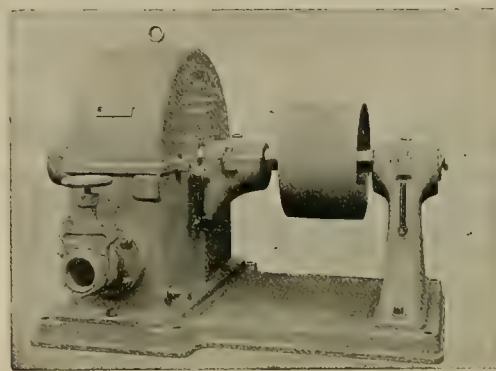


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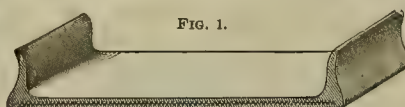


FIG. 1.

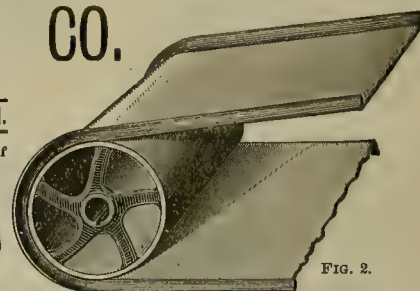


FIG. 2.

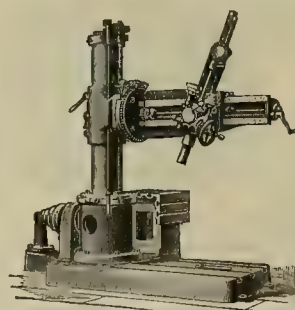
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Market Reports.

The Markets.

SAN FRANCISCO, Sept. 1, 1898.

SILVER.—London, 28d; New York, 60; San Francisco, 60; Mexican Dollars, 46½@47c.

COPPER.—Last week the Franklin M. Co. sold 100,000 lbs. at 12½c. Foreign exports from New York since Jan. 1st, '98, aggregate about 24,000,000 lbs. Lake is reported \$12.15@12.25.

LEAD.—New York reports "easy," \$4.05 bid, \$4.07½ asked. Smelters quote \$3.90; local, pipe, 6@6¼c; sheet, 6½@7c; pig, 5½c; bar, 6c.

IRON.—American, soft, \$20 and \$23 per ton; Scotch, \$23. The Iron and Steel Sheet Manufacturers' Association of the United States is in session at Pittsburg to fix prices for the ensuing year. Sec. Jarrett says that prices will be advanced probably \$2 a ton for sheets, in response to advances already made in raw materials. At the conclusion of the meeting it was announced that twenty-two establishments were represented and fully resolved, on account of the recently increased cost of billets, sheet bars and spelter, to advance selling prices of black steel sheets 10 per cent per 100 lbs., and of galvanized sheets 5 per cent.

SPELTER.—Unchanged, 5½@5½c.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c; Bar, 19c.

ANTIMONY.—9½, 10.

BABBIT METAL.—10-12-14—best 16c.

QUICKSILVER.—Domestic, unchanged, \$42.50@43; export and carload lots, special rates.

POWDER.—F. o. b., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1** 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.85; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington.....\$8 00 Coos Bay.....\$5 00 Seattle.....6 00 Southfield.....7 50

Cargo lots, Eastern and foreign: Wallend.....\$7 50 Cumberland.....\$10 00 Brymbo.....7 50 Cannel.....9 50 Pennsylvania, hd.....14 50 Welsh Anthracite.....12 50 Scotch.....8 00 Rock Springs.....7 60

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.12 per gal.; bbl., \$1.07; pure No. 2, cs., 85c; bbl., 80c; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.11; less than 200 gals., \$1.20; in bbls., 4c per gal. less than case; Baker's Crystal, \$1.50; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 43c; cs., 48c; raw, bbl., 41c; cs., 46c; lots of 5 bbls., 1c less. Lucol, boiled, bbl., 38c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17c; Astral, 17c; Star, 17c; Eocene, 19c; Extra Star, 21c; Elaine, 22c; Water White, bulk, in tanks, 11½c; Mineral Seal, iron bbls., 21c; wooden bbls., 23½c; cs., 26c; Mineral Spem, 27c; Deodorized Stove Gasoline, bulk, 12½c; do., cs., 18c; 86 deg. Gasoline, bulk, 20c; do., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½c; do., in cs., 16½c; Lard Oil, Extra Winter Strained, bbl., 56c; cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatsfoot Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs., 60c; Spem, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31c per lb.; carloads, 28c;

sulphuric acid, 2½c per lb. for 60%; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½c per lb.; blue vitriol, 4½c per lb.; borax, refined, 5@6c per lb.; chloride of potash, 9½@10c; roll sulphur, 2½c; blue vitriol, 4c; alum, \$1.90@2.00; flour sulphur, French, 2½@2½c; California refined, 1½@1½c; nitric acid, 12½@16c; caustic soda, 60%, 2½@2½c; 70%, 2½@2½c; 77%, 3½@3½c; Cal. s. soda, bbls., 65c; sks., 60c @ 100 lbs; chloride of lime, spot, 2.10@2.25c; to arrive, 2.10@—c; saltpeter, refined, 9c; chlorate of potash, 9½@10c; caustic potash, 8@9c.

LUMBER.—Retail: Pine, ordinary sizes, \$17@18.50; redwood, No. 1, \$18@20; No. 2, \$16@18.

CORDAGE.—Net rates on not less than 10,000 lbs., subject to change without notice.

| | Sisal. | Manila. |
|---|--------|---------|
| 1¼-in. cir. (7-16 dia. and upward)..... | 10½ | 11½ |
| 12-thread (¾ dia.)..... | 10½ | 11½ |
| 6 and 9 thread (¾ and 5-16 dia.)..... | 11½ | 12½ |
| Bale Rope (3 and 4 strand)..... | 10½ | 11½ |
| Bale Rope (2, 6 and 8 strand)..... | 10½ | 11½ |

NAILS.—List per keg: No. 20 to 60d, wire, \$2.35; cut, \$2.25; 10 to 20d, wire, \$2.40; cut, \$2.30; 8d, wire, \$2.45; cut, \$2.35; 6 and 7d, wire, \$2.55; cut, \$2.30; 4 and 5d, wire, \$2.65; cut, \$2.40; 3d, wire, \$2.80; cut, \$2.55; 2d, wire, \$3.05; cut, \$2.95. In carload lots, 10c per keg less.

Mining Share Market.

SAN FRANCISCO, September 3, 1898.

9:30 A. M. SESSION.

| | |
|----------------------------|---------------------|
| 1000 Alpha.....2c | 1000 Savage.....10c |
| 200 Best & Belcher.....13c | 100 Union.....15c |
| 300 Justice.....17c | 500 Utah.....6c |

2:30 P. M. SESSION.

| | |
|----------------------------|-------------------------|
| 300 Con. Cal. & Va.....38c | 500 Belcher.....15c |
| 300 Chollar.....15c | 300 Standard.....\$1.65 |

Commercial Paragraphs.

THE Fort Wayne Electric Corporation and the Tutthill Water Wheel Co. have shipped from San Francisco an electric lighting and power apparatus to South America. The machinery will be landed in Peru and sent overland 600 miles to the mines in the Andes beyond Lake Titicaca in Bolivia.

POSITION WANTED

By Experienced Chemist and Assayer. Cyanide Treatment a Specialty. Address CYANIDE, Mining and Scientific Press Office, San Francisco, Cal.

WANTED.

Partner in Extensive Placer and Quartz Mines. Free wood and water. JAMES ARTHUR, Cornucopia, Union Co., Oregon.

WANTED

GENERAL SUPERINTENDENT

Having experience and perfect knowledge of mining large bodies of ore, and familiar with square setting. Man now occupied in this position preferred. Prefer mining engineer having a knowledge of milling and machinery. Good salary, with chances of advancement.

Address only in confidence LOCK BOX NO. 1252, SALT LAKE CITY, UTAH.

Mine Wanted.

Man of experience will develop gold mine for ¼ interest, or will bond whole property and develop. Must have ore chute IN SIGHT. State exact conditions. Correspondence with owners only. Address P. O. Box 887, Los Angeles, Cal.

WANTED.

METALLURGIST AND PRACTICAL SMELTER

Will be open for engagement October 1st as Superintendent of Copper or Lead Smelting Works.

Thoroughly competent in analyzing, assaying, and handling men. Speaks Spanish. Excellent references. Address SMELTER, care Mining and Scientific Press.

Mine Operator Wanted.

The owner of a Mine (Lead, Silver and Gold), situated in the State of Nevada, near railroad, would like to get a partner willing to take charge of the property and work it, or form company. No money wanted; the owner has confidence in the value of the mine and will take his chances. Property consists of two claims, 1500x600 feet; both have been worked and ore shipped to different reduction works. The owner, being engaged in other business, has no time to attend to the mine.

Address E., this office.

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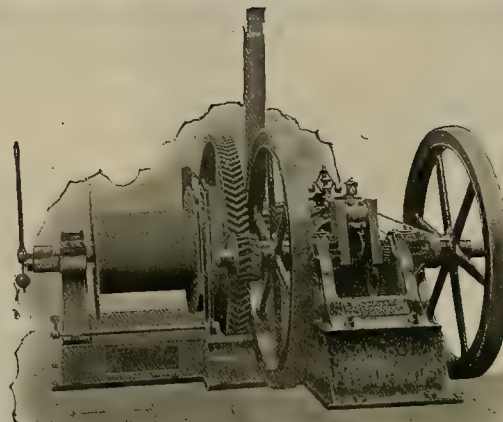
Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.



FRESNO, June 25, 1898.

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San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gaso line engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LODGE
M. & D. CO.,

Per N. W. Moodey, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

Notice of Stockholders' Meeting.

A meeting of the Stockholders of the Porfirio Diaz Gold and Silver Mining and Milling Company will be held at the office of the Corporation at the Undertaking Parlors of Craig, Cochran & Co., at 54 Mint Avenue, San Francisco, California, on TUESDAY, the 30th day of September, 1898, at 1 o'clock P. M., for the purpose of electing Directors of said Corporation to serve until the 23rd day of August, 1899, and until their successors are elected.

This notice is given by the order of Stockholders holding more than one-half of the votes and more than one-half of the Capital Stock of said Corporation, to-wit: L. W. Hilliker, Thos. Ryder, R. Fitz, Peter Saling and Jos. I. Davis, and pursuant to call in writing made by them and now on file with the undersigned.

Dated August 29, 1898.

W. A. STEPHENS,
Secretary.

Gold Mine for Sale.

Eight Claims on Mother Lode, Calaveras Co., Cal. Twenty-stamp mill building, and ten stamps. Some development work done years ago, including shaft 500 feet deep. Trustee offers at low price. For particulars address KNOX, care Mining and Scientific Press.

FOR SALE.

1 Rock Breaker,
1 5-Foot Huntington Mill,
3 Duncan Concentrators,
35 H. P. Boiler and Engine,
Shafting, Pulleys and Belting.
Machinery but little used. Will sell for one-half San Francisco costs on board cars at Hailey. Address L. C. BAILEY, Hailey, Idaho.

FOR SALE.

A complete set of California State Mining Reports and Bulletins. Address H. L. T., this office.

MOTHER LODGE MINE FOR SALE.
THREE CLAIMS UNDEVELOPED AND IN close proximity to several best paying mines of Tuolumne Co. Address OWNER, care Mining and Scientific Press.

Silver City Reduction Co.,

SILVER CITY, GRANT COUNTY,
NEW MEXICO.

Purchasers and Smelters of Gold,
Silver and Copper Ores.

This Plant is Owned and Operated by the Estate of the Late Senator George Hearst of California.

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Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage.

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Mining companies organized, their property experted, financed and managed.

Mines, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

Examine mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

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Cable Address: EDBEE.

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NOTICE.

Parties having Mining or Milling Machinery for Sale, or those wishing to purchase same on easy terms, please call at address

ASSAY OFFICE, 10 Stevenson St., S. F.

Assessment Notices.

CONSOLIDATED ST. GOTHARD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of August, 1898, an assessment (No. 1) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 113 Crocker building, sixth floor, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 25th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. F. HOLLING, Secretary.

Office—113 Crocker building, sixth floor, San Francisco, California.

WEST SANTA ROSALIA GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, State of Sonora, Mexico.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of August, 1898, an assessment (No. 1) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, No. 30 Pine street, Rooms 15 and 17, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of September, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. W. PEW, Secretary.

Office—No. 30 Pine street, Rooms 15 and 17, San Francisco, California.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 22nd day of August, 1898, an assessment (No. 4) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 916 Market street, Room 57, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 3rd day of October, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 31st day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

GEO. W. FLEISSNER, Secretary.

Office—No. 916 Market street, Room 57, San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of May, 1898, an assessment (No. 1) of 14 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CALVERT MEADE, Secretary.

Office—106 Leidesdorff street, San Francisco, California.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of May, 1898, an assessment (No. 1) of 14 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 7, fifth floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. L. CHENEY, Secretary.

Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 8th, 1898.

R. L. CHENEY, Secretary.

Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to August 6th, 1898, and the day of sale to MONDAY, September 5th, 1898.

R. L. CHENEY, Secretary.

Office—Room 608, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to September 3rd, 1898, and the day of sale to MONDAY, October 5th, 1898.

R. L. CHENEY, Secretary.

Office—Room 608, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

GOULD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of July, 1898, an assessment (No. 34) of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 62, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 5th day of August, 1898, shall be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of August, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DUBROW, Secretary.

Office—Room 62, Nevada block, No. 309 Montgomery street, San Francisco, California.

POSTPONEMENT.

The date of delinquency of the foregoing assessment (No. 34) has been postponed to TUESDAY, the 6th day of September, 1898, and the day of sale from the 25th day of August, 1898, to MONDAY, the 25th day of September, 1898.

By order of the Board of Directors.

ALFRED K. DUBROW, Secretary.

Office—Room 62, Nevada block, No. 309 Montgomery street, San Francisco, California.

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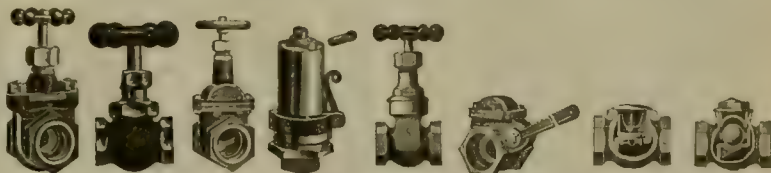
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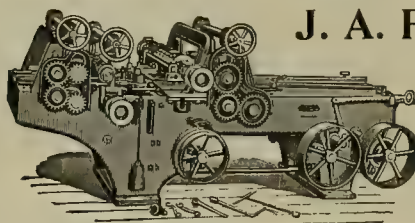
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CAPACITY FROM 4 TO 50 H. P.

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WITH NINE HOIST CONNECTED.

These HOISTS are now in use on several mines and they have proved practical, safe and economical. Starts and stops with ease. Speed under perfect control.

The entire plant, engine and hoist, is light and compact. Can readily be placed in any position, on the surface or underground.

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BARGAINS IN DYNAMOS, ENGINES, ETC.

DIRECT CURRENT DYNAMOS of 55, 150, 270, 350, 700, 725, 800, 810, 900, 1075, 1350, 1610 and 2500-light capacity. ALTERNATING CURRENT DYNAMOS of 750, 900, 1300 and 2000-light capacities. ARC DYNAMOS—20, 24, 30, 40, 50 and 60-light, both 1200 and 2000-candle power. ENGINES—12, 50, 75, 85, 100, 115, 125, 150, 175 and 200 H. P. BOILERS—50, 100, 250, 375 and 500 H. P. HEATERS—150, 1000 and 2000 H. P. STEAM PUMPS—All sizes.

Most of this apparatus has been removed from our own central stations to make room for larger units, and is therefore in excellent condition.

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(A CORPORATION.)

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Duplex Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc. Extra sizes and lengths made to order on short notice.

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Manufacturer of the Celebrated

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Cable: "Risdon's."

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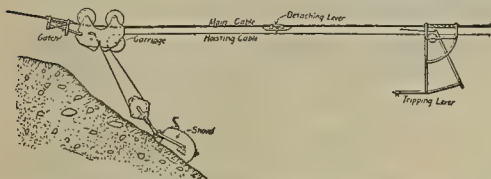


Diagram Showing Method of Operation of Calhoun Excavator.

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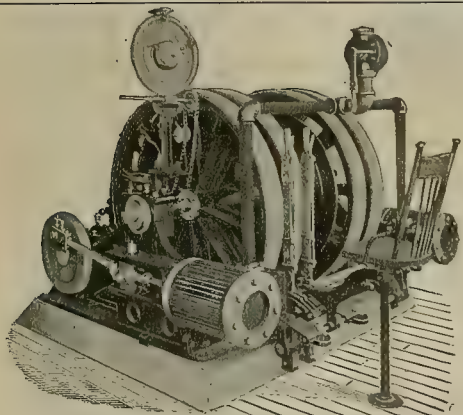
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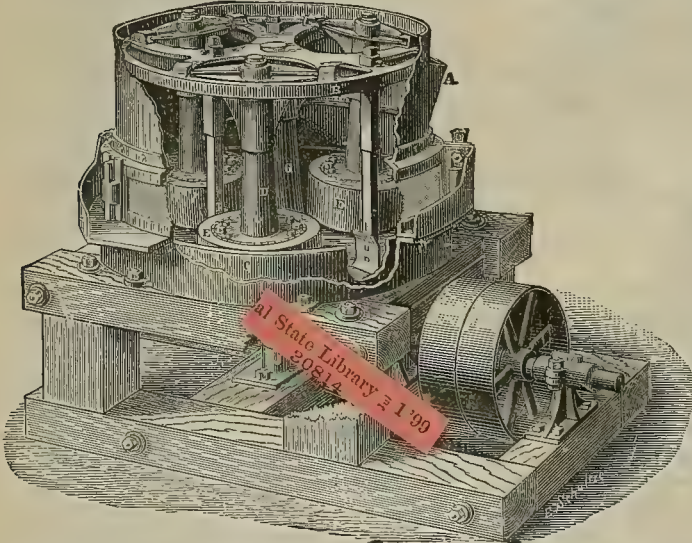
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Boiler Explosion at Buffalo, New York.

Explosions of stationary steam boilers on the Pacific coast are noticeably rare, the percentage of such casualties being less than that in the Mississippi valley and on the Atlantic slope, a fact creditable to this region and accounted for largely by reason of good workmanship in their construction, intelligent supervision and watchful care.

A study of such an unfortunate occurrence is always of value to all users of steam everywhere, for though newspaper accounts of those casualties usually say "the cause of the explosion is shrouded in mystery," yet examination often shows the cause direct or indirect, and detailed notice aids in prevention of recurrence of a similar character elsewhere.

The most recent occurrence of this nature serious in its effects was the explosion of the steam boiler at the Niagara factory of the National Starch Manufacturing Co., at Buffalo, N. Y., on July 14th, where seven people, including the engineer and fireman, were killed and twenty-one injured.

The accompanying illustration will give an idea of its effect and extent. There was a battery of five horizontal tubular boilers, 5½ x 16 feet, with 4-inch tubes. The boilers had been in use about ten years.

Fig. 1 shows four boilers. Boilers 1, 2 and 3 are standing in about their original positions. No. 4 was turned end for end and thrown about 20 feet from its setting and broken through the top seam, all the rivets being sheared off, the opening being the width of the lap, i. e., about 4 inches at its greatest width. At the left side of Fig. 2 can be seen the dome of the fifth boiler, which exploded. Since these photographs were taken boiler No. 5 has been uncovered and found to have been spread out by the force of the explosion into a flat sheet, the front head having been blown out and the back head torn into several pieces. The break was on the inside seam next to boiler No. 4, all the breaks in the boiler being at the riveted joints. No. 5 boiler was thrown about 80 feet from its original position by the force of the explosion. Fig. 3 shows the remains of the main engine and fly wheel back of the stack, the wreck being covered by debris. Fig. 4 shows the Oneida street side of the wreck. (The factory was situated on the corner of Bond and Oneida streets, the boiler room being on the Bond street side. These illustrations were taken after gangs of men had

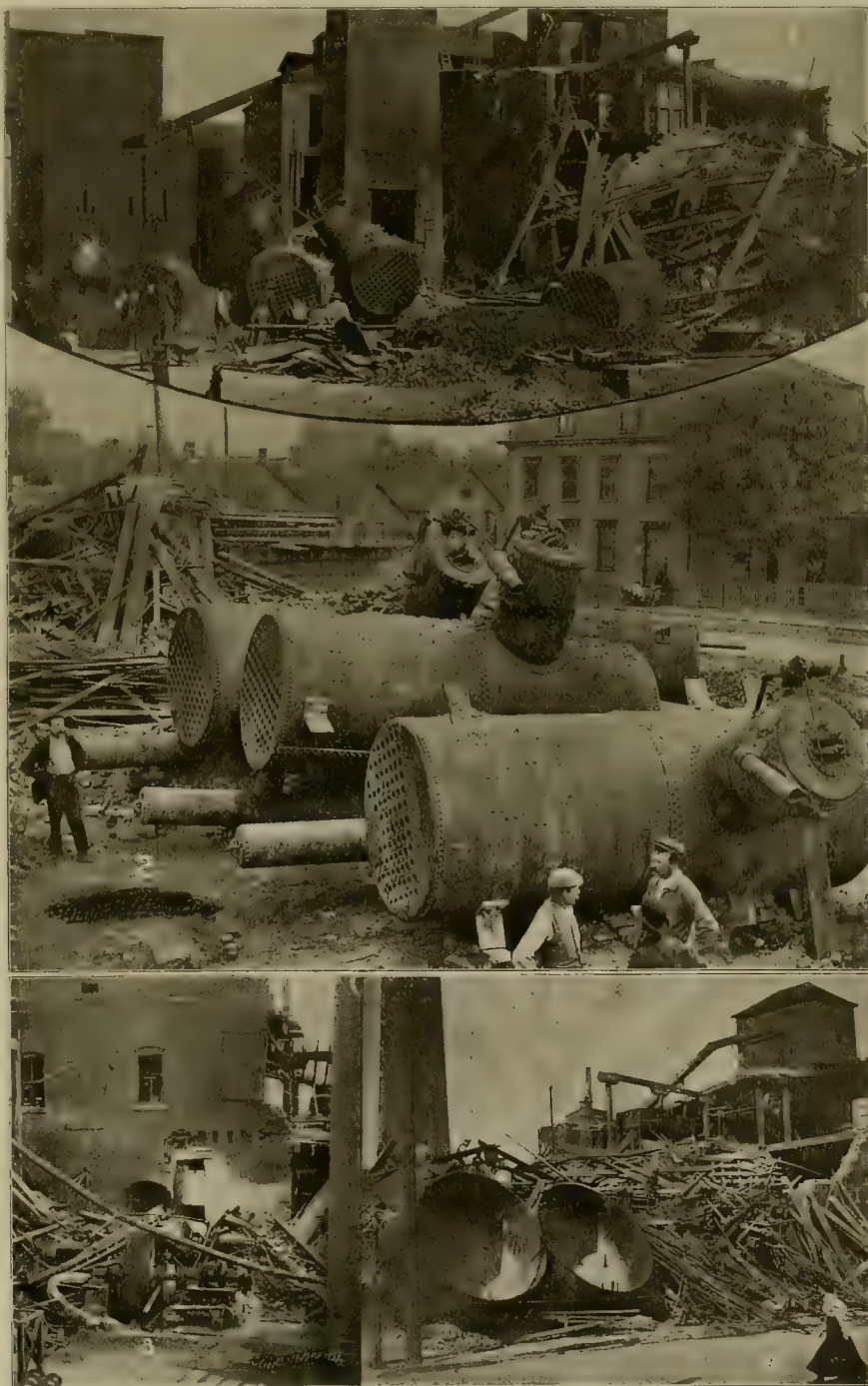
worked three days clearing up the debris.) While nothing is known definitely as to the cause of the explosion, there is some circumstantial evidence which throws a little light on the possible cause.

In the first place, the regular fireman was not at work that day and a substitute who was not a fire-

the boilers leak, and while it is not clear how the device could possibly have made the boilers leak, if they did leak, this fact would indicate that they were in a bad condition previous to the explosion, especially as there were no riveted joints on the bottom. The conviction is that the boilers had been in a faulty

condition for some time, notwithstanding they were supposed to have been inspected by an insurance company June 26, 1898.

The condition of boiler No. 4 shows that it had been overheated, and the colors of the iron on the sides could not have possibly been produced had there been much water in the boiler. They show a distinctly blue line part way up the sides and extending lengthwise of the boiler. It is stated that the boilers were cleaned the day before the explosion. A commission of engineers was appointed by the Mayor of Buffalo to investigate the explosion and determine the cause. At this writing their report is not to hand. At the time the photographs were taken from which the accompanying illustrations have been engraved Inspector Maltbie of the Fidelity and Casualty Co. was standing beside a huge tank, upon which was placed what had once been a boiler, but was then simply a huge and nearly square piece of boiler iron, as flat as if it had been run through a pair of giant rollers. When the explosion occurred the boiler parted at the side, and the rent is as straight and even as though the rivets had been drawn and the parts separated by a mechanic. In fact, in many places the rivets were blown out, the sheet iron remaining intact. This fact may be taken as an indication that the explosion was not due to any defect of the boiler itself. Inspector Maltbie was not inclined to discuss the explosion further than to say that the chances were that the cause would always remain a mystery. "It may have been due to low water," he said, "although I don't want to be quoted as advancing that theory. Each of the boilers had an independent water feed, and it would have been possible to allow the water to become low in this one and at the same time to have kept the others full. There are a dozen other things



VIEWS OF THE BOILER EXPLOSION WRECK AT THE NIAGARA STARCH WORKS, BUFFALO, N. Y.

man—that is, had not been working regularly as such, and who possibly was not competent in an emergency—had taken his place. Boiler No. 5, which exploded, is supposed to have been in poor condition, and a device which had been attached to the boilers had been thrown out a few months before, because the Starch Works Co. claimed that it made

which might have brought about the same result," he added, "but at present I do not care to add to the many theories already advanced. My duty now is to clear away the wreck as soon as possible." Asked as to the inspection of boilers, he said they made an exterior inspection every three months and an interior once a year, the last on June 26.

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The St. Keverne Mining Co. of Spokane, Wash., experiences the usual difficulty of mining companies organized on the non-assessable treasury-stock plan, and wants its stockholders to sign an agreement to pay an assessment "levied whenever the president of the company deems it necessary." Acquiescence in such a plan will probably be proportionate to the confidence of the stockholders in the integrity and business ability of that official. In Washington, unless under special agreement, it is impossible to levy assessments upon holders of non-assessable mining stock, a condition in which it is believed the disadvantages are sufficiently manifest to occasion a change.

The average success of several large electrical schemes, in connection with mining enterprises in California, has been sufficient to indicate similar commercial profit in other States, notably in Colorado, which is beginning on a large scale to do what has hitherto been found successful throughout that commonwealth in a minor degree. Recently the Colorado papers have had excellently written accounts of the opening of the electric power transmission plant at Canyon City, where, at a cost of nearly \$750,000, electric power is generated to be conveyed thirty miles, which marks a new era in the prosperous Cripple Creek gold district. In Platte canyon, twenty-three miles from Denver, is in preliminary shape a \$2,000,000 project to generate and transmit to the Colorado metropolis electric energy for light and power; and near Lake City, Hinsdale county, where lie large quantities of low-grade ore, another electric power plant is contemplated.

On the 1st inst. there was a change in the San Francisco mint officers. Incidentally is noted the record of that national institution. It annually puts more money into circulation than all the other U. S. mints combined, and has the lowest record of loss of any similar institution. During the four years ending Aug. 31st, '98, were coined in money \$153,697,834, there being handled during that time bullion valued at over \$300,000,000. The record for one day's coinage is \$620,000. During last month the coinage aggregated \$8,160,000. Of this, \$5,135,000 was in gold \$20-pieces; \$1,162,500 in gold \$10-pieces; \$1,764,500 in gold \$5-pieces; \$30,000 in silver half dollars; \$27,000 in silver quarter dollars; \$41,000 in silver 10-cent pieces. The total number of pieces of money coined during the month was 1,303,300. It takes as much time and labor to coin a silver 5-cent piece as a \$20 gold piece. The gold coined came from both sides of the Pacific coast—much of it from Australia in the shape of English sovereigns, which, after being recoinced, go out as American money, \$1,000,000 of which is now on the transport ship Arizona to pay U. S. troops at Manila.

Mines and Railroads.

This week is received the preliminary report of the Interstate Commerce Commission, which in admirable form gives exact statistical information regarding one of the great industries of the country—the building, maintenance, operation and business of the American railways. Reading the carefully collated summaries, one is moved to wish that some similar details could be secured relative to the great mining industry of the country. It is believed that such data would show more satisfactory business result, and appeal in strongest terms to the dividend desiring investor. During '97 the railways of this country paid \$40,979,933 in taxes: the aggregate dividends of the year were \$57,290,579. In Kansas, Wisconsin, Arkansas, Colorado, Oklahoma and Indian Territory the taxes exceeded the dividends by nearly \$3,000,000. In Texas they exceeded the dividends by \$1,000,000. In New England and the Northeastern States generally the dividends exceeded the taxes. The average of the profit columns shows that the railways, as a whole, had to carry a passenger 500 miles to earn one dollar, and had to carry a ton of freight 15.30 miles to earn one cent. The decline in freight rates is shown by a thirty-years table, exhibiting that in 1867 the rates per ton per mile were 1.925 cents, and in 1896, .806 cents per ton per mile—from nearly 2 cents to 8 mills, a fall of 58 per cent.

It is questionable if any line of business anywhere shows such depreciation in rates, and it is doubtful if any other great business is conducted so economically and intelligently and yet with so small a margin of profit. The elaborate report before us makes a poor showing as an investment proposition.

A contrast between mine and railroad investment indicates that the former is by far the most inducing. The absence of any detailed general mine report similar in scope and character to that of the Interstate Commerce Commission makes it impossible to speak positively, but it appears manifest that, taken in its entirety, those who invested in properly conducted mining operations in the past few years have much better returns for their money than anything that recent railroad annals can show.

On June 30th, '97, there were in this country 128 railroads in the hands of receivers: these roads represented a mileage of 17,861 miles. The aggregate capital stock of these roads was \$486,064,610. There is probably no metal mining region anywhere in the United States where a similar amount invested in mining operations would not make a vastly better showing than do these railway forms of investment, so dear to many who decry all manner of mining investment. The leaks and drains, the untoward conditions of business that preclude present possibility of profit in railway business are prominently and pleasurably absent in the mining world.

"Carrying Coals to Newcastle."

During a recent trip to Sonora, Cal., it was noted that an excellent improvement was being made in the town in the shape of a new and commodious courthouse. Judging from the beginnings which have been made, it is destined to be an ornament to the county.

It was noted further that a curious and surprising condition existed in regard to the selection of trimmings for this building. Instead of using stone taken from within the county, imported stone of much less beauty is being used. Several carloads of sandstone were observed in transit over the Sierra railway or being hauled in teams from its terminus at Jamestown. Four miles above Sonora are marble quarries which it is believed competed in the effort to obtain the contract for the stone for the new San Francisco postoffice. In addition to the marble, there is an abundance of good granite near at hand. It is difficult to understand how so little home pride could be shown by those having the drawing of the contract in charge, that they would permit sandstone which has to be transported miles to replace the marble or granite near at hand.

This is a small matter, but one too often illustrated in California, and it is not to be wondered at that many home resources remain undeveloped where so little local pride exists.

Improvement in the Cyanide Process.

The improvement in the metallurgy of gold made practicable by the introduction of the cyanide process seven years ago marked an epoch in gold mining. The advance in closer and more profitable working has been chronicled, and its apparent limitations in some class of ores have been deemed but temporary restrictions of its greater usefulness. The bulk of the precipitates and the special requirements of solution treatment have been the main obstacles to complete success. It was thought in '93 that the electrolytic deposition of gold would successfully solve at least one of these problems, but the financial results do not, so far, seem to exceed the older method.

In the current number of Cassier's Magazine J. W. Richards, discussing cyaniding, cites the fact that "from all ordinary gold salts the very weakest of reducing agents throw out the gold immediately. Those in common use are charcoal, hydrogen sulphide, copperas, oxalic acid. None of these, however, have the slightest effect on cyanide solution. Chemical research has disclosed the fact that the compound of potassium cyanide and gold cyanide is not a mere mechanical mixture of the two cyanides, but is an entirely distinct triple compound of potassium, gold and cyanogen, whose stability is somewhere about the average of that of the component cyanides. It is, therefore, no longer a question of breaking up a simple gold salt; it is more a question of breaking up a potassium salt. Not only thermo-chemical data, but also electro-chemical observations, point to the existence of potassium auro-cyanide, in which the potassium is the basic element, and gold and cyanogen form the acid radical. Such being the probable truth in the matter, we must, in order to get the gold, literally dispossess the potassium, providing it with some other negative radical, and then split up the gold cyanide. Some of the strongest reducing agents can effect this. Charcoal, if used in quantity, and given time enough, can do it. Sodium or potassium—used as amalgams, magnesium, aluminum, and zinc can effect it, the latter only when in shreds so as to offer a large, clean surface, and with many jagged points from which gas can be liberated, the latter metal being the only chemical participant in actual use. The chemical action involved is not simple, and brings into play the caustic potash which was generated during the solution of the ore. The zinc plays a double role. One-half of it splits up the auro-cyanide, and precipitates the gold; the other half displaces hydrogen in the caustic potash. The bearing of these on the course of the precipitation is two-fold: First, if the zinc has a flat, smooth surface, the gas forms a thin layer on it which stops the precipitation; a jagged, uneven surface allows the gas to form into bubbles, and so escape; second, the two zinc salts produced react on each other and produce insoluble zinc cyanide, which deposits on the zinc and hinders its reaction. This disposition can be prevented only by having a considerable excess of free potassium cyanide in the solution to take up the precipitated zinc cyanide and form the soluble double cyanide, or, in other words, to prevent this precipitation. Experience has shown that when there is less than 0.1 to 0.2% of free potassium cyanide present, the precipitation of gold is very imperfect. "Zinc can thus not be used with the more dilute solutions."

Prof. Richards asserts that electrolytic precipitation solves the question of precipitating dilute solutions, and draws other conclusions that will not be wholly accepted. Evidently the last word has not been spoken thereon, and, like other metallurgical modes and methods, gold cyaniding is still a progressive science.

THE United States is the only nation that is discussing the question, "Should the United States retain the Philippines?" Every other nation assumes the affirmative and every commercial instinct favors the idea. To this west half of the continent the idea particularly commends itself; to the Pacific coast it means great enlargement of trade; to California it is an unsurpassed opportunity; to San Francisco it opens an opportunity to "about face," and be the front door instead of the back door of the nation. A glance at a map of the Pacific ocean and its shores should be sufficient to suggest to every American the immediate desirability of such island acquisition.

Concentrates.

A "BARREL" of copper means 900 pounds. It is a Michigan idiom.

PRESENT platinum quotations in New York are \$14.50 to \$16 per ounce.

AMONG the 1200 miners at work in Aspen, Colo., three-fourths are leasers.

THE Bullion-Beck mine at Tintic, Utah, will market 2000 tons of ore during September.

THIRTY THOUSAND tons a month is said to be the output of the Kemmerer coal mine at Kemmerer, Wyoming.

A CONTRACT has been made for 3,000,000 bricks to be used in the construction of the Highland Boys smelter at Bingham, Utah.

FROM Australia during the last twelve months has been received at San Francisco gold aggregating in value \$23,793,129.

AT the Old Jordan cyanide mill at Bingham, Utah, there are twenty-seven zinc tanks working at a capacity of fifty tons daily.

THE Sonora, Cal., Democrat says that a conservative estimate of the annual gold output of the Jumper mine at Stent, Cal., is \$400,000.

THE assessed valuation of mining property in Stevens Co., Wash., for 1898, is about \$1,000,000; of this, \$300,000 is against the Republic mine.

WOLFRAMITE is a submetallic black, brown, opaque iron-manganese tungstate, (Fe, Mn) WO₄, crystallizing in the monoclinic system.

AT the Homestake mine, South Dakota, the wear and tear of shoes and dies is thirty-seven to forty-five pounds, respectively, per 100 tons of ore.

A RICH Colorado copper property is the F. Hough, on Engineer mountain, near Lake City, the ore going about 25% and valued at \$65 per ton.

THE Silver King mine at Park City, Utah, is said to have an ore body 200 feet wide on the 1100-foot level. The ore produces silver, lead and gold.

IN the 800 level of the Homestake mine, Black Hills, S. D., the ore body is said to be 600 feet wide. The property has been operated twenty years.

THE Epigram of Baker City, Oregon, says that the monthly payroll of the mines of that locality amounts to \$106,000. Of this, \$70,000 is paid for wages.

IN a fifteen-minute drilling contest at Greenwood, B. C., Aug. 26th, D. J. McClune, assisted by a turner, drilled 32½ inches in granite. The purse was \$250.

OPHIR, Colorado, a town of only 400 inhabitants, has electric lights, water works, churches and schoolhouse, and ships the year round, daily, two cars of concentrates.

ON the narrow gauge road of the Arizona Copper Co., Clifton, Arizona, a seventeen-ton engine runs on a twenty-four-pound per yard rail. The gauge is 30 inches.

AT Bannack, Montana, three dredge boats are in constant operation. The boat built by the London company is 135 feet long; it cost \$85,000 and has a daily capacity of 3000 cubic yards.

FROM sulphurets from the Black Oak mine, Tuolumne Co., Cal., an extraction of 90 per cent of the gold and 90 per cent of the silver is obtained at a cost of \$3.50 per ton, by the cyanide process.

AT De Lamar, Nevada, work has been begun on the De Lamar to double its present daily 300-ton capacity. It is locally stated that the present net earnings of the property exceed \$120,000 a month.

THE recent Eastern rise in copper from 11½ to 12½ cents is solely due to the close of the war and the fact, manifest to Europe, that copper must be immediately secured, it being an indispensable material.

THE Starliss M. Co. contemplates putting up a large precipitating plant at the Starliss copper springs at Bingham, Utah, and a 50 H. P. electric plant, hoist and pumping apparatus for the mine.

IN Mexico commissioners have been appointed for the Paris Exposition by all the State governments. The industrial and agricultural centers are making great preparations to place their resources before the world.

IN Mercur, Utah, it is reported that an effort will be made to have the next Legislature revoke the eight-hour law, and that leading mining men in the State are at work in the matter. The report is causing much comment.

AS to the scour of water-course beds, ¼-foot per second will scour fine clay; ½-foot, fine sand; ¾-foot, coarse sand; 1 foot, fine gravel; 2 feet, round pebbles 1 in. diameter; 3 feet, angular stones size of a hen's egg, 5 feet, conglomerate.

THE Rose Valley Borax Works in Harney county, Oregon, are outputting 80,000 pounds a month. C. L. Taylor, the owner, has contracted to deliver 80,000 pounds a month for three years. He ships to Winnemucca, Nevada, 144 miles, where the product is loaded on cars for the East.

A GOOD cement for cracks in boilers or to secure steam joints is made as follows: Litharge in fine powder, 2 parts; very fine sand and quicklime (that has been allowed to slake spontaneously in a damp place), of each 1 part. Mix and keep it from the air. It is made into a paste with boiled oil before application.

ACCORDING to the Canyon City, Colo., Record a mill is being built in the Grand Canyon, twelve miles above that town, with a process for treating ores by which rock running less than \$2 will pay from \$15 to \$20 per ton, which causes the Telluride, Col., Journal to suggest that on this basis common quarry stone ought to pay well.

DURING the first month of the war the new subscriptions to the MINING AND SCIENTIFIC PRESS fell off, as compared with the ratio of the past few years, but in the last three weeks the renewal of interest in mining is abundantly illustrated by the increased number of orders for the paper from all parts of the country, Colorado, Utah and Arizona, especially.

THE cost of cyaniding ore is a variable figure, depending on the character of the ore, economy, management, situation, etc. Several mills treat ore for less than \$2 per ton. So far as known, the Mercur, Utah, is as minimized as any in that direction in this country—the cost there being 85 cents per ton. South African mills claim, in some instances, to successfully cyanide ore at a cost of 60 cents per ton.

THE El Dorado Co., Cal., Democratic Convention in their

platform put the following plank: *Resolved*, That we are in favor of the amendment of the mining law passed by the last Legislature, so as to do away with the necessity of doing \$50 worth of work within sixty days after location. Also an amendment providing for the recording of mining notices in the mining district when the mine is located.

IN electrical precipitation of gold from cyanide solution, in the Siemens-Halske process, the anode is iron and the cathode is lead. In the Pelatan-Clerici process the anode is iron and the cathode is an amalgamated copper plate covered with a bath of mercury. Zinc anodes cannot be used, for the zinc oxide which is formed reacts with the ferrocyanide of potassium formed during the leaching, insoluble ferrocyanide of zinc being formed.

AT a special meeting of the executive committee of the Cal. State Miners' Association in S. F., on the 6th inst., the time and place for the annual convention of the association was agreed upon. The session will be held in San Francisco, beginning at 10 A. M., Monday, Nov. 21st. Messrs. Parsons, Sonntag and Byington were constituted a committee to make all necessary arrangements therefor. Secretary S. J. Hendy reported \$431 in the funds.

ADVERSE rulings in Montana, Utah and elsewhere, locally reported during the week, emphasize the need for a Department of Mines and Mining. Nothing is ever settled till it is settled right, and the mining industry of this nation, whether it be in Massachusetts, South Carolina, Texas, Idaho, Colorado, or anywhere else, will never be rightfully recognized and justly treated by the Government till there is a Department of Mines and Mining.

IN the Government mines at St. Andreasberg, in the Harz, two new batteries of nine iron stamps have been installed which are said to do nearly twice as much work as the wooden ones they replace. With a fall of 10 inches the iron stamp treats in twenty-four hours 1.8 tons of ore with a consumption of 2.6 gallons of water per minute for the two batteries. The wooden batteries consumed 4.4 gallons of water per minute and treated only 1 ton of ore per stamp.

TO DETERMINE whether a given low-grade gold or silver ore can be profitably concentrated, take a weighed quantity of dry pulverized ore passed through a 40-mesh screen, such as will be an average sample of the bulk of ore treated, say one pound, after having previously assayed the sample. Pan this quantity carefully into a second pan, and repan until all the sulphurets are separated from the gangue, then dry and weigh the sulphurets and assay them. The weight represents the percentage of sulphurets the ore contains.

THE hoisting engine at the Anaconda mine, Anaconda, Mont., built in '82, is to be replaced by one of the horizontal type, with a capacity for hoisting from a depth of 5000 feet. The ore will be hoisted in a skip containing twelve tons, filled directly from ore bins or chutes below, and on arriving at the surface will be automatically dumped in ore bins. This skip will be used only for hoisting ore, and in the other compartment of the shaft will be a cage containing four decks for lowering and hoisting men, cars, timber and machinery.

A TRUSTWORTHY test for the presence of acids in oils is to use a tincture of phenol phthalein, and render it alkaline with a little caustic soda, shaking up the suspected oil with a little of the test reagent. The red color of the tincture will be discharged if acid is present in the oil. The proportions to add are as much phenol phthalein as will cover a silver 25-cent piece to ten to twelve ounces of methylated spirit, then add sufficient of the solution of caustic soda to render the fluid perfectly of a reddish tinge. In shaking up a little of the mixture with the oil the presence of acid in the oil will be immediately shown by the reddish color disappearing.

THE grade from a gold mill battery, with copper or silver plates leading to the concentrator, may be as follows: The full width plates, 1½ in. fall to the foot; the 16-in. width plates, 1.5-16 in. fall to the foot; the 4-in. sluice boxes, ¾ in. fall to the foot; for single row of machines, 7 ft., total fall from mortar lip; for double row of machines, 9 ft., total fall from mortar lip. The floor on which concentrators stand to be 7 feet below the lip of the mortar for a single row of machines; but if crowded for fall, the concentration box can be sunk or lowered 18 inches. If, however, two rows of concentrators are used, as usual, the floor to be 9 feet below lip of mortar, to bring sluices above attendant's head when standing between the two rows.

UNDER Government auspices the work has begun of deporting needy Yukon prospectors from St. Michael, Copper river and other northern points where they were stranded, partly through their own improvidence and partly through the swindling transportation companies that took their passage money and then dumped them wherever practicable. Some of these companies now refuse to bring them back, but are willing to contract with the Government at so much "a head" to carry the penniless men back to civilization at Government expense. The U. S. gunboat Wheeling and the U. S. revenue cutter Bear have been detailed to take as many as practicable as far south as Sitka. From that point the Government will contract for transportation to Seattle and San Francisco.

REPEATED TRIALS appear to make it manifest that a belt will transmit about 80 per cent more power, with a given tension, when the grain (smooth side of the leather) is in contact with the pulley than when the flesh side is turned inward. It is also claimed that the leather is less liable to crack, as the structure on the flesh side is less dense and the fibers more extensible. The adhesion of belts is greater on polished than on rough pulleys, and is about 50 per cent greater on a leather covered pulley than on a polished iron pulley. Large pulleys and drum may be covered with narrow strips of leather or with longer strips wound spirally. Pulley covers are manufactured in strips of the desired width, and reduced to uniform thickness by machinery. Belts should be kept soft and pliable by applying tallow occasionally, and neats foot or liver oil, with a little resin when they become hard and dried.

AT Bragdon, Shasta Co., Cal., Moore & Saunders save fine gold by sluicing. The boxes shoveled into are 16 inches wide, 9 inches deep, and set at a steep grade, 7 inches to 12 feet. The last of the riffle boxes is 16 inches wide at the top and 32 inches wide at the bottom end. Their shape spreads and throws the gravel so that the gold must touch the blanket riffles, and there it remains. At the bottom the water falls into a V-shaped trough, covered with fine wire gauze or screening, and the fine sand and gold is then carried at right angles from the box into a large tub, the coarse gold falling over outside. The riffles are made of grain sacks. The V-shaped trough and tub are for the especial purpose of cleaning up in, but are left in place all the time for fear that one little

wee speck will not like the carpeting and go on. In the tub the gold settles to the bottom and is easily amalgamated.

TO MAKE concrete for machinery foundations or retaining walls it is advised to use six parts of broken rock small enough to go through a 3-in. mesh screen, two parts of clean, sharp sand, one part of Portland cement, and thoroughly mix together when dry. Do not add any water until it is required for use; then add enough water to make a thick mortar. Mix in small quantities and use at once. Thoroughly tamp with a suitable tamping bar immediately. Concrete will set enough in twenty-four hours to carry a load, and in three to four days will be hard enough to run machinery on. Should broken rock be difficult to obtain, use clean creek gravel of about the same size instead. In no case use loam, clay or very fine sand. For special strength, more cement may be used. This is from cable road practice, and may be considered sufficiently reliable for ordinary use, but for special purposes a special mixture would be required.

AT the 75th meeting of the American Institute of Mining Engineers, to be held at Buffalo, N. Y., on the 15th prox., papers will be read as follows: "Note on the Forms Assumed by the Charge in the Blast Furnace, as Affected by Various Methods of Filling," by F. Firmstone, Easton, Pa.; "The Auriferous Deposits of Siberia," by Rene de Batz, Paris, France; discussion of a former paper, "Mining Districts of Colombia," by Messrs. Granger and Treville, Quibdo, Colombia; "The Ketchikan Gold Mines, Ural Mountains, Russia," by H. B. C. Nitze, Baltimore, and C. W. Purington, Boston; "The Genesis of Certain Auriferous Lodes," by J. R. Don, N. Z.; "The Influence of Bismuth on Brass and Its Relation to Fire Cracks," by E. S. Sperry, Bridgeport, Conn.; "Notes on the Mines of the Frontino and Bolivia Co., Colombia, S. A.," by S. Crago, Mariana, Minas Gerais, Brazil; "Experiments in the Sampling of Silver-Lead Bullion," by G. M. Roberts, Murchison gold fields, West Australia; "Modern Cupola Practice, With Special Reference to the Discussion of the Physics of Cast Iron," by B. S. Summers, Chicago, Ill.

THE "Concentrate" in the issue of Aug. 27, stating that "one miner's inch of water, equivalent to 1½ cu. ft. per minute in falling 100 feet, will generate .24147 H. P.," has elicited dissent from several sources. It is asserted by four correspondents that more accurate data would give .2936 H. P. as the correct figures in the case. It is believed, however, that the statement as originally made will stand. Theoretically our critics are right, but the calculation was made on the basis of an 85 per cent efficiency, which is as much as ordinarily can be got out of that power. One California mining engineer, in his criticism, says: "I find a handy empirical rule to work from is that 100 inches, falling 100 feet, has a theoretical energy of 28½ H. P. With this as a starter one can mentally expand it for varying heads and quantities. I believe the uncertainty of the miner's inch as a unit of measurement has caused more trouble than it is worth, for simple as it is as an approximate measurement I find the average man entirely unable to handle it with even the semblance of accuracy, while to the engineer it is an abomination. I expect some time to see a law here similar to that in other States establishing the second-foot as the legal unit of water measurement."

ENGINEER AYTON of El Bote mine, Zacatecas, Mexico, some time ago carried out a series of experiments as to the best method of producing a thick pulp for pan amalgamation from the pulp of stamps or Chili mills. He found in practice considerable difficulty in getting a continuous thick discharge without occasional blocking up of the pipes when using a siphon, while the disadvantage of a small opening under the full head of the settling box is obvious. The difficulty was overcome by adopting an intermittent discharge. The following arrangement was found to work satisfactorily, and to give a pulp entirely under control as far as consistency is concerned: A short nipple at the bottom of the pointed box was fitted with an outside door valve held in position by a spring, and opened at intervals by a cam movement driven from a shaft. The extent of the opening and the frequency of the same is under control. The pulp collected at the bottom of the box for a short period, and, on the opening of the valve, discharged in a thick flow, the valve being closed so quickly as to prevent its becoming too thin from the rush of water following the first discharge. This method of intermittent discharge is believed to combine the advantages of a comparatively large opening, free from the danger of blocking, with a limited flow of water so that the thickness of the pulp can be maintained.

REGARDING the sizing and cutting of gear wheels, the word "diameter" when applied to gears is always understood to mean the pitch diameter. The diametral pitch of the gear is the number of teeth to each inch of its pitch diameter. If a gear has forty teeth and the pitch diameter is 4 inches, there are ten teeth to each inch of the pitch diameter, and the diametral pitch is 10; or in other words, the gear is 10 diametral pitch. Circular pitch is the distance from the center of one tooth to the center of the next tooth, measured along the pitch circle. If the distance from the center of one tooth to the center of next tooth, measured along the pitch circle, is ½ inch, the gear is ½ inch circular pitch. The diametral pitch given, to obtain the circular pitch divide 3.1416 by the diametral pitch. If the diametral pitch is 4, divide 3.1416 by 4, and the quotient, .7854 inch, is the circular pitch. The circular pitch given, to obtain the diametral pitch divide 3.1416 by the circular pitch. If the circular pitch is 2 inches, divide 3.1416 by 2 and the quotient 1.5708 is the diametral pitch. The number of teeth and the diametral pitch given, to obtain the pitch diameter divide the number of teeth by the diametral pitch. If the number of teeth is 40 and the diametral pitch is 4, divide 40 by 4, and the quotient 10 is the pitch diameter. The number of teeth and the diametral pitch given, to obtain the whole diameter or size of blank of gear, add 2 to the number of teeth and divide by the diametral pitch. If the number of teeth is 40 and the diametral pitch is 4, add 2 to the 40, making 42, and divide by 4; the quotient 10½ is the whole diameter of the gear or blank. The number of teeth and the diameter of the blank given, to obtain the diametral pitch add 2 to the number of teeth and divide by the diameter of the blank. If the number of teeth is 40, the diameter of the blank is 10½ inches, add 2 to the number of teeth, making 42, and divide by 10½; the quotient 4 is the diametral pitch. The pitch diameter and the diametral pitch given, to obtain the number of teeth multiply the pitch diameter by the diametral pitch. If the diameter of the pitch circle is 10 inches and the diametral pitch is 4, multiply 10 by 4, and the product 40 will be the number of teeth in the gear.

The Occurrence of Platinum in the Oural Mountains.

Written for the MINING AND SCIENTIFIC PRESS by
R. HELMHACKER, Prague, Bohemia.

Though this precious metal had been discovered first in Brazil, and occurs in slight quantities also in Borneo, San Domingo, Colombia and California, it is accumulated in sufficient quantities to be economically available exclusively in the middle Oural mountains. This portion of the Oural between the northern latitude of $57\frac{1}{2}^{\circ}$ to $59\frac{1}{2}^{\circ}$, in the government of Perm, is the sole distinct source in the world from which this "noble metal" is derived. The workable platiniferous deposits are only alluvions in which it is disseminated either alone or accompanying the placer gold—alluvial accumulations being extracted exclusively by washing operations like the gold. The platinum alluvions containing sufficient quantities of this metal to be extracted with profit are situated on both sides of the Oural, close to the elevated part or the summit, presenting the features of the watershed of Europe and Asia; the waters from its eastern or Asiatic side contributing to the Trtish, the great left tributary of the Obi stream; while those flowing northward to Europe pass to the Chusovaia, a left-hand affluent of the Kama, and this later a left-hand tributary to the Volga.

On the eastern side of the Oural watershed, beginning in the direction from north to south, are situated platinum placers in the district of Verkhotoorie or the mining district of Goro-Blagodatsk (in translation: district of the Mount Blagodat). The numerous washings are along the headwater branches of several rivers near the Asiatic watershed, thus:

1. One placer on the mining dominion of Bogoslovsk, belonging to Mrs. Tolovcev, drained by the river Sosva, a right-hand affluent to the Tavda, this a left-hand tributary of the Tobol, emptying at left in the Trtish.

2. Two placers on the estate of the Nikolaie-Pavdinsk mining works of Pastukhov and on the Lialia river (Lobva) in the dominion of Vagranka. The Lialia is a right-hand tributary to the above-named Sosva.

3. On the system of the Toora river, with the Nijne-Toorinsk and Verkhne-Toorinsk estates, and its left-hand affluent to the Is, are situated fifty-six placers on the crown land, five placers on the Znamenskaja estate and nineteen placers on other private estates' land. The Toora is a left-hand tributary of the Tobol.

4. More southward is the Salda, a right-hand affluent of the Toora, with three placers.

5. Yet farther south is the Taguil river, emptying at right hand in the Toora, with one placer in the crown's land Koshevinsk, and three placers in the crown's Baranchinsk estate.

All these even-named ninety placers, from which about sixty-six are situated on lands to which the crown once laid claim and granted licenses to private owners to dig for platinum, produce severally each one only moderate quantities, but jointly they contribute about five-eighths of the entire platinum production of Russia, or, rather, of the Oural.

6. Another accumulation of platiniferous character is in the district of Verkhotoorie, on the western or European slope of the Oural, drained by the Ootka river system, in its affluents, rising on the watershed. Here only five works are washing the metal, but on a considerable scale, contributing about one-fourth of the entire output in Russia. These five works are situated on the large dominion of Nijni-Taguilsk (Nijni-Taguilsk is a railway station 335 versts from Perm to Yekaterinbourg), belonging to the heirs of Prince Demidov, in the vicinity of the iron smelting works of Veosimo-Shocitansk and Veosimo-Ootinsk, on the Ootka river, a left-hand tributary of the Chusovaia. The geological features are represented by Devonian crystalline limestone and metamorphic micaceous sandstone, and by Silurian slates of greenish color, sometimes argillaceous or chloritic, in which enormous masses of the earliest eruptive rocks are deposited; thus olivine gabbro, olivine and their transformations into serpentine, or diorites, diorite porphyries, pyroxene (Ouralite), porphyries, Ouralite gabbro, amphibolitic rock, gabbro, tuffas with green serpentinous, chloritic or talcous slaty rocks, derived from them by later peculiar processes. The platinum alluvial deposits are situated in this district on serpentine or the adjacent rock. If all the platinum placers on both sides of the Oural's watershed situated in the Nijni-Taguilsk dominion, worked by the landlord and private owners, are taken together, their production reaches about one-half of the bulk of the entire output of this precious metal in Russia.

7. In the Biser estate of Count Shuvalov are the lands of the Krestovozdvjenskii mining and smelting works, near the railway station of Tiophaigora, 223 versts from Perm—several platinum placers, covering a Devonian ground consisting of dolomites, quartzites, shales, chlorite schist and olivine diallage gabbro, partly decomposed to serpentine. These metalliferous alluvions are situated along the banks of headwater river channels running to the Vilva and Koiva, two right-hand tributaries of the Chuso-

vaia. This occurrence on the western Oural side is situated in the district of Perm, in the government of Perm, and is a good producer, affording about one-eighth of the platinum output.

8. In the Solikamsk district of the government of Perm—Solikamsk is situated on the Kamo, north from Perm in a straight line about 190 km.—are placers producing a small quantity of platinum.

Besides these two systems of placers on the eastern and western slopes of the Ourls no other workable deposits are recognized, and in 1894 the following were in operation: Seventy placer mines on crown or estate lands worked by private owners, eighteen placers situated on private estates and worked by their landlords, and seven placers in private dominions, which means former crown possessions given as a donation (possession estates) to some persons by the monarch for as long a time as they would smelt iron in their works.

The annual production of platinum is now very formidable on account of the attention directed to the metal, and amounted in the year 1895 to 4416.5 kg. and in 1894 to 5209 kg. The long-continued rains in 1895 did not permit washing through the whole season. During the decade 1885-95 the average yearly output was 3570 kg. and the preceding decade, 1875-85, 3145 kg.

The greatest producers are the five placers of Prince Demidov, with 1035 and 1294 kg. in the years 1895 and 1894; then follows Count Shuvalov's with 647 and 655 kg. from his Krestovozdvjenskii placers, both on the western slope of the Ourls. The other ninety placers do not produce, each taken by itself, notable quantities of this metal. Thus the production of about 100 to 130 kg. annually is reached only in each one of three placers; 50 to 100 kg. is produced in each one of twelve placers, while 15 to 50 kg. is extracted in each one of about thirty-three placers, and the other placers average less than 15 kg. of platinum annually.

With the exception of only three placers in the system of the headwaters or its affluents of the Toora river, which extract exclusively platinum, all the other placers contain either the platinum, associated with the prevailing gold, or the gold associated with the platinum as accessory metal, being commonly worked for gold and platinum together; while the other numerous placers scattered in the alluvial district, extending through the platiniferous region on both sides of the Oural summit contain only pure auriferous deposits. The eleven placers with gold and accessory platinum are extremely fluctuating in their yield of platinum, this latter metal forming 1 to 1.33 part of the gold tenor of the metalliferous sands. In the other, about eighty-three platinum placers in which also gold is met with in the gravel, the tenor of the accessory gold presents a variance in its yield from $\frac{1}{4}$ to 1-1100 compared with the yield of platinum, taken as one.

In the most productive platinum (gold) placers in Europe worked by Demidov the precious metals extracted is a mixture of about $6\frac{1}{2}$ parts of Pt with 1 part of Au; those in the Biser estate (Krestovozdvjenskii mining land) operated by Shuvalov produce precious metals in the proportion of 31 parts of Pt to 1 part of Au.

Beside the platinum in some gold placers of the Oural other precious metals of the platinum group are met with, but in exceedingly slight quantities; thus the alloys, or rather combinations of Tr and Os, forming what is known as osmium-iridium, osmeiride, and the trid-osmium, iridosmine, termed in the mineralogie as nevianskite TrOs_4 , and sissertskite TrOs ; the names are derived from the two localities in the eastern Oural, where they were first observed.

In the Oural gold placers of the government of Orenbourg, generally in the crown estate of Mias, these rare metals accompanying the gold were extracted in the insignificant amount of 4.5 kg. and 4.1 kg., in the years 1894 and 1895. This rare metal forms the 1-200th to 1-210th part of the gold they accompany, this later taken as 1.

Beside the two native combinations of iridium with osmium, the nevianskite TrOs_4 and the sissertskite TrOs occurring both in minute flat (hexagonal) scales of dull steel gray to tin white color, is occasionally found also native, nearly pure iridium and very seldom native palladium among the small grains of native platinum. In some rare gold or platinum-gold placers, but more abundantly in the Krestovozdvjenskii alluvions, small diamond grains are found with the precious metals.

The banks of gravels and sands with the platinum and the accompanying gold mostly in the beds of the small streams, or the valley bottoms, also on hillsides where ancient water courses are supposed to have been, are from $\frac{1}{4}$ or 1 m. to $2\frac{1}{2}$ m. thick; their thickness is seldom lesser nor greater than the figures here given. The platinum-auriferous beds of the thickness just assigned are always found beneath barren or non-metalliferous accumulations of debris of rock, as of sand or gravel; or of banks of rock-debris covered with a more or less thick stratum of peat forming the soil of the vegetation. When this is the case the uppermost stratum of peat is resting on an impermeable stratum, which may be even thin, of tenacious clay. In the northern region of the Oural placer deposits these barren covers are $2\frac{1}{2}$ to

3 m. thick, while in the middle Oural deposits they reach the thickness of 10 to 14 m. In the first case, when the deposits lie shallow this barren alluvial layer is dug mostly in the winter season in the open air and transported to such places beneath which lies no metalliferous gravel. The precious bed thus laid open is worked in the summer season in the open air and washed. In the second case, when the barren cover is a thick one, the platiniferous gravel beneath them is worked underground throughout the whole year by shallow pits, from which, with a pannetwork of drifts, the gravels are dug and hoisted to the grass from where they are worked in the summer season. It may be stated that the greater part of the shallow metalliferous placers are richer in gold and poorer in platinum, while those in the region of thick barren covers differ, as they are more valuable in platinum and poorer in gold.

The platiniferous placer with its extractable layer is commonly lesser charged with loamy or argillaceous matters, which have generally not a tenacious character, as this can be observed by some auriferous placers; therefore the assemblage of worn coarse gravel with shingle and fine sandy sediment being more loose, falls to pieces more readily in the washing process. The washing operation is the same as in use in gold washing; the more readily disintegrable bed is reduced with jets of water in perforated revolving drums by stirring them to a loose coarse and fine, sandy and muddy mass, from which the heavier particles (Au, Pt, magnetite, chromite, zircon, etc.) are left behind riffles, when they are carried in a water flow along the bottom of the washing sluice. If not noticing the yield of gold the caught platinum is generally fine grained or small flattened and there is a difference observable. While the mostly equal platinum granules from the Is river and northwards of this left affluent to the Toora are water worn, smooth, and very glistening, the metal from the Taguil system and southwards is dull in color, and slightly associated with the very rare metals (osmium-iridium) accompanying it. Coarser pieces of platinum are more rare, pebbles of the size of a pigeon's egg or yet larger are very seldom and only occasionally assume considerable dimensions. Thus in the year 1827 an irregular lump weighing 4.3 kg. was extracted. The largest nugget ever found—in the Demidov placers—weighs 7.8 kg. The crystalline form of platinum as found native is that of the octahedron or cube, but small crystal-shaped detached pieces of it occur very rarely among the minute water-worn grains of this metal in the placers.

In the year 1894 were washed on the ninety-seven placers in operation exactly one and two-thirds millions tons metalliferous debris, gravels and sands, with 5546 engaged workmen. The average yearly tenor of platinum in the metalliferous sand extracted amounted to 3.08 grams in one ton, by which the yield was fluctuating from 12 grams in the maximum to 2.6 grams in the minimum. The first figure is relating to placers with abundant platinum and accessory gold, the latter to placers in which platinum is subordinate to the gold tenor. The placers on the western slope of the Oural mountains, or the European, bearing more rich in platinum, show an average yearly yield of about 4 to 6 grams in one ton, while the accumulations of more gold and lesser platinum in the bearing alluvions on the eastern side of the mountains situated in Asia show the average annual platinum tenor of about $2\frac{1}{2}$ to 3 grams in one ton of workable sands or gravels.

The extraction of Pt which amounted about twenty-five years ago to only 1500 kg. annually, extended considerably in the last ten years, as the attention of the electrical industry was directed to this metal, which is by no means replaceable by any other. But as the platinum metal was valued only at \$111 per kg., being about thrice the price of silver at that time, only the most yielding or high grade deposits were extracted. Thus the average yield of Pt in one ton workable alluvions amounted in the decade 1870-80 in the Krestovozdvjenskii placers to 16.1 grams (from the maximum 20 gr. to 12.4 gr.), while the Nijni-Taguil platinum washings afforded 6.4 gr., or in aggregate from all the worked placers 6.7 grams. In the year 1887 the average yearly tenor of all the deposits extracted, varying from 19 gr. to .3 gr., amounted in average $3\frac{1}{2}$ gr. per annum to the ton. But as the value of the metal increased slowly to the year 1890 the yield of the workable metalliferous gravels since that time has constantly fallen off to 3.08 gr. in the year 1894, especially since the year 1891, when the metal was valued at \$260 to \$300 and even \$440 per kg. in the years 1894 and 1895. Since the year 1895 the value ranged about \$430 per kg. As by a low value of the platinum only the deposits abundant in metal could have attracted attention, and sands and gravels with more moderate tenors were insufficient to justify mining exploration, such metalliferous beds not proving abundant enough in metal could now pay expenses and minor platinum-bearing regions now attract attention. Therefore, also suspended old placers were re-established as better prices for the metal made washing profitable—hence the decrease of the average tenor in metal in the workable deposits since the value of it had risen. If the platinum would be valued at \$110 per kg., deposits yielding from $2\frac{1}{2}$ to $3\frac{1}{2}$ gr.

metal in one ton, equaling from 51 to 64 gr. in one cubic fathom of gravel, are workable; while at the present price of \$370 to \$440 per kg., metalliferous sands with the tenor from $\frac{1}{2}$ to $\frac{3}{4}$ gr. in one ton, being equal to 13 to 17 gr. in one cubic fathom, pay extraction expenses. In the Krestovozdvijenskii or Biser mining estate is an extended region of such less abundant metalliferous sand accumulations, not yet sufficiently explored, which may in the future contribute to the production of platinum in the country, if the present price of it would retain still longer. Thus the production of platinum in the Ourals from its placers—which is nearly twenty to thirty times the amount derived from the other platiniferous countries of the globe—would continue to cover almost the entire supply of this metal as required for the purpose of manufacture.

The placers in the dales drained by the headwaters of the brooks are worked in claims along the course of the deposit-bearing channels, each claim being $\frac{1}{2}$ km. (5 versts) long, if there is room for that, and at least 500 m. broad. The crown dominions granted to private owners and private estates' land are exempt from the mining regulation on account of claims, as they have the exclusive right of mining in their possessions.

The extracted metal pays a royalty of 3 per cent, which is taken by the Government from the production, besides many other expenses.

Among the extracted platinum were collected, though rarely, specimens consisting of chromite impregnated with the metal, also water-worn pieces of olivine, or serpentine, with abundant platinum granules, so that the attention was directed to the source of it, or to the primary deposit of this rare metal. And as the metalliferous alluvions are deposited on a large scale upon a serpentine ground, it was supposed that this specimen might be the mother rock, from which this metal had been derived by its decay and swept in the gravel strata. Though the assertion that the primary deposit might be attributed to the serpentine was thorough, this fact could not be completed by direct observation, and it was admitted that nothing strictly analogous can be seen on the earth's surface.

But the last 1883 and 1892 discoveries of the matrix of the platinum attracted much attention, resolving thus an interesting question; at first, in the olivine gabbro, forming the ground of some placers in the Biser dominion, where in the structure of this rock are enclosed accessory particles of this rare metal. Near this platinum mother rock—an olivine gabbro without labradorite composed from diallage, some olivine and chromite—beneath the placer formed of yellow-brown sandy loam, of 22 m. width and 4 km. long, are deposited small, detached, sharp-edged grains of the metal with sharp-edged gold, which become more water-worn, finer-shaped and more shining the more distant from the original deposit they are scattered in the platiniferous alluvial strata. Beside this, chromite with embedded platinum the size of a nut is frequent in the placer deposit. Later the mother rock of it was observed in an occurrence of chromite, forming bunches in olivine rock at the Soloviev mountain, $\frac{1}{2}$ km. in a northeasterly direction from the village of Zakharevo, in the district drained by the left tributaries of the Ootka on the land of the Veesimo Chaitansk iron works. The bunch of chromite is impregnated with microscopical particles of platinum, which, by chemical assay, is contained in it at the rate of 106 grams in one ton. But also the olivine rock itself yields traces of this precious metal. In both cases the extent of platinum-bearing primary rock is insufficient to justify mining exploration. Thus the question about the mother rock, of generally small detached granules of the platinum, was at last satisfactorily resolved, as the new discoveries showed it to be embedded originally either with chromite ore, or olivine, or in a serpentine derived from olivine.

The discovery of this precious metal, known from the gold placers in Spain about 200 years ago, was held secret to prevent its admixture to gold in alloys. This metal was first known in Europe in the year 1735, when the Spanish traveler Ulloa received it from the alluvial gold deposits of the river Tinto, in the district Choco, near Popayan, in Brazil; and Wood, an assayer of Jamaica, discovered it at Cartagena in 1741. The metal procured from South America, distinguished by its difficult fusibility, liking to silver, which in Spanish language is termed "plata," received this name, also "platina del pinto," which means "little silver." Most of the producing countries, as Brazil and Borneo, afforded an insignificant yearly output, and it is said that their average yearly extraction amounted to nearly 400 and 120 kg. in the year 1885, while the yield for 1896 might be 70 and 100 kg.

(To be Continued.)

A NEW YORK LOCOMOTIVE WORKS recently turned out a mammoth engine of the twelve-wheeled mastodon type, with cylinders 21 by 34 inches, drivers 55 inches, boiler 78 inches in diameter. Its total weight is 212,750 pounds, and the total weight of engine and tender 308,750 pounds. It is for heavy freight service on the Great Northern railroad.

Ladders for Underground Service.

Following is the result of some recent tests of the strength of various forms of ladders as noted in the *Mining Reporter*:

Fig. 1 is black pine stock, sides, 2x3 inches; slat, 1x3 inches; wire nailed, but not notched. Slat connected like this were capable of standing an average strain of 1225 pounds. The usual manner of breaking is shown at A, where the ends of the slat would split and the nails pull out. The method of testing consisted in placing the ladders at an angle of 45 degrees, and pulling down on the slat or rung by means of a rope and hook. The rope encircled a drum directly beneath the ladder. The dial for registering the pull was connected in with the rope half way between the hook and the drum. The drum was turned by means of crank and gears.

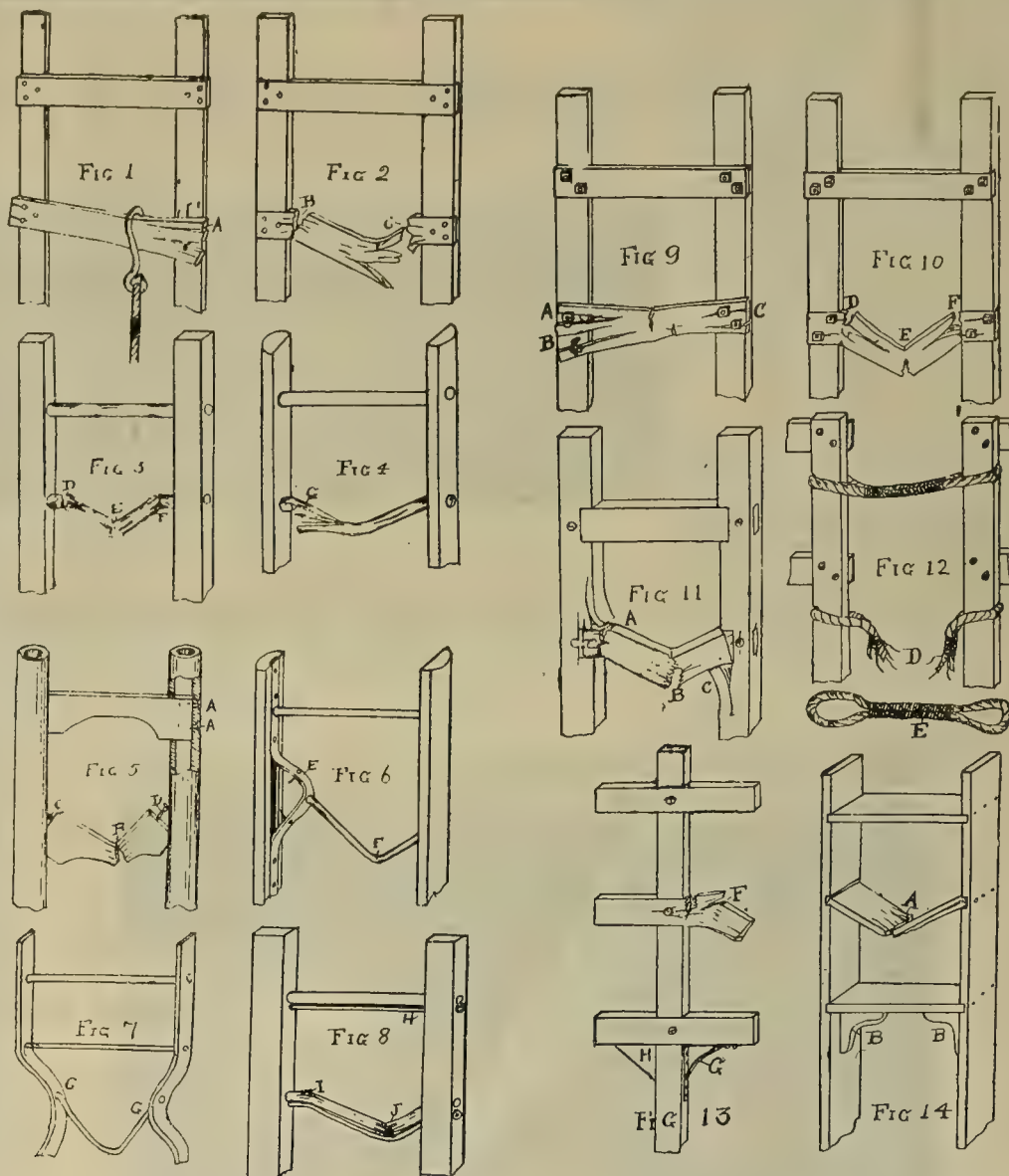
In Fig. 2 is the same form of ladder as in Fig. 1, except that the slats are notched into the sides $\frac{1}{2}$ -inch. The average breakage registered at 1325

1 $\frac{1}{2}$ inches wide and $\frac{1}{2}$ -inch thick. The rungs are iron, 1 inch in diameter. The imperfection in each test was the drawing out of the strips from the grooves, as at E. The rungs would be pulled down, as at F, when strained to only 850 pounds.

A style of aluminum ladder is shown in Fig. 7. The sides are 3x3 $\frac{1}{2}$ inches; rungs 1 inch of same material; metal, 10 per cent alloy; very light, and makes a good ladder for light work. Under pull of 1200 pounds the sides were distorted and rungs bent, as at G, G.

Ladder in Fig. 8, intended for heavy work, has 3x3 $\frac{1}{2}$ -inch sides of bull pine, $\frac{1}{2}$ -inch rungs, and the latter are strengthened by means of a $\frac{1}{2}$ -inch rod, H, which passes through the sides and is headed up outside. When subjected to a pull of 1450 pounds, the rungs and rods would assume the conditions shown at I and J. But this form of ladder is cumbersome. Bolts are more effective in wood ladders for underground service, where the dampness is likely to produce alterations in the wood.

Fig. 9 shows same ladder as in Fig. 1, with bolts substituted for wire nails. A number of bolted slats



pounds. The general character of the break is shown at C and B.

Fig. 3 shows a ladder provided with 3x3 $\frac{1}{2}$ -inch sides, $\frac{1}{2}$ -inch rungs, 12 inches apart, and same stock in sides as above, and hard-wood rungs. Most of the rungs tested in this form of ladder broke, as shown at D, E and F, when strained to 1275 pounds.

Fig. 4 illustrates the bull pine type of ladders, sides 3 $\frac{1}{2}$ inches on flat sides, $\frac{1}{2}$ -inch rungs, 12 inches apart. The rungs in this style broke about as shown at G, when strained to 1265 pounds. In every test the lumber in the ladders was dry, well seasoned and fairly clear.

Among some of the new forms of ladders now used in mining are paper, aluminum and other kinds.

Fig. 5 is a section of a ladder provided with $\frac{3}{4}$ -inch diameter hollow paper sides. The sides are made by rolling manila paper on a mandrel, and cementing and pressing same. A section is cut away to show how the slats are attached. Flanged pins A, A, pass through the shell into the slat. The latter is ash, 1x3 $\frac{1}{2}$ inches, and cut out underneath $\frac{1}{2}$ inches. In repeated tests a number of slats broke as at B, and the pins were pulled out of the shell as at C and D, when strained to 1000 pounds.

The design of ladder in Fig. 6 has met with some success. The sides are bull pine, 3 $\frac{1}{2}$ inches on flat side and grooved to receive a wrought iron strip

broke, as at A, B and C, at a pull of 1250. When the slats were notched into the sides, as in Fig. 9, the slats usually broke, as at D, E and F, at 1325 pounds pull.

The somewhat clumsy form of ladder in Fig. 10 consists of bull pine sides 3x3 $\frac{1}{2}$ inches and steps 3x2 $\frac{1}{2}$ inches mortised and pinned to the sides, as shown. The combination was wrecked, as at A, B and C, when pulled to 875 pounds.

The rope system, as in Fig. 12, was tested to 950 pounds pull on $\frac{1}{2}$ -inch diameter hemp rope, looped and wired as in E. The fracture usually happened as at D.

Unbraced steps mortised into a single piece, as in Fig. 13, broke as at F when pulled to 750 pounds, with the rope hook midway between end and upright. Size of upright, 3x3 $\frac{1}{2}$, bull pine and notched $\frac{1}{2}$ -inch for the steps. The latter are 3x2-inch, also notched $\frac{1}{2}$ -inch. When braced with a wood piece, H, the breaking strain was increased 10 per cent. When braced with a metal bracket, the latter bolted, the breaking strain was increased 12 per cent.

The sides of stepladder in Fig. 14 are 7 $\frac{1}{2}$ x1 $\frac{1}{2}$ inches; steps same width and $\frac{1}{2}$ inches thick, and set into the sides $\frac{1}{2}$ -inch. Hard pine stock. The fracture at A occurred at 775 pounds. When strengthened with wood braces, B, B, the breaking point was registered at 910 pounds.

Electric Transmission From Mechanicville, on the Hudson.

The development of the power of St. Anthony's Falls on the Mississippi at Minneapolis, Minn., is followed by utilization of the power of the upper waters of the Hudson river at Mechanicville, N. Y., where an undertaking of equal magnitude has recently been completed, over 5000 H. P. being available at the power house, the use of high voltage electric current permitting of its distribution over a wide territory. As in the Mississippi, the waters of the Hudson above the present point of development have been employed to some extent, but not until the present enterprise was undertaken had any very serious effort been made to take advantage of the great amount of power which has run to waste for ages down the main waterway of the Empire State. Some time ago the attention of R. N. King, president Stillwell-Bierce & Smith-Vaile Co., Dayton, O., was drawn to this water power, and his experience led him to recognize the possibilities which there lay ready to hand. The site is only two miles from Mechanicville, eleven miles from Troy and eighteen miles from Albany, in each of which towns large quantities of power would undoubtedly find a market. Most important of all, it lay only seventeen miles from Schenectady, where, covering 130 acres, the great works of the General Electric Co. are operated from an extensive steam plant, with which the electrical power from the Mechanicville cataract could readily compete.

The hydraulic engineering features of the development were carried out in their entirety by Mr. A. C. Rice, the Stillwell-Bierce & Smith-Vaile Co.'s chief engineer, and in the complete work as it stands to-day little or no departure from his plans has been made. As the General Electric Co. was the largest customer, its advice as to the electrical equipment was closely followed and the result brought about by the harmonious co-operation of both hydraulic and electrical engineers is a power transmission plant representative of modern hydraulic and electrical practice.

At the point chosen for the development the Hud-

son river is divided by an island into two channels with a combined width of about 1200 feet. The western channel is used for the head and tail race. The power-house starts from and extends into the river 215 feet, and is connected with the island by a concrete dam 26 feet above the bed of the river, 10 feet wide on top and 18 feet wide at the base. The upstream face is vertical, the downstream face sloping. This dam is provided with four arched waste gates 4 feet wide, 6 feet 9 inches high. The main dam is built entirely of concrete. The upstream face is vertical, the downstream face curved, with a horizontal apron 14 feet wide, which throws the falling water off horizontally, preventing wash or scour of the top of the dam. The dam is 16 feet high above the river bed, 8 feet thick just below the crest, 16 feet thick through the base and 30 feet thick through base and apron. The dam is set between massive abutments an-

chored to the rock sides of the river bank and island. The eastern is 20 feet long, 26 feet high above the river bottom, 16 feet thick at the top and 34 feet wide at the base; the western abutment is 100 feet long, the other dimensions being similar to those of the eastern abutment. The length of the spillway between abutments is 800 feet. In the western abutment are twelve arched waste gates, each

4 feet wide and 6 feet high, opened and closed by heavy iron hoists operated by rack and pinion. The eastern dam is practically a solid rock wall, considered capable of resisting floods. The power house lies between the west bank and western stream running between the bank and the island forms the forebay 300 feet long. The main tail race is 205 feet wide and joins the main stream 750 feet below the power house. Arched chambers are provided for seven main



THE POWER BEFORE DEVELOPMENT.



THE DEVELOPMENT OF THE POWER.

the short concrete dam and is practically a continuation of the dam. It is of concrete with the exception of the upper walls. The foundations are carried down to bedrock, and the house is carried on heavy steel box web girders resting upon steel I beam columns. The latter are imbedded in concrete walls carrying arches which form the floor of the generator

wheels and two exciter wheels. In the head wall of each main chamber is set a heavy cast iron cower, through which the turbine shaft passes in a water-tight packing box, carrying the ring oil bearing for the shaft. The saving in space effected by the new arrangement of housing and coupling together of the turbines, patented by the Stillwell-Bierce & Smith-Vaile Co., has tended to diminish considerably the size of the power house. A 20-ton crane runs the entire length of the dynamo room. In front of the wheel chambers is a trash rack of steel bars supported on a framework of steel channel and I beams. This rack effectually prevents the access to the wheels of any rubbish or floating material that may escape the boom.

The main wheel plant consists of ten pairs of 42-in. horizontal Victor turbines of the latest type, built by the Stillwell-Bierce & Smith-Vaile Co. of Dayton, O. Each main turbine consists of two pairs of wheels, each of which at the normal speed of 114 revolutions is rated at 250 H. P. The total power of each set of turbines is, therefore, 1000 H. P. Five units are now in position, and two additional turbines will be installed shortly. The head under which the water wheels are operated is 18 feet. The turbines for the exciters consist of three 18-in. Victor cylinder gate wheels, having, at 259 revolutions per minute, a total of 300 H. P. Two draft tubes lead from each main turbine, the forward tube descending straight into the tail race beneath the power house, the rear or upstream curving and flaring downward and outward. Each tube is 9 ft. 6 in. in diameter at the bottom. Two draft tubes are also allotted to each set of exciter wheels, the rear tube 4 ft. in diameter and the forward tube 3 feet. The speed of each set of main wheels is regulated by an electro-mechanical governor, mounted on a platform directly over the turbine shaft, and between the head wall and the generator.

The dynamo room is 255 feet long, 34 feet wide. The ultimate generator capacity of the station is 7000 H. P. in seven generators each of 750 K. W.



THE MAIN DAM AND WASTE GATES.

son river is divided by an island into two channels with a combined width of about 1200 feet. The western channel is used for the head and tail race. The power-house starts from and extends into the river 215 feet, and is connected with the island by a concrete dam 26 feet above the bed of the river, 10 feet wide on top and 18 feet wide at the base. The upstream face is vertical, the downstream face sloping. This dam is provided with four arched waste gates 4 feet wide, 6 feet 9 inches high. The main dam is built entirely of concrete. The upstream face is vertical, the downstream face curved, with a horizontal apron 14 feet wide, which throws the falling water off horizontally, preventing wash or scour of the top of the dam. The dam is 16 feet high above the river bed, 8 feet thick just below the crest, 16 feet thick through the base and 30 feet thick through base and apron. The dam is set between massive abutments an-

room and the floor on which the wheel flumes rest. The walls form a separate and distinct tail race, 22 feet wide, for each set of turbines from which the water may be shut out at will.

The house is divided into two parts by a thick head



UPSTREAM SIDE OF POWER HOUSE WITH FOREBAY.

capacity. Five have been installed and are now running. They are unitooth, three-phase, forty pole, 750 K. W., 114 revolution alternating-current machines, having revolving fields and stationary arma-

poles, each securely fastened by two bolts to the ring. The whole revolves on a shaft 15 inches in diameter, provided with a rigid coupling bolted to a similar coupling on the turbine shaft.

switches, each mounted upon corrugated gerd rubber cones. As these switches are to break current of 12,000 volts, they are tested to break without difficulty currents of 21,000 volts. The switches are without handles. An eye is made in the end of each blade, into which a hook at the end of a stick may be inserted and the switch opened by the attendant from a safe distance. To prevent any dangerous arcing from blade to blade, marble barriers 1 1/2 inches thick, 3 inches long and 12 inches wide from the face of the board are erected between each blade. On the back of the panels are the high-tension fuseblocks, designed for 20,000 volts, also mounted on corrugated hard rubber cones. The fuse of aluminum is held tightly between two clips attached to springs, and as soon as an increase of current in the line melts the fuse, its two halves are instantly pulled apart and the formation of an arc prevented. Each outgoing line is provided with a circuit-breaker or automatic plunger switch, by which contact may be so suddenly broken that arcing is impossible. The lightning arresters are of the G. E. short-gap type, a type used on nearly all of the most important long-distance transmission lines in this country, and proved a most satisfactory protection against damage by lightning. The line is protected by double-pole 2000-volt arresters, giving six spark gaps.

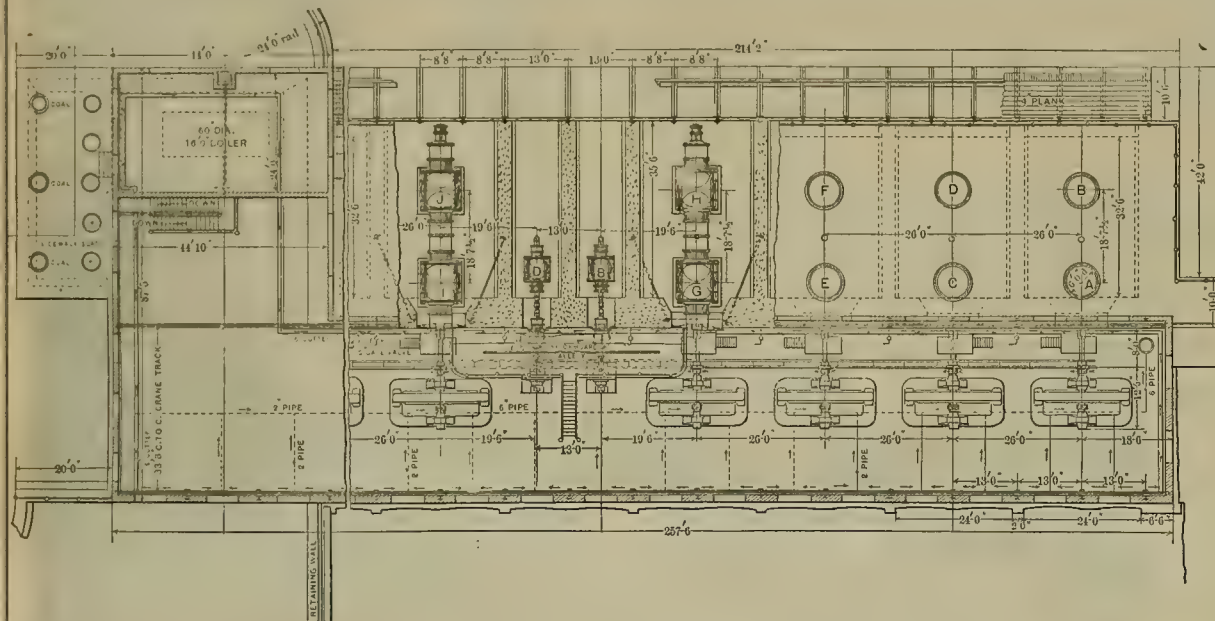
The line from Mechanicville to Schenectady consists of three No. 000 B. & S. bare wire. The circuits are carried on poles 30 to 60 feet long, all 8 inches in diameter at the top. Each pole carries one cross arm, carrying three triple petticoated porcelain insulators. For lightning protection a barbed wire, frequently grounded, runs along the tops of the poles. At the end of the town limits the line is carried down to the ground and connected to three cables of stranded copper insulated by rubber, protected by lead sheet laid in terracotta conduits.

The introduction of this transmitted electrical power into the factory has worked a considerable change. Heretofore all the machinery was driven by electric motors, while the testing depart-

tures wound to delivering to the transmission lines 36 amperes of current at a periodicity of 38 cycles and a pressure of 12,000 volts. By using the revol-

The exciters are placed one on each side of the stairway leading to the switchboard gallery. They are 6-pole, 100 K. W., 125-volt standard, direct cur-

rent machines, with ribbed field frame and ironclad armatures. The switchboard, erected on a gallery on the north wall of the dynamo room, is built up of nine polished panels of marble, each 7 feet 6 inches high, 3 feet wide and 2 inches thick. Of these nine panels, five are used for the generators and two for the feeders; one is the total output panel,



PLAN OF POWER HOUSE.

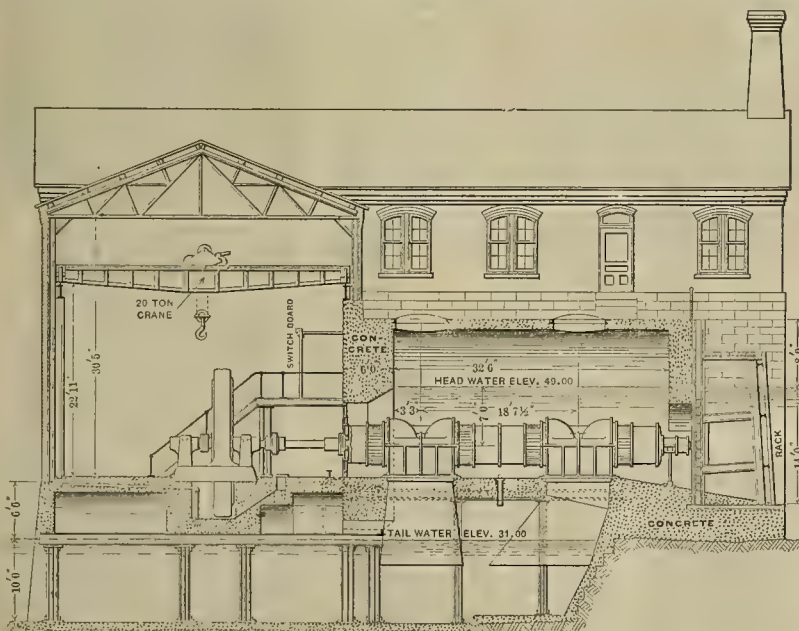
ing field type of generator, thus securing this pressure directly from the machine, the use of step-up transformers to raise the voltage for transmission is dispensed with.

The alternators are similar in their main characteristics to those successfully used in the development of the power of the Lachine rapids at Montreal. The armature frame, or ring, is of the box type, 15 feet 4 inches in diameter and 36 inches wide. It is bolted to a base 18 feet 2 inches long by 10 feet wide, along which it may be moved parallel with the shaft,

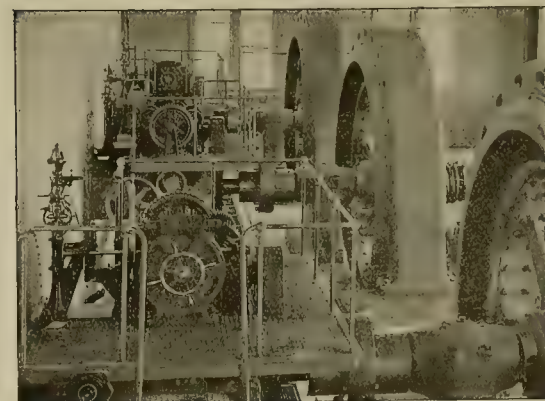
rent machines, with ribbed field frame and ironclad armatures. The switchboard, erected on a gallery on the north wall of the dynamo room, is built up of nine polished panels of marble, each 7 feet 6 inches high, 3 feet wide and 2 inches thick. Of these nine panels, five are used for the generators and two for the feeders; one is the total output panel,



A MAIN WHEEL CHAMBER.



SECTION THROUGH WHEEL CHAMBERS.



MAIN WHEEL GOVERNORS—GIESLER TYPE.

in order that the revolving field spider and poles may be uncovered should occasion arise. The field ring is bolted to the spokes of the spider. It carries forty

and the last is for the control of the exciters. Each generator panel is equipped with three single-blade, double-throw, quick-break, high-tension

ment demanded an independent supply of current there being two distinct generating plants.
(To be Continued.)

Is Darwinism True?

NUMBER III.

W. S. PROSSER.

A vibrating stretched string was observed to give out a pleasing sound; longer strings gave lower notes; shorter gave higher. These and other ideas finally resulted in the piano: a contrivance only possible to civilized man. It is a product of high mentality, knowledge and great, slowly acquired mechanical skill. Only an insane person would dream of coaxing pianos to grow on trees: or would fiddle assiduously to some frogs, in the hope that the next generation would be able to whistle a sonata from Beethoven. These illustrations are not over-strained. It is more absurd to dream that the marvelous and complex devices for hearing, seeing, feeling, etc., just simply grew. In every human ear are the essential parts of a piano, consisting, among other things, of some 3000 stretched strings (the "fibers of Corti"): the shortest vibrating to 16 impulses per second, the longest to about 8000, the limits of sounds audible to man. We hear no sound unless it accords with one of these fibers. Other beings, with cords of other relative lengths, might have entirely different musical tastes, and hear sounds inaudible to us. As animals have varied needs, they have varied appliances to supply those needs. For instance, insects perhaps need to distinguish between sounds of 7140-7150-7155, etc., or 9,000-10,000-11,000. They probably do not hear thunder and such deep notes, as their bodies are too small for very long strings. The elephant and lion have room in their skulls for cords vibrating to 10-8-6 vibrations. In nature we should thus expect to find a series of auditory appliances, more or less extensive, more or fewer fibers. Now, how did these originate? Vibrations of air produce sound, and must mechanically affect solid bodies, and so animal bodies, which would become conscious of such, if conscious at all. But from this vague consciousness of vibrations of movement (perhaps arising through the sense of touch) to an organized ear, to an intricate mechanical invention for hearing, for distinguishing sounds, and counting the exact vibrations in each, for picking out a given note in a whole orchestra, there is a great gulf. If we go back with evolutionists, from ears with 3000 cords to ancestral ones with 1000-100-10-4-2-1, shall we assume with them that this original one (as only a little one, anyhow, and not worth quarreling over) arose somehow in the misty region of "desire," "environment," or "chance"? To do so is merely to leave the domain of science and wander into the land of imagination. Suppose this first string had been made and used for a time, does it advance one atom the formation of a second string? If so, on what solid known scientific ground, outside of imaginary chance? If at the beginning Mr. Darwin had been made instead of Adam, and with an ear capable of hearing notes of 16, 32 and 64, and the Creator had kindly offered to make any improvements that Mr. Darwin could suggest inside of 100 years, would he have asked for additional fibers of Corti in the ear, and been able to specify the exact lengths required to enable him to hear the buzz of a mosquito's wing, there being no mosquitoes and no such sound known to him? This fancy can only vaguely hint at the numerous absurdities involved. Don't it seem, for a supposed scientific theory, to border on the childish, to say that, by some variation or hocus-pocus, a second string and a third and so on, just happened, and that they each and every one just happened, by chance the usual way, to be of exactly the right lengths? Even as to length, the chance that 3000 would be all just right by accident, or accidental "variation," would be one in billions of trillions. As to the actual production of the various mechanical means for brains, sight, smell, several separate kinds of taste, and several kinds of touch, it must be always borne in mind that these must have existed prior to the perception by the brain of those properties of matter. Else we must assume not only that the mind of man is inherently percipient of matter, which may be true, though unproved and unprovable; but that all animals, even to the lowest, must be also percipient.

All vegetable and low animal forms seem conscious of light, either over the whole surface or in certain spots. Darwinists claim that this vague perception gradually ripened into the perfect animal eye. Suppose a man on the bank of some great river, and anxious to cross. He leans over the edge, holding to a tree. He has gone 10 or 12 inches. Some evolutionists might tell him just to keep going and he would soon be across. All of the imagined starts or steps of progress of evolution are just as baseless and impossible. No one, Darwin, Wallace or any other, has ever (keeping to my figure) given this man a boat or raft to make his crossing possible. The foundation of sight and all the senses, the specialized nerves and their mysterious connection with the brain and mind, must be guessed at; and must be assumed in advance of the eye, ear, etc.,

and in advance of anything on which the animal could possibly base a selection. Not only these nerves, but for thousands of years the budding eye and ear must have been inchoate, must have been so imperfect and rudimentary as to be of no use, and hence totally without influence in development. In the animal eye, the first perception of light seems to be by means of complicated rods and cones, whose manner of action is totally unknown; the perception of taste and smell still farther back in the unknown. Yet we are coolly asked to believe that all these just happened: just grew. The animal eye refracts rays and utilizes more rays from an object and sees farther and more distinctly than insects, which use only a few perpendicular rays; and thus are met the animal needs. The bird sees the insect, but the insect probably does not see the bird till too late. So the birds are fed, while the insect races are kept up by fecundity. Insect and animal eyes are so different in principle that no one claims that they are desirable one from the other, or both from a third. But it is said that they originated independently, but in some unknown way. At what point on the road from nowhere to somewhere between no eye at all and a good eye, the idea of an eye—with a double convex lens, correcting, by both increasing curvature and increasing density, achromatism in a something totally unknown, bending those unknown rays, with muscles for greater bending by greater curvature in that lens, to say nothing of a dozen other devices, all needed to effect vision—was born, and of what parentage, has been exactly determined. That somewhere the idea began its career, would be on a parity with the fancy that somewhere in blank space Adam and Eve, in a canvas-covered wagon, began driving toward the earth and finally tied their horses

show how the operation of natural causes, selection, environment, exercise, or "the inherent power of the organism," can originate a new and novel idea, an invention not previously thought of: can put that idea into bodily form: can begin, centuries prior to its completion and use, a complicated machine, involving knowledge of laws necessarily unknown to any organism existing, and for unknown purposes, as hearing unknown sounds, etc. Until such showing be made, Darwinism cannot claim a footing in real science. It is only the romance of a summer day.

(To be Continued.)

A Great Stone Bridge.

Napa county, Cal., claims the longest stone bridge west of the Rocky mountains. The structure is shown in the accompanying engraving. It consists of three 70-foot arches carried down to bedrock. The center span is 42 feet above low water. The abutments are 6 feet below the surface, resting on bedrock. The piers are 16 feet at their base and 10 feet at spring line, and also rest on bedrock. The arch stones are 3 feet 6 inches deep, 12 $\frac{3}{4}$ inches at crown, and 11 inches at base, laid in cement mortar. The stone used in the bridges is a native sandstone, and is found in abundance near the site. It is extremely strong, having stood a test of 8000 to 12,000 pounds pressure to the inch. There were used in the construction of the last-mentioned bridge 2600 $\frac{1}{2}$ cubic yards of material, 675 barrels of cement, 380 barrels of lime, 55,000 feet of lumber for false work, and 1 $\frac{1}{2}$ tons of iron. The only article pur-



LONGEST STONE BRIDGE WEST OF THE ROCKIES—OVER PUTAH CREEK IN NAPA COUNTY, CAL.

to an apple tree in the Garden of Eden. I have no intention to burlesque; I make these outre comparisons merely to fasten in the mind the absurdities of chance variation: and of deriving something from nothing, a mechanical invention from mindless matter. An oyster could as easily originate the Lick telescope as a vision-giving eye; a piano as an ear. It helps nothing to say that the eye grew part at a time, or to produce an intermediate eye with some of the parts, if that could be done. Each part began sometime, and began as an idea, part of a definite whole, strictly co-ordinated, to a definite end.

A host of other definite and original ideas in animal mechanics tell a similar story. I have heretofore named about seventy such. Even the least of these positively disproves evolution by natural generation or chance variation. Somewhere in the animal series, feathers, wings, etc., began. Previously they were not. Previously those ideas were not.

If evolutionists claim that new devices originate gradually, thus having their beginnings in individuals prior to those who really used them, the absurd consequence must follow that the less an animal knows the more it knows. For every device must have originated, not in the high forms that use it, but in low forms that did not; that eyeless beings of the intellectual status of the oyster invented the eye, which subsequent beings with brains, even man, has not been able to supersede, or even improve on, or even understand.

The theory of separate creations has been usually rejected on the ground that such would involve a series of miracles. Which is the more miraculous and incredible, several creations by a competent and skillful mechanic, or a creation extending over a day or a million years, by a something, totally devoid of knowledge, intelligence or skill? Or that this dumb lowish matter conceives and embodies dozens of the most brilliant and original ideas, and with consummate mechanical skill? If something new comes into the world, it is a creation, whether that creation occupied one hour or a thousand years; whether it was a totally novel animal or a novel part.

The life of Darwinism depends on its ability to

chased outside of Napa county was the cement. The entire cost of the bridge was \$19,980.

Singular Accident to a Hoisting Rope.

At shaft No. 1, Robinson Deep mine, Johannesburg, South Africa, it was recently noticed that the skips which weigh about 2000 lbs., and which are balanced, were not running smoothly. The hoisting engine was stopped and gradually reversed. On reversing, the rope must have become coiled on the top of the skip, until the latter became free from the broken guide which jammed it; and when—having reversed itself—it fell, it did so through the bight of the rope. It would appear that the falling skip, on being checked by the rope, broke the draw-bar short off and fell to the bottom of the shaft. On the rope being hoisted up, it was found that some 400 feet from its end there was a double loop or bow, and that the end of the rope had formed a single hitch embracing the shackle, the thimble, and swivel on the top of the skip. Moreover, some 25 or 30 feet from the end was a hard knot, of which an illustration is here given. The rope is 1 $\frac{1}{2}$ inches in diameter, made of plough steel, and consists of six strands of nineteen wires each, and a hempen center; the breaking load is ninety tons; the weight is 3 lbs. per foot. The rope was untied with some difficulty, but was found at each spot where it had been knotted to be fit for use and is now in operation in the same shaft. Judging by the distance from the end of the rope at which the knot illustrated occurred, the total drop of the skip is estimated to have been about 90 feet.



THE Oroville, Cal., Register says that Butte county is not affected by water famine, and that 100,000 inches of pure mountain water daily courses past Oroville.

Coast Industrial Notes.

—Coffee grown on American soil is on sale in San Francisco.

—It is estimated that the Yakima county, Wash., hop output this season will be 10,000 bales.

—The receipts of the Mexican National railway for the third week in August were \$105,410.92.

—At Pendleton, Oregon, Callahan, of St. Paul, Minn., bought 2200 lambs and 1700 ewes at \$2.25 a head.

—At Ellensburg, Wash., 120 cars have been engaged for the shipment of sheep to Eastern points, principally Chicago.

—The Crow's Nest railway in British Columbia has been surfaced to Bullhead and trains are running to Cranbrook.

—Electrical appliances sold to Mexico in June amounted to \$23,621, an increase of over 20 per cent over the previous June.

—The contract has been let for grading the first four miles of the eastward extension of the Sierra railroad from Jamestown, Cal.

—The Colorado river bottom south of Yuma, Ariz., is annually covered for miles with wild hemp, which is susceptible of commercial use.

—The sugar beet crop tributary to the Watsonville, Cal., factory is estimated at 65,000 tons. The factory started on its autumn run last week.

—Salinas, Cal., is furnishing lime rock for the Watsonville and Spreckels factories. Three quarries have been opened on the Gabilan ranch.

—The custom house receipts for the port of San Francisco for the month of August amounted to \$567,273.49, the largest receipts for a single month in the records of the department.

—The California Cotton Mills, Oakland, Cal., have increased their capital stock to \$800,000. During the last three years there have been expended \$120,000 for new machinery, etc.

—Some time ago the Chilean Government offered a bonus of \$24,000 to any firm or company which should establish an iron foundry in the Republic. Thus far no one has sought to earn this grant.

—Mr. Thomas of Los Angeles, Cal., goes to Honolulu, U. S. A., to raise oranges for local consumption and vegetables, etc., for the United States Pacific coast line during the close season thereon.

—The Santa Fe office has been advised that the steamer Belgian King, of 3379 tons register, has been secured by the California & Oriental Steamship Co. to ply between San Diego, Cal., and Asiatic ports.

—The report of the Northern Pacific railway for the year ending June 30th shows net earnings of \$12,584,347; reserved for continuity of dividends on the preferred, \$3,000,000; surplus forward, \$387,703.

—From San Francisco last week one ship, destined for Liverpool, Eng., carried 42,855 cases of canned fruit, 16,255 cases of canned salmon, 19,418 casks of wheat, 2,826 casks of beans, and 2,726 sacks of beeswax, the cargo amounting to \$234,964.

—The first half of this year shows an increase in Mexican exports to the U. S. of over \$10,000,000. The total exports for the period reached \$15,000,000. Imports showed an increase of nearly \$1,000,000, of which the U. S. furnished over \$600,000.

—A \$4,000,000 mortgage from the Spring Valley Water Works to the Union Trust Company of San Francisco has been filed. The mortgage covers all of the Spring Valley property, and secures 4,000 bonds of \$1,000 each. Attached to the instrument are \$2,000 worth of revenue stamps.

—Enrique C. Creel of Chihuahua, Vice-Pres. of the new Chihuahua & Pacific railroad, Mexico, says that the road needs 2000 more laborers, the labor question being the only one that hampers it at present. Mr. Creel expects the road to reach Guerrero by March of next year, and it will be three years before it reaches the Pacific.

—Eucalyptus oil is being manufactured at Garden Grove, Cal. The crude oil finds a market with some railroads for the polishing of brass work; the refined oil is used for medical purposes. One ton of eucalyptus leaves yields from five to nine gallons of oil which, when refined, is worth \$1 a pound. One gallon of the refined oil weighs eight pounds.

—At Los Angeles, Cal., on the 6th, was a rush at the land office to place filings on the 1,000,000 acres of land thrown open to settlement through the decision recently made in the overlapping land grant cases. The land extends from Pasadena to Tehachapi Pass. Places in the line sold for big sums. People had been waiting in line for three days.

—At a recent meeting of the directors of the Pacific Cable Co. plans were considered for establishing cable connection with the Philippines, the Asiatic coast, Japan and Australia, via Hawaii. Surveys for a duplicate cable via Sitka and the Aleutian islands were ordered. J. A. Scrymser, president of the Pacific Cable Co., will sail from Vancouver for Japan next Monday.

—The total assessment roll of California for '98, as made up from the rolls of the various counties, foots up \$1,180,362,341, an increase of about \$40,000,000 over last year's roll. The following amounts must be raised by California this year: \$2,553,502 for the general fund, \$2,314,963 for the school fund, \$141,435 for the interest and sinking fund, and 2 cents on each \$100 for the State University. The tax levy is 48.8 cents for this year.

—The Secretary of the Treasury has issued a call offering to redeem the outstanding bonds amounting to \$14,004,500 issued to the Pacific railroads. Of this amount over \$9,000,

000 was issued to the Central Pacific, over \$3,000,000 to the Union Pacific and over \$1,500,000 to the old Western Pacific. These bonds will be redeemed at the treasury at a rebate of one-half of one per cent of their face value at any time during the month of September. This is on the basis of two per cent per annum.

—The Interstate Commerce Commission, by a decision in the matter of the passenger rates disturbance of the Canadian Pacific, involving the propriety of differential passenger rates between Eastern points and the Pacific coast, holds that the Canadian Pacific is not entitled to the differential contended for. The case is one of the most important that has been before the commission for a long time, the American railroad lines and the Canadian Pacific having been engaged six months or more in a war over passenger traffic between the East and West.

—Contracts for the erection of a coaling station at Pago Pago have been invited by Commander Z. L. Tanner of San Francisco, who has the work in charge. The commander will not state the amount to be expended, but he says the work will be of a substantial character, and at least a year will be required for its completion. Lieut. Chamber, of the civil engineering department of the navy, will supervise the construction of the wharf and coal sheds. He will also provide for a water supply and take a complete topographical survey of the United States land surrounding the harbor. Commander Tanner says that no fortifications are to be erected.

—It is stated that at last an incorporation will be made of a company to build a railroad through the Tejon, Cal., to connect the S. F. & S. J. R. R. with the Santa Fe route, giving San Francisco another transcontinental route. The cost of the connection is variously estimated at from \$5,000,000 to \$8,000,000. In this connection it is interesting to note some remarks from a Boston business man who has just returned from California, who says:

"One needs to go West at the present time to size up the business situation. New England mill industries are in poor shape, but they must later feel the effect of the Western demand, for the West is prosperous as never before, has money to burn and is chuck full of vim, enterprise and schemes. Furthermore, the West will this time put its own money into schemes for its own development. But what surprised me most was to find the West still for silver. I look to see 500 miles of railroad built in California next year. This means a tremendous development, as there are not 500 miles of railroad in the State outside of the Southern Pacific and Atchison dominions. New Mexico will also add largely next year to its railway mileage, and I shall not be surprised to see an era of railroad construction inaugurated in the United States that may mean many thousand miles added to our present railway system." This is an important matter to coast interests. The S. F. & S. J. R. R. people say that what they are doing is independent of the Santa Fe, that the Santa Fe on being approached declined to act, and that this is solely a California move. They say the line can be built for \$4,000,000. In this column some time ago was noted the intended extension of the railroad running from Salt Lake City, Utah, to Milford, westward toward Pioche, Nev. About 400 miles more would extend that road to Los Angeles, Cal., and it is within reason to assume that the simultaneous action implies an understanding as to connection and future action regarding final junction of the two at Los Angeles. The S. F. & S. J. R. R. people will be in position to do business with either or both the Santa Fe and Salt Lake lines.

The First Water Jacket.

TO THE EDITOR:—You are correct when you say that the late M. W. Belshaw of Antioch, Cal., was the first to use the water jacket. We first used a water tyeure in an adobe firebrick. I made the mould. The clay was found on Cerro Gordo hill, Inyo Co., Cal. The water entered the bottom of the tyeure, emerging at the top. Water cost at that time (1868) 10 cents a gallon. The tyeure worked well. Then came the water jacket, 3 feet around. It was gotten up by the late Ira P. Rankin of the old Pacific Iron Works. Edgbert Judson, M. W. Belshaw and I were then the most successful smelters of silver and lead ores in the State, or, probably, the United States. Lead was worth 6 cents per pound and silver bars were 14 cents premium. The works were at Cerro Gordo, Inyo Co., Cal. That was in 1868. We commenced the use of the water jacket a year later.

A. B. ELDER.

Glencoe, Calaveras Co., Sept. 5th, '98.

Commercial Paragraphs.

On the 1st prox. the Simonds Saw Co. will occupy new and more commodious quarters at 33 Market street, San Francisco.

S. N. KNIGHT & Co. of Sutter Creek, Cal., are casting a pump for the San Francisco Bridge Co., which is to be used on the Oakland flats to operate a 20-inch pipe. Its weight will be about eight tons.

THE Edward P. Allis Co. of Milwaukee has closed a contract with the Timber Peak M. Co. of Philadelphia for the erection of a 150-ton concentrating plant, to be located about twenty miles from Socorro, N. M. The contract calls for a complete mill, including the buildings, which are to be of steel construction throughout. The mill is to be fitted with two rock breakers, six sets of Reliance crushing rolls, twenty Reliance vanners, and the necessary elevators, revolving screens, etc. The power plant consists of a Reynolds Corliss engine of 150 H. P., to drive the crushing department, and a 40 H. P. high-speed automatic engine to drive the vanners. The boilers are of the locomotive type, three in number and of 80 H. P. each.

Personal.

JNO. W. MACKAY is in San Francisco.

ROSSITER W. Raymond is at San Andreas, Cal.

D. WOLF becomes Supt. Ben Butler mine, Bingham, Utah.

GEN. W. S. KEYES has returned to San Francisco from the East.

T. K. CLARK becomes Gen. Mgr. Snow Drop M. Co., Dewey, Idaho.

A. N. BUTTS, Supt. Bovee mine, Altaville, Cal., is in San Francisco.

R. F. RAFFOON is appointed Supt. Holmes M. Co., Candelaria, Nev.

W. C. BODY, a mine operator at Grass Valley, Cal., is in San Francisco.

L. C. PARKE now occupies offices No. 608, 330 Market St., San Francisco.

M. W. KEENEY, Supt. Ohio mine, Greenwood, Cal., is in San Francisco.

W. MAITLAND, Supt. Nash mine, Abrams, Cal., has returned from San Francisco.

S. B. MILNER, Mgr. Dexter M. Co., Tuscarora, Nev., is in Salt Lake City, Utah.

R. ROBERTSON succeeds C. E. Uren as Supt. Allison Ranch mine, Grass Valley, Cal.

C. A. HOLLAND has succeeded M. Berry as Supt. Providence mine at Carters, Cal.

W. J. SUTHERLAND, Pres. Holmes M. Co., Candelaria, Nev., is at Virginia City, Nev.

CHAS. OSBORNE, a well-known California miner, died at Bulwago, S. A., July 10th.

V. B. ALLEN, Supt. Bushman mine, Black Hawk, Cal., has returned from San Francisco.

O. L. BARTON, Supt. Herman mine, Wells, Cal., has returned from San Francisco.

S. J. FLEMING, Supt. Providence G. M. Co., Bigbug, Ariz., has returned from California.

F. W. WILMANS, Pres. Rose Creek M. Co., has returned from San Francisco to Sonora, Cal.

P. T. FARNSWORTH, Gen. Mgr. Horn Silver mine, Frisco, Utah, has returned to Salt Lake City.

SUPT. HONNOLD of the California Exploration Co., Four Corners, Cal., is in San Francisco.

J. S. LARUE of the Triple Alliance mine, Placerville, Cal., has returned from San Francisco.

E. W. HOPKINS, Pres. Gold Hill M. Co., Grass Valley, Cal., has returned to San Francisco.

D. W. BALCH, formerly of the Comstock, has returned from an Eastern trip to San Francisco.

SURVEYOR-GENERAL GLEAVES of San Francisco is spending a few weeks at Shasta Retreat, Cal.

GEO. BLAKE, Supt. Bell mine, Tuttletown, Cal., after a month's sojourn in San Francisco, has returned home.

W. F. ENGLEBRIGHT, managing owner Red Dog drift mine, You Bet, Cal., is in San Francisco from Nevada City, Cal.

R. K. BERRY, owner Greenstone mine at Shingle Springs, Cal., has returned from San Francisco to Placerville, Cal.

S. Z. DICKSON, largely interested in mining in the West, particularly at Creede, Colo., is seriously sick in New Jersey.

CAPTAIN THOS. COUCH, formerly of the Merced mine, Cal., is now in Alaska studying the outlook for copper mining in that region.

T. J. PARSONS, Vice-Pres. California State Miners' Association, has returned to San Francisco from a visit to his mining property in Sierra Co., Cal.

A. P. BRAYTON JR., Vice-Pres. Pelton Water Wheel Co., left on last steamer for Japan and China, to look after the interests of his company in the far East.

J. SIMPSON, Mgr. Eureka mine, Grants Pass, Oregon, has returned from San Francisco, where he purchased a cyanide plant and several concentrators.

CLARENCE SHARON, prominently identified with the Comstock mining interests for the last twenty-five years, has taken up his residence in San Francisco.

A. M. KELLY, who sold the Murphy mines near Tuscarora, Nev., for \$150,000 to the McDermot Bros. of Butte, Mont., and Los Angeles, Cal., is in San Francisco.

THOS. H. LEGGETT, a well-known California miner, has a twenty-three page article on "Diamond Mining in South Africa," in the September number of Cassier's Magazine.

IRVING HALE, a Colorado electrician and miner, who came to San Francisco as Colonel of the First Regt. Colorado Infantry, has received deserved promotion to a Brigadier-Generalship.

F. DASSENVILLE, formerly manager of Baker & Hamilton of San Francisco, has retired from that post. Horace Coffin, well known as cashier for the firm for many years, has succeeded Mr. Dassenville.

PROFESSOR W. B. RISING of the chemistry department of the University of California, has returned from Europe, where he attended the meeting of the International Chemical Association as a delegate from the Pacific coast.

MRS. J. A. STEWART, of Deep Creek, Utah, is an accomplished assayer. The Salt Lake Tribune says she "enjoys the distinction of being the only female assayer in the West." There are others in various western States. In the northern part of California, Miss R. N. Bell of Shasta, is a good practical assayer.

J. V. KEELLEY, a Nevada miner who wintered at Dawson, has returned to California. He says the exaggerations in California newspapers regarding the richness of that region are ridiculous to those who have been there,

and rightly thinks that truthful publicity of California's great mining resources would be more consistent.

E. SNOW of San Francisco returned last Monday night on the Portland. He has been in Alaska and Northwest Territory something over a year. He thinks that the amount of gold brought on the steamer will not reach \$1,000,000, and that most of this belongs to the Canadian Bank and the Alaska Commercial Co. He refers to several persons mentioned in the daily papers as bringing out \$200,000, one of whom has nothing, and another, supposed to have the largest bulk, hasn't \$50,000. When he left Dawson butter was selling at \$1 a can and potatoes at \$50 a sack. There are, according to his statement, 3000 men in Dawson who can get no work, though they have offered themselves at \$7 a day and board themselves. From Dawson to McCormick and Indian creeks hundreds of gravel dumps can be found, which men took out during the winter to wash in the spring, which have produced practically nothing, and the men lost their time and money. He says this is the case, too, in many instances on Bonanza. He predicts suffering and hardship for many who are there, and those who go in, unless provision is made for them, as they haven't means to get out. He is particularly censorious of transportation companies for advocating possibilities not to be found in that country.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING AUG. 30, 1898.

610,116.—STAPLING MACHINE—G. W. Ansley, Medical Lake, Wash.

610,013.—WAVE POWER PUMP—J. E. & W. Armstrong, Santa Cruz, Cal.

610,122.—ROCK BREAKER—F. H. Cook, Spokane, Wash.

610,155.—SASH LOCK—R. D. Duff, Tacoma, Wash.

610,057.—FOLDING BED—F. Jensen, Seattle, Wash.

609,905.—SEED DRILL—Porteous & Cole, Fresno, Cal.

609,999.—COOLER FOR ICE MACHINES—R. F. Schroeder, Sacramento, Cal.

609,978.—FOUNTAIN PEN.—H. J. Schulte, Los Angeles, Cal.

610,008.—FISH HOOK—C. J. Sly, Klamath Falls, Or.

609,918.—GLOVE FASTENER—J. Steinberger, S. F.

609,850.—PLOWS—Twomey & Mills, Anaheim, Cal.

609,863.—STAMP MILL—G. Wood, Prescott, A. T.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PRELIMINARY COOLER FOR ICE MACHINES.—Richard F. Schroeder, Sacramento, Cal. No. 609,999. Dated Aug. 30, 1898. This invention

relates to an apparatus for cooling water previous to its being introduced into the freezing cans of ice machines where it is finally frozen into blocks. It is necessary after the air has been expelled from water previous to freezing that it should be frozen as rapidly as possible to prevent re-absorption, and my apparatus serves to reduce the temperature to nearly or quite freezing point before the water is introduced into the freezing cans. It consists of channels through which the water is conveyed to the freezing cans, a cold brine supply above the same, a directing apparatus between and in line with the channels in the brine supply for discharging cold brine upon the channels while the can is being filled, and means automatically controlled by the flow through the channels for throwing the directing apparatus out of the line therewith and with the brine supply so that the discharge is diverted while the flow in the channels is temporarily arrested so as to prevent the water being frozen in these conducting channels instead of after having been introduced into the cans.

WAVE POWER PUMPING APPARATUS.—John E. & William Armstrong, Santa Cruz, Cal. No. 610,013. Dated Aug. 30, 1898. The object of this invention is to utilize the motion of the waves to actuate a pump. The pumping apparatus is fixed in a vertical well which may be made in a cliff at a distance from the front where such a cliff exists, and from the bottom of the well a flaring or diverging passage extends outwardly to the front of the cliff and below the surface of the water outside. Within the well is a float suitably guided and adapted to rise and fall by the rise and fall of the water within the well. This float is connected with the pump so that the latter is actuated by it and by suitable conducting pipes water may be carried to any reservoir or point desired. The divergent mouth of the passage presented to the waves of the sea concentrates the latter into the well so as to largely increase the rise and full therein, and the float will thus be moved over a much greater distance than would be due to the absolute rise and fall of the waves.

Recently Declared Mining Dividends.

Grand Central, Utah, \$31,250; Sept. 10.

Swansea, Utah, 5 cents per share, \$5000; Sept. 10.

Crown King, Arizona, 2 cents per share, \$12,000; Sept. 1.

Pennsylvania, California, 5 cents per share, \$2575; payable immediately.

Calumet & Hecla, Michigan, \$10 per share; payable Sept. 30.

Mining Summary.

ALASKA.

W. De Varila, M. E., Deputy U. S. Geological and Mine Surveyor, has returned from the Klondike, and says precisely what this paper has been publishing regarding that region. An interview with him sounds like a summary of this paper's utterances since the last "rush" northward began. He says he has spent three years there, and that the Klondike is a good place to keep away from. While a few men stumble upon the gold very many waste their energies and exhaust their means in a vain endeavor to find gold where there is none. The Klondike, says Mr. De Varila, and by the Klondike is meant all the auriferous territory on the Yukon, is more of a gamble or speculation than any other placer country probably in the world, because it is so uncertain. It is not, Mr. De Varila contends, a true placer country and therefore the gold is not well distributed. The placer gold of the Yukon interior he holds is the product of erosion or of now extinct or ancient glaciers, carried down by them from unknown fountain heads and left in the crevices, gulches or depressions found on bedrock. This is a matter for subsequent development, and has been discussed scientifically herein. The uncertainties of the Yukon, Mr. De Varila insists, are too great for the average man to undertake mining up there, no matter what part of the country he may locate in. Again, he says that too much is being made out of the success of the few and too little notice taken of the large majority who return unsuccessful, which is manifest.

After having read some recent accounts of rich Klondikers who have returned and are to return, he felt it incumbent upon himself to enter his protest, and that most emphatically, against the misrepresentation of some papers and of the miners themselves in a good many cases. Mr. De Varila was at Dawson and took pains to secure accurate information in regard to the output of gold. From what he was able to learn he does not believe that above \$6,000,000 will possibly come out or is there to come out. His main protest, however, is not against the statements of large outputs, but against the delusion into which men all over the country are being led and induced to go there. Mr. De Varila says that out of the 1700 claims worked in the Klondike section not over forty on El Dorado and twenty on Bonanza paid for the working, or paid for the fuel consumed. He says wood costs \$100 a cord and wages \$15 a day, that the cost of sinking a shaft is at least \$15 a foot, so that a man can run through a small fortune in a very little while and if he is not lucky in his first venture to bedrock he finds himself a poor man in the most inhospitable country on earth for a poor man. It is simply suicide, he says, for any man to go into the country to prospect with less than two years' supplies.

Mr. De Varila left Dawson July 23rd, and at that time there were 2500 boats lined up along shore with the owners—mostly men whose future was very uncertain. The country is staked for seventy miles out of Dawson and it is the same with the lower camps. Every claim thought to be worth anything on Koyuk river for 600 miles is staked already, and yet there is not that liveness at any of the new or revived diggings that has been reported. One could travel for miles and miles on Forty Mile and other streams without seeing a soul.

Mr. De Varila talks differently from most men who have been reported as saying anything. In short he believes that the bottom has dropped out of Dawson and he expects to see 6000 people hustle themselves out of there this fall. He says he saw George Carmack, the famous Bonanza discoverer, who arrived on the Roanoke, when he was at Fort Get There, and knows what money Carmack and his two Indian brothers-in-law who are with him have between them. That sum is \$35,000, representing several months work, yet Mr. Carmack has been reported as coming out with a million. He knows of others who have been reported as bringing out much gold whose sums have been grossly over-stated. It is this that is leading too many people to their financial ruin in the Klondike and testing their vitality. He knows that there are hundreds of men now in that country who haven't the price of their fare home and he can see no other way for it but Government help to get them out of it.

Mr. De Varila talks of the mineral characteristics of the country as a man thoroughly familiar with it and assigns his reasons at every stage why the gold cannot be generally found. He has been exploring the country all the way from Yakutat Bay to Fort Hope, above Bering Straits. The whole region from White Horse Rapids to Nulato is of the same general characteristics, so far as the auriferous showing goes. No true rim rock is ever found and none of the usual indications of a genuine auriferous deposit. The entire bedrock is hummocky and disappointing. It may be found 30 feet from the surface or it may crop out almost at the grass roots. The country is alluvial granite, without the characteristics of slate, schist, talc, porphyry or the usual indications of gold bearing.

At the present time Little Munook gives the most promise and is the most active of any of the camps.

Work is being conducted at the placer mines of Silver Bow basin operated by the American G. M. Co. with satisfactory results.

Near Cook's Inlet, the Bear creek mine in the Turnagain Arm district, is sold to O. H. Sleeper, of Exeter, New Hampshire, by G. R. Beedy of Seattle for \$25,000. This mine consists of five and one-fifth claims covering 7,300 feet in length of Bear creek, with a width of 580 feet or 104 acres of land. This creek produces coarse gold on bedrock. It is

Mr. Sleeper's intention to work his mine on a large scale with improved machinery.

ARIZONA.

The Oro Plata, Mohave county, has eighty tons of ore on the dump that will go \$100 in gold, besides silver and lead.—The C. O. D. mine, Mohave county, will soon begin to furnish ore to the market. A high grade of concentrates is being turned out.—Bent & Lamson of Tucson have sold their Centennial group of mines in Gujias mountains to a Michigan company, headed by F. A. Smith. The group consists of eleven claims, which will be developed immediately.—The Moody & Place group of mines near Crowned King, Yavapai county, has been bonded to E. E. Breed, who has begun development work. The present force will be increased as rapidly as possible, and as soon as the property is sufficiently developed a mill will be erected.—The Elkhart mine at Chloride, Mohave county, is idle, the steam hoist having been burned recently. A hoist of greater capacity will be erected at once. The Elkhart has large bodies of ore. A 100-ton concentrator is on the property.

The Franco-American Co. at Oro Blanco is pushing work and the mine is producing high-grade ore.—On the Tres Amigos mine at Oro Blanco the ore is getting better as sinking progresses.—Cornelson & Co. have sold to F. E. Canda of New York their interest in the wolframite claims at Russellville for \$3500.

CALIFORNIA.

Amador.

Dispatch: At the South Eureka mine, Jackson, work continues in both shafts and at the mill. Electric power has been in use at the mill for months, and immediately the water began to slack off, the engines, which were already in place, were attached, and work was not delayed. Reports from the South Eureka continue encouraging.—The north shaft at the Kennedy mine has been idle for two weeks, owing to lack of power to run the hoist, but the machinery was started last week and work is going on again in the north shaft. The mill is running only fifteen stamps, but the number will be increased now that all the water power can be centered at the mill. Work is going forward at the south shaft, and has not been interfered with there, as steam power has been in use for several weeks.—Teams are again hauling quartz from the Oneida mine to the Zeila mill for crushing. The first crushing of 100 tons yielded over \$4 a ton. The Oneida ledge is large and the shaft and machinery are so arranged that the ore can be mined at a profit at this figure.—The Potazuba M. Co. at Sutter has had 147 tons of rock crushed at the Zeila mill, which yielded about \$4000—\$37 a ton. The management is still taking out rock of the same grade.—At Sutter there is very little activity in mining, owing to the shortage in water. The Lincoln is going ahead, and work progresses night and day on the new Wildman shaft. This is down 250 feet, and is still in hard greenstone.

Ledger: At the Jackson Exploration and Development Co. at Jackson, sinking under contract is progressing as rapidly as the scarcity of water will permit.—Mr. Bryson of Stockton has taken hold of the Bay State mine at Plymouth and will unwater it preparatory to making an investigation of its value.—The Argonaut—Kennedy, Jackson, suit is set for the 15th inst. in the Superior Court of San Andreas, Judge Nicol of Tuolumne presiding.—The Ivanhoe, or the old Wheeler mine, at Plymouth, has added fifteen stamps, making its milling capacity twenty stamps. They have started a shaft and erected a new hoist.

Republican: During the idleness of the Keystone mill at Amador City a great deal of repairing is being done. About twenty men are now employed.—The Amelia mine at Jackson shows the usual activity, with prospects improving.—The Anita is still in hard rock, but there is no cessation in the work.—A good body of rock has been found in the Valparaiso mine. The prospects are considered good.

Butte.

Two new dredgers are under construction for use on the Feather river between Biggs and Oroville and another will be begun shortly.

In the Mt. Ida quartz mine near Oroville development work is continued and a good quality of ore is on the dump awaiting the irrigation season to close to start up the mill.

Calaveras.

The Santa Ana mine, near Angels, will start up soon with new machinery.—J. Maltman has leased the Angels mine. Development work has begun.—A large force is employed at the Thorpe mine grading for the new mill.

W. B. DeWitt has taken a bond on the Machu mine at West Point for \$10,000. The agreement under which DeWitt takes possession is that he is to erect within a year a mill of no less capacity than five stamps and to employ due diligence in developing the mine and one-fourth of the gross returns of the mill to be applied as often as there is a clean-up.

The pump at the Stickle will be kept in operation to keep the Utica and Stickle mines freed from water pending the cleaning and enlarging of the Union ditch. The mines that are running by steam power will continue operations. The Lightner mine will install electrical power in a short time from the California Exploration Co.'s wires.

In the Demarest mine near San Andreas a strike was made last week on the 200 level of a ten-foot ledge said to run \$45 a ton.

El Dorado.

In the development of the Gold Bug mine in Placerville ore has been found of high grade. A mill site has recently been bought in addition to the two claims and the building of a mill is contemplated.—The Triple Alliance Co. operating a gravel property near Pacific House, found their property adapted to hy-

draulic rather than drifting. They will build a dam and put on machinery. The property is operated by Kimble & Co. of Placerville.

Kern.

At Randsburg the Little Butte is sinking and has the same body of sulphuretted ore, which mills \$16 in free gold. They are down 500 feet, and are sinking a new air shaft 200 feet from the main shaft. The 2-stamp mill has averaged since it started about \$5000 in bullion per month. The company have about 150 men on their payroll, including the men at the wells.—The cyanide works have started and three tanks have been filled.—The monthly clean-up of the Yellow Aster M. Co. at Barstow was made last week for August and resulted in \$42,000 of bullion, \$105,000 for July and August.—Work will be commenced on the O K mines Sept. 15. The development work on the Black Hawk has done much to show the value of the O K and the O K No. 2.

Nevada.

The Pennsylvania M. Co. at Grass Valley, at a meeting of its directors held Sept. 2, decided to add ten stamps to its milling capacity.

At the Texas mine near Nevada City, which had been idle for years, and on which a San Francisco company resumed work about a year ago, at 250 feet depth a ledge 7 feet wide has been found. It is locally reported that a 203-stamp mill is soon to be built. F. Korbel, 203 Battery street, San Francisco, is president of the company.—From the Mountain Maid mine near You Bet station good ore is being taken from the 100 level. The property is owned by the Pierce estate.

On the 15th inst. it is quite probable that every mine in the Grantville district running by water power will temporarily close down, as the water company intends to repair its ditches, and besides this there is a shortage of water. Among the mines to suspend are the Spanish, California and Mineral Hill.

The Mineral Hill mine near Washington has milled ore which pays \$50 to the ton. With only a 2-stamp mill the mine has been producing over \$100 per day, the ledge being of good size, and the ore has indications of permanency.

Herald: In the Live Oak and Minuet mine, Columbia Hill, work is progressing. The ledge is large. The ore is free milling, and there are considerable sulphurets. Supt. McMahon has fifteen men employed.—At the St. Gothard, also in Columbia Hill district, work is pushed with success. The ledge is a large low-grade property so far as developed.

Placer.

At the Hatheway mine near Auburn a large amount of development work has been done. The 200 and 400-foot levels are in a distance of 900 feet, and the 600 level is being driven rapidly. Twenty-four men are employed and ten stamps are run during the day and fifteen at night. A new ditch has been cut and the water power will be greatly increased when the pipe line has been extended up to the ditch. A. B. Eastwood has been superintendent of the mine for five years. Supt. Sullivan of the Pioneer gold mine reports that, in doing exploratory work in the south end of No. 4 tunnel, an entirely new vein of ore has been struck. When first encountered it was only 24 inches wide. It has since widened to 3 feet and is still broadening.

Plumas.

At the Bushman quartz mine near Quincy work will be resumed without delay.—Near Johnsville the Four Hills mine will install electric power and build a mill. The success of their development has proven satisfactory.—Supt. Cheyney says the Jamison mill will have sufficient water supply to continue work the present month.

At Franklin hill several companies are drift mining with good success.—At Sprout hill an Oakland company is developing a quartz property.—On Kellogg creek the Von Leicht mine is building a cyanide plant. Fifteen men are employed in the mine.

San Diego.

The Ranchita mine, near Banner, of which C. J. Coutts is principal owner, will erect another and larger mill on the property. One difficulty at the mine is lack of water, but this can be remedied in a short time. A tunnel is being driven 14 feet under the old water tunnel to tap some big springs up the valley, and it is believed this will furnish water to keep the mill running twenty-four hours a day.

Shasta.

Near Whiskeytown, in the Manlove Treasures mine, at a depth of 120 feet, a 6-foot ledge produces free-milling ore that runs \$15 a ton.

The Milkmaid mine, at French Gulch, has resumed operations after a shut-down of several months.—Development work on the copper mines at Stillwater, which is being done for Lewisohn Bros. of New York, is going steadily forward. Two shafts have been sunk on the property. Native copper has been found in small quantities.

Sierra.

At the Gold Bluff mine near Downieville a new steam hoist is being placed and sinking will be resumed without delay.

Slakiyou.

Journal: The miners along Klamath river are all working day and night and all seem hopeful of doing well before the season closes. The Pacific mine is in working order again since the filling up from an old drift. All the Chinese companies are busy as though doing well, but it is impossible to get anything from them as to their success.—The Cherry Hill mine on Cherry creek is prospecting well. Considerable quartz is being taken out and the claim put in shape for the winter season, when a quartz mill is to be built. H. H. Hunter & Co. are the owners.—J. Ironsides has been finding good quartz on Cherry creek.

Reporter: At Quartz valley a new ledge on the lower level of the Little Queen mine has

been found of good ore. The mine is employing fifteen men. It is locally reported that about \$25,000 has been taken from this mine since January.—Owens & Co. have cut the ledge and are stopping ore which runs \$75 a ton.—The dredger operated on the Klamath at Oak Bar by Distelhorst & Barton closed down last week on account of low water. They are reported to have had a successful run.—In the Volcano mine an incline is being run on the ledge from the 410-foot station and a force employed on the upper levels stopping ore to supply the 5-stamp mill which is running night and day. The general condition of this mine is very good.

Journal: Gardener & Souther, prospecting Yreka creek bed, have nearly completed their work of making a continuous test of all the basin from Shasta river to Yreka, and will probably put in a dredger plant.—W. L. McClaghry, who has been running a tunnel for nearly four years past to strike the ledge on the north fork of Humbug, struck it last week and it prospects well.—The American Bar Co. at Ash creek is crowding work day and night with a large force, and it is believed the claim is paying well this season.—The Manzanita Bar claim in the Virginia Bar district is reported paying well, the owners having found a rich channel at bedrock.—Work at the Pacific mine at mouth of Humbug creek in Klamath river is progressing.

Trinity.

Near Abrams, Norton & Frue of San Jose have twelve men at work on their ledge. They have two shafts down. Their vein has an average width of 5½ feet, and an average assay value of \$50 per ton so far.

The Altoona mine at Cinnabar last week shipped 100 flasks of quicksilver. The output is 500 flasks a month.

Journal: J. A. Edwards of the New York M. Co. is sinking prospect shafts on the land of Clayton & Blakemore along the Trinity river in Lewiston. If the gravel prospects sufficiently it is the purpose of the company to put in dredgers.—The LaGrange mine has shut down until water comes.—C. S. Childs has an option on the Minersville, Rowles and Italian gulch placer mines in the Minersville district, and has placed a crew at work prospecting the property. If results are satisfactory operations will be begun on a large scale.

Tuolumne.

(Special Correspondence).—The effects of the dry year are being severely felt among the mines in this county as in the rest of the State. All the mills are shut down and but little work is being done in any of the mines along the mother lode or higher up about Sonora. Never before in the history of the county has the water supply been so short. Even at Sonora the supply has been cut off a part of the time. Irrigation has necessarily almost stopped and the frequent forest fires show how dry everything is.

Such a dry season may not occur again for many years, but it will occasionally come and the condition of things most forcibly draws attention to the great waste of water with the present system of water ditches. The loss is so great that even with the present dry season the condition is much worse than it might be. It is generally asserted that the loss from open ditches is small, that an impervious layer of mud is formed upon the bottom. When, however, one follows the main ditches to their distributing points and traces the small ones which wind for miles around the hills where the soil is shallow and numerous ravines to be crossed, it does not take much observation to see that in connection with surface evaporation the loss amounts to a very large percentage of the total, and in the present year the waste from such sources is sufficient to make the difference between almost utter lack and a fair supply for the most important purposes of mining and agriculture.

One cannot follow a ditch for more than a quarter of a mile at most any point in its course without noticing the leaks of greater or less size due to various causes, some of which might be prevented, others not owing to the nature of the conduit. The introduction of a new system of iron pipes or cement ditches must necessarily be expensive, but it seems that some such method must ultimately be adopted before this foothill region can be reasonably developed, either in mining or agriculture.

At present a large electric plant is being installed a few miles above Sonora from which it is expected to conduct electricity to the important mines, thus doing away with the necessity with so much water for mining purposes, and another dry year will find the mines much less affected. This enterprise does not lessen the necessity, however, for a greater economy in the distribution of water. All the important sources of water supply are said to be utilized at present and with the development to which this region is capable, many an ordinary year will find the supply short under the existing circumstances of distribution.

No better investments can be found than that of water systems along the Sierra foothills traversed by the mother lode, if they are properly developed, but under the old time management as it exists in some of the counties the water supply is not properly stored and in addition a very large evaporation of that saved is lost later through evaporation and leakage along many miles of the small distributing ditches.

Sonora, Cal., Sept. 7th, '98.

Of the quartz mills in the county six are in operation, four on the east belt and two on the mother lode. The others are waiting for rain.—The big dam of the Tuolumne County Water Co. at Lyons' Flat will be completed within two weeks. Another is being built, while extensive repairs are simultaneously being made on the remaining three belonging to the company.—The Horse Shoe Bend M. Co. at Columbia are running a tunnel to tap the ledge at considerable depth.—An additional twenty stamps will be added to the

Shawmut mill, Jacksonville, in the near future, making a total of sixty.

The *Democrat* says river-bed mining in the Tuolumne river is now carried on to better advantage than ever before, as the river is so low. A company of Chinamen are credited with realizing fifty pounds of gold in a clean-up last week. They are mining in the river bed above Jacksonville.

Yuba.

Unwatering the Pennsylvania mine at Brown's Valley has reached the 800 level, and stoping was begun last Monday.

COLORADO.

BOULDER COUNTY.

Three carloads of ore from the Wirth mine at Ward gave returns of six ounces gold for the first-class and 3.44 ounces for the second-class. The lot netted \$1120. Eight carloads of mill dirt were shipped from the same mine of a general average of \$30 per ton in gold.

Ward's producing mines are the Newmarket, B. & M., Sullivan, Utica, Dew Drop, Ward Rose, Ruby Sullivan, Nelson, Wirth, Morning Star and Gold King. Nearly 600 men are employed. The camp contains the longest tunnel in the county, the Adit, being 3000 feet, which cuts the Dew Drop a distance along the vein of over 1000 feet.

The Emancipation mine, Sunshine district, has an output of sixty tons per month of high-grade ore, taken from the 400-foot level, at which depth new ground is opened and new ore bodies found.

The Larimer tunnel at Caribou is making ore shipments running from \$40 to \$300 per ton.

CHAFFEE COUNTY.

(Special Correspondence).—The smelting plant of the Buenavista Smelting & Reduction Co. has commenced operating at Buenavista, Colo., under the management of B. F. Morley. Its purpose is to treat the low grade silicious, sulphide ores which are produced in the tributary country, which do not bear shipment to more distant smelters. The work done here is a semi-pyritic smelting, there being copper enough in the ores to collect the values and make a tolerably clean slag. The product is a matter containing gold, silver and copper values, twenty tons of ore being reduced to one ton of matter. The ore contains some zinc which is eliminated in the process. The plant can handle ten-dollar ore profitably. The company is operating on ores from their own mine, the Mary Murphy, a few miles away, which has been worked for eighteen years. The smelter, which has a capacity of over 100 tons per day, has some new features, designed by Mr. Nesmith, of the Colorado Iron Works. WASCOTT.

Buenavista, Colo., Aug. 24th, '98.

The Jasper mine in Turret mining district is showing up some fine ore from recent shipments. The mill returns gave from the hematite ore \$107 and \$136 per ton.

The Jasper mine in the Turret mining district has a 3-foot vein carrying an 8-inch pay-streak from which a mill run gave returns of \$136 per ton in gold. There are two ore chutes in the property.

CLEAR CREEK COUNTY.

The Dives-Peligan group, near Silver Plume, has seven levels. The shortest is 2800 feet and the longest 6000 feet. Every level is in good ore. The streak of smelting ore averages 3 feet, while the values run from \$75 to \$250. The shaft cuts the second lower level at 700 feet. This part of the property is giving employment to 153 men.

DOLORES COUNTY.

The ore shipments from Rico for eight months ending Aug. 21st, '98, were 526 cars, a gain over the same period last year of 221 cars.

EAGLE COUNTY.

Last week were shipped from Battle Mountain district fifteen carloads of ore, making a total of 270 carloads, 8,123 tons, since January 1st.

EL PASO COUNTY.

(Special Correspondence).—The Monument shaft on Battle Mountain has reached a depth of 340 feet. On the 300-foot level rich streaks of sylvanite were formed in the granite. E. Everett is manager and says he is shipping two or three cars of ore a week that runs as high as four ounces to the ton.

The Newell tunnel is 1,400 feet in Grouse Mountain. One blind lead was struck which the manager thinks will justify the building of a mill to handle the ore.

The Standard tunnel has been driven into Beacon hill a distance of 2,200 feet and the work still goes on.

The Grace Arthur is now in charge of James Mackin, recently from Prescott, Arizona. At a depth of 120 feet the work is in low-grade gold ore. WASCOTT.

Cripple Creek, Colo., Aug. 24th, '98.

The Cripple Creek output for August was 35,740 tons with a bullion value of \$1,405,200. This is an increase of nearly \$100,000 over July. The cyanide and chlorination plants extracted \$669,200 in gold from 25,240 tons. The tonnage treated at the smelters was 10,500 and the bullion value was \$735,000.—The Modoc ore output, Cripple Creek, for August was not as large as heretofore, as development work has been extensively performed and only a nominal amount of work on the ore bodies. The shaft is put down 720 feet.—Work has been started retimbering the Lillie shaft from a depth of 500 feet to the surface. The shaft is to be 5½ feet in the clear; the property is to be equipped with fine machinery.

Denver Mining World: W. S. Stratton has decided to place the Independence once more among the heavy shippers of the Cripple Creek district. Plans for new ore bins and sorting rooms have been drawn and lumber dealers and contractors are figuring on the job. Before the month is over work will be under way. For the past year the output from this

mine has been light, as only the ore encountered in drifting, sinking and unraising has been marketed. It was rich enough, however, to meet the mine expenses, and Stratton was satisfied.—Twenty tons a day is the output of the Granite mine on Battle Mountain from a depth of 700 feet, at which point the ore shoot is 5 feet wide and averages \$30 a ton. The upraise from the 700-foot level has been connected with the drift at 600 feet depth and a large block of stoping ground opened up.—The first shipment for some months from the Hallett & Hamburg, Cripple Creek, consisting of three carloads of 4-ounce ore, was sent out last week. The crosscut at the 325-foot level has opened a good body of ore, and with new stopes opened up, shipments will be steady and permanent.—Shipments from the Moon-Anchor Co. properties amounted to 170 tons last week. Of the total amount sixty tons was mill ore and the rest was consigned to the smelters.

GILPIN COUNTY.

The daily shipments of the Pederson mine near Central City are 30 tons of mill ore, averaging 3 ounces gold per cord on the plates, the concentrates running from \$15 to \$25 per ton. The smelting ore gives returns of \$30 per ton. Employment is given to forty-three men.—The vein has been struck in the 900-foot level of the Sleepy Hollow mine, and assays show 12 ounces gold per ton, but the vein is small. Forty tributaries are at work.

LAKE COUNTY.

Leadville. (Special Correspondence): Evans & Donnelly, lessees of the Adams discovery on Carbonate Hill, are shipping sulphide and lead carbonate ores from various levels in the 700-foot shaft. The chief values are in lead, silver and copper.

The Pyranee, under lease to the Rialto Mining & Leasing Co., is being developed by a shaft which at present is 1200 feet deep. They are sinking to get the ledge uncovered in the Mab. Two pumps at the bottom of the shaft deliver about 100 gallons of water per minute.

The Mab mine shaft is down 1010 feet. The first level at 1000 feet runs 600 feet to the ore chute, which dips to the southeast and raises to the northwest. The ore is a sulphide of lead, carrying gold, silver and lead values. Supt. Sam Nicholson reports the shipment of about 125 tons per day. A pump at 860 feet and another at 1000 feet keep the mine tolerably clear of water.

The Wolfstone, on Carbonate, with a 1000-foot shaft, is shipping from the 700-foot level about 1000 tons per month of silver-lead ore. The workings below the 700-foot level have been flooded with water ever since the Maid of Erin pulled her pumps. These lower workings are reported to contain rich carbonate ore and while this property will not be affected by the proposed work of the downtown pumping association, it is very likely the mine will be unwatered next year. The Wolfstone is under lease to Chas. Hill and Sam Nicholson.

The old Breese mine, on Breese Hill, is being worked by the Penn Mining & Leasing Co. Three shafts are equipped with machinery, and a new 10-stamp mill is at work on the property. A lot of low-grade oxidized porphyritic quartz is being milled from an open cut on the lower claims.

The Ballard, on Breese, is being developed by Lessees Turnbull, Golob and Poos, who have struck a body of silicious ore at 350 feet, which carries lead, silver and gold.

The Ibez group, on Breese Hill, has six well-equipped shafts, from which about 7000 tons of ore are handled per month. The ores at 300 to 400 feet depth are oxidized and at greater depth they are sulphides. All, however, contain gold and silver values and are treated by the smelters. No. 2 shaft is 700 feet deep, three-compartment and double cage. It has five 80 H. P. boilers, a 50 H. P. hoist and a ten-drill compressor—the last named operating drills in the shafts excepting at No. 5. No. 3 shaft is 700 feet deep and has nearly the same boiler and hoisting power as No. 2. It has a 1000-gallon per minute pump. No. 4 shaft has four 80 H. P. boilers, an 85 H. P. hoist and is 900 feet deep. No. 5 has the same equipment as No. 4 and has reached a depth of 960 feet. No. 6 shaft is at a depth of 300 feet and is developed by four levels. No. 1 has good equipment. The underground workings connect the six shafts. At each shaft is an ore bin of 1000 tons capacity. New bins are being built at various switch termini of the incoming Ibez branch of the Denver & Rio Grande Railroad. The Ibez Co. has on the ground a complete machine shop and dynamo for lighting all the shafts. John F. Campion is Gen. Mgr. of the Ibez and E. M. Ray is Supt. of the mine.

The Forest Queen, which joins the Ibez group on the west, has a 600-foot shaft and it is the intention to sink to the 1300-foot level to get through the porphyry dyke in which they are now and to strike the level of the Yak tunnel, which is being driven from California gulch with this part of Breese Hill as the objective point. From the mouth of the Yak tunnel to its proposed terminus, in the Ibez grounds, is three miles, two miles of which is already driven. The Yak people control the Forest Queen.

George Campion is sinking two shafts in South Evans gulch—one being the Howard, 715 feet deep, and the other the Bob, 100 feet deep.

The New Year, in South Evans gulch, is being worked through an incline 2000 feet long by Lessees Canning, Johnson and Statham, who are shipping gold-silver-lead bearing ore.

The Resurrection, on Little Ella Hill, is shipping about 2000 tons of silicious gold and silver ore per month.

The Sedalia, adjoining the Resurrection, has been closed down since July 1st, but it is expected to resume work within a month. Different levels yield different ores—gold-bearing quartz in some parts and lead carbonate in others.

Below the Sedalia is the Fortune, with a

425-foot shaft, which is being sunk to the 700-foot level to reach the Sedalia vein. The Fortune is under lease to John Doddridge and associates.

Still below the Fortune, in Big Evans gulch, is the Dolly B., of which P. K. Connelly is manager. It has an 800-foot shaft, from which some lead carbonate ore shipments are being made. The property is equipped with heavy hoists and compressors and pumps.

The Famous, in the same gulch, is under lease and bond to R. T. Root, who has sunk a development shaft 600 feet and will now drift northward for the vein.

The Monarch, between Big Evans and South Evans gulches, is shipping about twenty-five tons per day.

The Small Hopes group, comprising the R. A. M., Emmett and others, is a constant shipper. WASCOTT.

Leadville, Colo., Aug. 27th, '98.

The William Wallace mine of Leadville is producing about seventy-five tons of ore per day, and has made a 10,000-ton contract with the Globe smelter in Denver. The ore carries some silver, but is largely iron excess.

The Bull Hill group on Mt. Elbert, owned by J. W. Beam of Denver, is opened by over 1000 feet of shaft work in the form of shafts, tunnel and drift. One shaft at 100 feet shows 3 feet of ore which assays \$42 per ton.

The Mab Mining Co. Leadville, is outputting 120 tons daily. As more ground is opened new men will be put to work. With the additional ground opened there is no perceptible increase in the water; the working level is 1000 feet deep.

LA PLATA COUNTY.

The Sundown mine at Mancos milled 19,990 pounds of ore which yielded \$45 a ton.

MINERAL COUNTY.

The Ridge mine, Campbell Mountain, shipped in August 160 tons of lead and 300 tons of zinc.

OURAY COUNTY.

(Special Correspondence).—Last year the Cleopatra M. & Co.'s smelter at Ouray, Colo., was receiving ore from only twelve properties, in small quantities and irregularly. This year it is getting regular consignments from thirty mines in Ouray, Hinsdale, San Miguel and Dolores counties. It has stimulated prospecting on low-grade properties and kept several mines of this class from closing down. Ouray, Sept. 5th, '98.

PITKIN COUNTY.

The Homestead of Aspen is working on quartzite ore, which returns from different shipments 45 per cent lead and \$90 in silver per ton. The vein is 7 feet wide.

Gold ore is being taken from the Dewey mine near Aspen that runs from \$12 to \$15 per ton, and increases in value as the development increases.

SAN JUAN COUNTY.

The Oro mine, Bonita mountain, has a 5-foot vein that yields \$23.50 per ton gold.

SAN MIGUEL COUNTY.

The Belle-Champion mine in Saw Pit gulch is outputting four carloads per week of good grade ore.

The Tom Boy mill at Telluride is treating from 200 to 260 tons of ore every twenty-four hours. The output is locally said to be \$100,000 a month. The vein shows from 10 to 16 feet of ore.

SUMMIT COUNTY.

(Special Correspondence).—Taking the South Park railroad at Leadville, the traveler winds up the Arkansas river to its headwaters, crosses the continental divide at Fremont's Pass, drops down the Pacific slope, along Ten-Mile creek, to Robinson, Kokomo and Dillon, the last-named being on the waters of the Blue; thence up the Blue to Breckenridge, and he has traversed the backbone of the Rockies at one of its richest and most rugged points.

At Kokomo the Col. Sellars, a rich producer of gold and silver bearing ore, is shipping regularly about 100 tons per day. In the same locality, the El Dorado, Nettie B., Wilfley, Hercules and White Quail are shipping in the aggregate about 200 tons per week. Aug. 25th, '98. WASCOTT.

Breckenridge. (Special Correspondence): The North American Gold Dredging Co., under the management of Ben Stanley Revett, are operating two Risdon dredges on Swan creek, near Breckenridge, and a hydraulic plant as well. Where the dredges and hydraulic elevator are at work the sand and gravel are about 30 to 45 feet deep. A great deal of material has thus far been handled and the work is progressing in a very systematic manner. The hydraulic apparatus being operated a mile below the dredges consists of the ordinary flume and giants, an Evans gravel elevator, which conveys the gravel from bedrock to the sluice way, a distance of 42 feet, with 176-foot pressure and through an 8-inch throat. The gravel is of that composition as to make it very easy to handle. A steam hoist with wire rope and pulleys and conveyors are used to move the heavy boulders from the bedrock.

The work on lode properties on Mineral and Farncomb hills is mostly in the hands of lessees and the results are only moderate. On Mineral the ores have been of a silver-lead nature, while Farncomb has a record of having produced a great deal of free gold in seams and pockets near the surface. Its production has not been great this year, though lessees are said to do well. Nowhere on Farncomb has work been carried to any great depth. The Wapita Co., which controls most of the exploited ground on this hill, has a 1000-foot tunnel, from which an upraise goes about 500 feet to the surface. This represents the deepest work on the hill. On the north side some profitable hydraulic work has been done by the same company, which has a fourteen-mile flume, through which sufficient

water is brought from South Swan creek to work a few months of the year.

The Boss mine on Farncomb, which belongs to St. Louis parties, is being worked by M. E. Griffin of San Francisco.

What was formerly known as the Peabody placers, in Gold Run, are being worked by the recent purchasers of that property.

The Mountain Pride on Baldy mountain has an excellent plant of machinery and its managers are doing some valuable prospecting.

The Pence-Miller Placer Co. have completed their hydraulic plant on the Blue, putting in the Ludium sinking pump and elevator. They have worked but a few weeks.

The Jumbo mine and mill are now both operating. The mill has been closed down several years.

The ore shipments from Breckenridge average about 300 tons per month. They consist of sulphide and carbonate ores, which run about \$35 per ton. WASCOTT.

Breckenridge, Colo., Aug. 30th, '98.

The Colonel Sellers mine at Kokomo outputs 175 tons daily of iron sulphide ore. It also carries gold and silver. Considerable new development is constantly kept ahead of this production.

IDAHO.

(Special Correspondence).—A company of Indiana capitalists have secured an interest in the Gold Drop mine near Dewey and have begun work. The property comprises fifteen claims, and much development work has been done on them. The tunnels cut the ledges at a depth of over 1000 feet. Dewey, Sept. 3rd, '98.

Senator Pettigrew of South Dakota, who with others has a bond on the Empire mine at Silver City, is making his second visit to the mine. The property has been unwatered to the eighth level and is cleaned out for inspection.

From Buffalo Hump the first pack train load of ore was sent last week from the Big Buffalo for Florence.

The Jesse James group near Custer has been sold to B. Wooley, representing a company, for \$60,000, a portion of which was paid cash. The property has a vein 10 feet wide that mills \$23 gold and six ounces silver per ton.—In the Lucky Boy mine near Idaho City the pay chute varies in thickness from 3 to 6 feet and the ore averages \$24 a ton in gold. In addition to the high-grade chute there is from 7 to 10 feet of ore that carries from \$7 to \$15 a ton.

The report of the Tiger-Poorman mine presented at the recent annual meeting shows that during the year 112,607 tons of ore were mined and milled, being reduced to 16,638 tons of silver-lead concentrates, which was shipped to smelters. The profit from the mine was \$64,604, being \$57 a ton crude ore, or \$3 88 a ton of concentrates. The rate of concentration was about 6.8 tons into one ton. The shaft has reached a depth of 1400 feet.

Statesman: The difficulties of getting the foundation of the Basic Co.'s big dynamo to its destination may delay starting the Placerville dredge until the middle of September.—The 5-stamp mill going up at the Bruiser group of gold mines at Grimes began crushing last week.—Retimbering the 2000-foot Morning Star tunnel is progressing rapidly. Fifty men are camped near the mine waiting to be put to work.—The new 5-stamp mill at the Twin Sisters mines, near Centerville, is crushing two tons to the stamp per day. The plates show that the ore is good.—Walking & Wisher are opening a hydraulic claim near Twelve-Mile House.—Supt. Kincaid is cleaning out the tunnels and drifts of the Elkhorn preparatory to doing some prospecting for a Denver company. He is running the 5-stamp mill right along.—With the exception of the Summit Flat quartz property, the mines, ditches and water rights owned by Ben Willson & Co. on Grimes creek were sold at sheriff's sale last week to T. W. Duff, agent for the Oriole Co., which held the judgment against it, for \$10,980. The ditches and ground are scattered a distance of nearly twenty miles.

MONTANA.

Operations on the placer mine at McCauley's bar near Clancy began this season about April 1. Since that time two outfits made three clean ups and took out eighty ounces of gold.

In the Hecla mine at Lion City, which has been idle twenty years, work was resumed last spring, and the property is again productive. An 8 foot ledge has been found that yields 300 ounces in silver and 40 per cent lead.—Leasers on the old Trapper mine are said to have put \$23,000 worth of ore in three months.—The Montana O. P. Co. is erecting one of the largest gallows-frames in Butte at the Karus mine.—The Queen mine near Butte has been leased by Kangle & Leslie. Ore is going into the bins and a 20-stamp mill is being built.

The new tunnel at the Stray Horse mine, near Winston, is in about 500 feet and ore is found in increasing quantities as the work proceeds.—At Toston the bituminous coal mines which have been idle several months are to be again operated.

At Sylvanite the Goldfint is working about thirty men and the stamps are using seventy tons of ore of good grade every twenty-four hours. The Keystone is working three shifts and shows an ore body that will require the erection of a large plant at an early date. Work is being pushed on the Juliette, the Eberhart, the Kansas as usual, and the outlook for the camp is good.—At the Cruise mine near Marysville the mill will be increased to twenty stamps. There will also be put in 12 pans and six settlers. All the work will be done before the holidays and the property will be in condition to yield and treat 100 tons a day.

NEVADA.

(Special Correspondence).—The State of Nevada has had an illustrious career in the mining line. The first chapter opened with a

series of brilliant discoveries following each other in rapid succession, which added a billion in treasure to the world's circulation. Many causes have contributed to bring on a period of depression in marked contrast to the opening years of State life. The distance from money centers, the scarcity of fuel and water, lack of transportation facilities, the fall in the price of silver and the temptation offered by booming mines in other regions, have turned the current to other fields and the State has not prospered as its neighbors have. But there seems promise of a change and a renewal of interest in the heavily mineralized districts of Nevada, where prospecting is going on with vigor, and in some places large investments are being made.

The one that locally promises most is the Glasgow & Western Exploration Co., J. P. Coates president. It seems to have unbounded means at command, and owns a mine in Utah, one in Montana, the Gray Eagle and Star at Cherry Creek in White Pine county, Nev., and extensive bodies of copper twelve miles south of Golconda, on the line of the C. P. R. R.

Otto Stahlmann is manager. Unfortunately Mr. Stahlmann shares General Woolsey's opinion of reporters. A well-known writer approached him not long ago and went away with the remark, "If I wanted this place written up, don't you suppose I could do it better than you could?"

Access to the works is not denied. The mine lies in the mountains, and formerly was approached by a road up a canyon from the southeast. In digging a grade more directly to the mine a body of superior ore was uncovered on the north side of the hill, which is being quarried out and hauled to the mine with teams at considerable cost. A railroad will no doubt be built to carry the ore down. The buildings stand on the open plain about a mile east of Golconda, with the Humboldt river running near and the railroad on the south side, connected by sidings with the furnace and the mill. The works consist of a 150-ton mill, east of which lie two Bruckner and two reverberatory furnaces, capable of working sixty tons of ore every ten hours, resulting in four tons of matte. The foundations are laid for two more furnaces, and it will not be long before the mill is running day and night.

The ore goes to the top of the mill in an automatic hoist and falls from the chute into a rock breaker, which sends it to Cornish rolls, thence through jiggers, a Huntington crusher, slime tables, etc., to the furnaces, where it is mixed with concentrates from the Gray Eagle in White Pine county.

Everything at Golconda is in charge of T. M. Davis. There are plenty of people who predict that Golconda will soon be as big a copper camp as Anaconda, and it looks as if their hopes might be realized.

Golconda, Sept. 1st, '98.

The gross value of the ore taken out of the De Lamar mine from April 1st to June 30th is reported to be \$417,516.93.

Chicago men are interested in copper properties near Austin and will develop them.

Sentinel: The old shaft of the Eureka Con. mine at Eureka is being repaired and is in good shape to the ninth level. Steam is being kept up at the hoisting works. It is stated that the prospects for finding ore are improving.

NEW MEXICO.

Silver City Enterprise: The Santa Rita Copper & Iron Co. owns seventy copper and iron claims and has 100 men employed in the mines. The greater number are working on a royalty, and most of the miners are making more than wages. The camp is producing about 600 tons of copper ore per month. The Santa Rita Copper & Iron Co. is shipping six cars of iron ore per day.

The dredge that has been in operation in the Moreno Creek placers the past season has been a success. The machine handles 300 yards of 25-cent gravel daily and works smoothly.

OREGON.

Near Roseburg, in the Noonday mine they tapped a vein at a depth of 400 feet, 8 feet wide, of free milling ore running from \$20 to \$100 per ton. The company will run 400 feet more of tunnels before starting the mill.

Journal: The Eureka mine and mill near Grant's Pass will shortly start up again. In the several months during which the mill has been idle the company has been submitting samples of ores to experts in different parts of the country to ascertain what process was best adapted to saving of the non-free milling values in the ores. As a result the ores will be concentrated and then cyanided. The Miller mine is a large property.—Twenty men are employed by Jones & Gorham on their late purchases in Mt. Reuben district. In the California mine, after striking the ledge at the end of a 599-foot tunnel, this ledge was crosscut and drifts have been run 235 feet. This work continues. The ledge is 14 feet wide. In the Gold Bug mine development continues with good results. Ground is being cleared for the stamp mill. The company will put in at first only five stamps, but the mill will be so arranged that it may be readily enlarged. The machinery will be on the ground as soon as the road is completed.

SOUTH DAKOTA.

The Dakota Maid mine at Galena has a ledge of ore 4½ feet that assays from \$12.50 to \$44 a ton.—In the Great Northern shaft at Two Bit they are down 250 feet in hard shales.—The shaft of the Chicago and Two Bit has been sunk 400 feet.

UTAH.

In the South Swansea mine at Silver City on the 650 level a new ore body has been found locally reported to be the best ore the company has discovered.—In the Comstock at Park City an ore body has been opened that carries sulphurates of silver and a good percentage of copper.—At Stockton on the

Argent they are sinking to the 600-foot level. During the year the Argent has shipped some \$5000 worth of ore of an average of \$35 per ton net. Development work has held back extraction of ores.—On the No You Don't mine, M. Hennifer has opened up good bodies of low-grade ores. He shipped eighty tons East this week. His shipments this year have averaged fifty tons per month.—The Hercules has been shipping monthly this season, and sent last week sixty tons of good ore.—At the Honorine the tunnel is being pushed; a fine ore strike was made a few days ago. The Silver King is retimbering the shaft to water level 700 feet.—Bingham's shipments for August were 2586 tons.—From Tintic last week's shipments were 156 cars of ore, twelve cars of concentrates and one bar of bullion.—Silver City's ore shipments for the week were thirty-six carloads.—The old Silver King at Stockton shipped a carload of high-grade silver and lead ore.—The tunnel in the Hershel mine has reached 2200 feet. A winze is being sunk at one point and an upraise at another.

The ore body in the Rabbit's Foot at Silver City has been broken into at a depth of 357 feet and 4 feet of mineral is exposed that assays from 1.2 to 4.1 per cent copper, 50c to \$1.20 in gold and five to thirteen ounces silver.—The Columbia of Lion hill marketed a carload of ore that netted \$34 a ton, notwithstanding the long haul.—At Park City the Marsac mill is again in operation. The wooden chutes have been replaced by iron.—At Richfield the Annie Laurie developments show the vein to be between 30 and 40 feet in width. About 800 tons of second-class ore is one the dump, the average value of which is reported at \$40, while sacked and ready for shipment are eleven tons that yield \$200 per ton. The tunnel is in 350 feet.—The Grand Central at Mammoth closed the month with an output of 1800 tons of ore that provided \$31,250 for the September dividend and a large sum to the reserve fund, which it is said approximates \$100,000.—The Red Wing G. M. Co. at Bingham has made its first payment on the bond and arranged to discharge the balance—\$20,000—in four months. The lower tunnel is in 400 feet, where the vein has been reached. The upper tunnel is in 200 feet.—The Ophir Hill mine at Ophir is shipping 1000 tons of concentrates.

The Cigale Co., whose properties are at Mercur, has let the contract for a roasting plant, and in seven weeks the furnaces will be in operation, as will also the mill. The roasting plant will have a capacity of 100 tons a day.

The Eureka Hill mine and mill at Eureka last week sent out a consignment of \$125,000. This is the third of the kind the present season.—The lower workings of the Dalton & Lark at Bingham indicate that in a short time the copper ores will become a source of as much revenue as the other ores in the property. In the 850 level the chute carries an average of 8 per cent copper. The mill will continue to turn out about 500 tons of concentrates a month.

A shipment of silver and gold cyanides was made from the Chloride Point, at Mercur, valued at \$1750.

L. C. Doty & Co. have secured for two years a lease on the Apex group, at Eureka, for \$75,000, and have begun work on a tunnel.

At Ophir last year the Ophir Hill mine and mill remained idle, leaving the camp dormant the entire year. Now the mine is sending out an average of 3000 tons of ore per month, and the mill reduces this to 1000 tons of concentrates. This gives employment to forty men in the mine and mill.

WASHINGTON.

STEVENS COUNTY.

(Special Correspondence).—In Eureka district the Surprise quartz ledge has been prospected by a number of crosscuts in the croppings, which yield in gold from \$2 to \$36 per ton. The ledge is exposed 16 feet wide in the Blacktail tunnel, where it assays from \$5 to \$10 per ton in gold. The company contemplates sinking a shaft from the surface, where the highest assays came from.

A tunnel 80 feet in length has been driven, crosscutting a well-defined quartz vein, 11 feet in width, in the Pearl mine. Drifting 19 feet northwestward and 40 feet southeastward has given average values of \$7 in gold per ton. Exploration is being continued by the company on the lode southeastward.

A tunnel driven northward has crosscut one of the big east and west quartz ledges of the Lone Pine mine 15 feet. A drift 30 feet westward and 70 feet eastward on the ledge has developed quartz of from \$2 to \$40 gold values per ton. Samples from the croppings run as high as \$30 per ton. There are three other parallel veins upon this mine, which will be developed at over 250 feet in depth by a tunnel from above the east side of Eureka creek. This tunnel is in 136 feet, with 240 feet farther down to tap the first ledge north of the ore that has been crosscut in the northerly tunnel. The owners, the Lone Pine G. M. Co., have excellent prospects in their property.

The Quip mine shows a vein 72 feet wide between the walls. A great mass of ledge matter upon the footwall is faulted by a vertical movement of porphyry, which definitely separates it from the ledge in the hanging wall. The mine is opened by a tunnel, which has already penetrated the hanging wall, and quartz of high value and identical in appearance with the high grade ore from the Republic mine is being developed.

The Little Cove mine is opened by a vertical double-compartment shaft to a depth of 140 feet. At 125 feet depth a crosscut westward cuts the hanging wall, and, passing through a vein 20 feet wide between the walls, exposes 8 feet width of quartz, which carries its strength for 70 feet to the northwest, as shown by a drift in that direction. All of the material in that drift will average in value about \$7.50 per ton, all in gold. A drift of nearly 100 feet southeast, towards the Pearl, an adjoining location upon the same

vein, exposes the ledge from 10 to 12 feet in width, with assay values running in gold from \$2 up to \$60 per ton, and an average value of \$12. Farther to the southeastward and only a few feet northwestward from the Pearl, a surface tunnel has developed the same ledge 25 feet in width. There the average value is estimated at \$12 per ton, but samples of the quartz run as high as \$70.

The San Pail has been regarded as one of the most valuable mines in the district. It is situated northeasterly, at a distance of about two miles from the Republic. The vein is very well defined and easily traced by its surface croppings, which have been stripped and crosscut at interval spaces of about 50 feet from one end line to the other. A shaft sunk 50 feet on the ledge has developed assay values ranging from \$10 to \$300, with an average commercial value of about \$20 per ton in gold. No. 1 tunnel crosscuts the ledge, under the shaft, at a depth of 100 feet. Thence a drift carried southeasterly 25 feet and northward 130 feet shows a solid ledge of quartz from 4 to 8 feet in width, with an average of about \$20 per ton. From the point of intersection by the tunnel a winze has been sunk 15 feet upon the ledge, which goes down 5 feet in width and carries values of \$18 to \$80, with an average of about \$30 per ton, substantially in gold. The samples have shown returns of twelve and fifteen ounces respectively in silver. The drift has been carried 40 feet beyond the point 130 feet northwesterly from the winze, but with the quartz pinching between hard walls in the roof. It, however, shows about 2 feet of quartz in the bottom. A tunnel enters the hill, with sufficient dumping room, from the west side of Eureka creek, to tap the vein at a depth of 250 feet. It is now in 315 feet, with 60 feet farther to run.

The Mountain Lion mine, situated northerly about three miles from the Republic, combines two full claims and a fraction, and presents an exposure at the surface of three separate quartz ledges. The surface developments consist of two crosscuts and a shaft upon the center vein, 50 feet in depth. A crosscut, 9 feet in length, from the bottom of the shaft, touches neither wall. Samples of the quartz run from \$12 to \$25 per ton, principally in gold. Running westward from the shaft is a trench about 3 feet in depth which has cut 25 feet across the ledge, the quartz giving assays of from \$7 to \$12 per ton. This appears to be the main ledge. The west ledge runs parallel with it, but will not average more than \$5 per ton of quartz. The easterly vein strikes to the northeast and shows comparatively little value. A tunnel has been driven from an elevation of about 75 feet above Granite creek to intersect the veins of the Mountain Lion property; it enters the hill from the west side and passes 718 feet through porphyry strata to the footwall of the west vein at 310 feet depth below the surface. As seen in the tunnel, the vein stands almost perpendicular, dipping with a slight inclination to the northeast. It is 8 feet wide and yields average values of about \$10 per ton. At 756 feet in another ledge was encountered, which crosses the tunnel at an angle of 60°. That was cut through in 18 feet, and, after passing through 3 or 4 feet of porphyry, the tunnel is again in quartz. What the extent of this vein is cannot be ascertained at this writing. It evidently does not show at the surface, and the center vein should not be reached within the next 70 feet. The assays are stated to run from \$30 to \$40 to the ton. A mill is contemplated for this property, and active steps will be taken for that purpose as soon as the plans are matured. M. H. JOSEPH.

At Republic, W. H. Giles bonded the Sampson and Dewey claims to H. I. Kressley of Illinois for \$2000.—C. A. Wallace of Chicago has bonded a half interest in the Greenberg mine near Keeler for \$10,000 and will immediately begin extensive development of the property.

WYOMING.

The Bradley mine near Laramie is being successfully worked and has a large body of high-grade ore at a depth of 127 feet.—The American G. & C. M. Co. near Laramie is developing two of its sixteen claims. The Jesse lode is free milling gold ore and the vein is nearly 100 feet wide, recent assays showing from \$8.40 to \$45.60 per ton.

Herald: Near Grand Encampment work has been suspended on the Golden Eagle mine and all men put to work on the Charter Oak, at which a new steam hoisting and pumping plant has been installed. It is the intention to sink 300 feet on the Charter Oak and work will be pushed with three shifts.

FOREIGN.

BRITISH COLUMBIA.

At Slocan a two-thirds interest in the Fidelity mine was sold for \$10,000 cash.—The Ajax has seventeen men at work.—Five feet of ore in the lower tunnel of the Payne was found and the force has been increased to 140.—At Ymir fifty men are working in the Puerto Rico mine.—In the Meadow Lark mine ore has been found that runs \$92 in gold per ton.—At the Cariboo mine, Quessnelle, flumes are in place and the dirt being rushed through. The amount of the full wash-up is generally believed will be large, from \$100,000 to \$150,000. It is known that one 10-inch streak of gravel was found in the workings that is said to average more than \$30 to the yard. The water is holding out well.—In the Jumbo mine at Rossland the main tunnel is in 800 feet and is crosscutting the ledge.—Pay ore has been found in the Riverside property at Grand Forks in a ledge 9 feet in width that assays \$40 in gold and copper.—The War Eagle at Rossland last week shipped 870 tons of ore.—The report of J. Monaghan, Pres. of the Cariboo mine, Camp McKinney, ending July 1, 1898, showed, among other things, that the mill had crushed 6770 tons of ore that yielded \$121,270 in bullion and \$17,943.64 in concentrates. For the same period during the previous year, the records of the

company show an output of 6742 tons of ore, which yielded in bullion \$104,826.09 and in concentrates \$13,513.39. The output for the year was an increase of but eight tons over that of the previous year, while the increase in value of production was \$20,904.06.

It is reported from Greenwood that the final payment of \$27,000 has been made on the B. C. mine in Summit camp by A. H. Harrison and his associates.—The sale of the Lily May at Rossland to the English-Canadian Co., Ltd., has been completed, and it is expected that work will be resumed about the first of November. W. J. Harris, who represents the purchaser, has instructions to let contracts at once for supplies and to call for bids to sink the shaft 100 feet farther. The transfer was completed last week and the basis of the sale was \$10,000 cash and 70,000 £1 shares of stock. The consideration is equivalent to \$360,000.

At Grand Forks a miner, while working at the Republic mine, stole \$350 worth of amalgam from the plates at the stamp mill. After taking the amalgam the thief started to escape and succeeded in going as far as Nelson, Wash., where he was overtaken and captured.

In the Fern mine, near Nelson, for the week ending August 14th, the number of tons of milling ore mined was 297; the mill ran 164 hours, the number of tons milled was 265, or four tons per stamp per day.

BRITISH GUIANA.

The government of British Guiana has lately taken practical steps in arranging for geological surveys in the gold districts. A survey has been conducted by J. B. Harrison in the northwest district and the results embodied in a report, while an additional report on the petrology of the district is awaiting publication. A further expedition to examine the formations of the Potaro-Conawarook district is now being organized. The great importance of this work will be recognized in view of the fact that there are no trustworthy official reports on the geology of British Guiana in existence. The experience of the past ten years has proved that British Guiana is rich in gold, and what is now needed is the importation into the colony and the adoption of mechanical washing appliances for alluvial gold. By such means, deposits of alluvial gold, vast areas of which are known to exist (but would not pay to work by the means now employed), could be made to produce large quantities of gold. During the year ending June 30th the amount of gold exported from the colony was 117,265 ounces, or a decrease of 10,326 ounces upon the output of 1896-97. This serious decrease is partly ascribed to exceptionally bad weather and partly to the exhaustion of alluvial workings in the Barima district.

MEXICO.

Modern Mexico: Twenty-five cars of ore are shipped from the Sierra Mojada daily.—Machinery for the new smelter to be erected by J. R. Magruder is arriving at Hermosillo.—A Philadelphia company operating near Mamimi, Durango, is completing a furnace of forty tons capacity for smelting its copper ore. A railroad will be built from the Mexican Central tracks to the mine.—A 40-ton Reliance Chilean mill has been erected at Ameca for the Barranca mine, which is working 150 men and turning out ore that averages \$20 and upwards in gold and twenty to thirty ounces in silver per ton.—G. J. Reiger sold the San Pablo mine near Chihuahua for \$60,000.—The new 10-stamp concentrator at the mines of L. Ephraim at El Promontorio has started on a large dump of second-class ore.—F. Borquez has sold to the Sabina M. Co. five claims in the district of Baucari for \$5000 gold and one-third of the stock in the company.

Monterey Globe: The Mexican Metallurgical Co. of San Luis Potosi and the La Plata M. Co. of Monterey have organized the Chrysolite M. Co., with a capital of \$500,000, and transferred to it their holdings in the eight mines known as the San Felipe group, located in the Sierra Madre mountains, near the terminus of the Monterey Mineral Railroad. The new company purchased the interests held by J. A. Robertson and J. Rice in these properties, paying at the rate of half a million dollars for the whole. The Denver mine, owned by the La Plata Co., has been leased to the Chrysolite M. Co. for twenty years. The combined properties cover 370 acres, located in the center of the most important silver and lead mining district in the republic of Mexico. Plans have been adopted for work on a large scale. Four crosscut tunnels will be driven north and south, varying in length from 500 to 1000 feet, with the necessary connecting shafts and winzes. The main tunnel is to be driven on the vein from east to west 400 feet in length, traversing all of the mines. It will be 3200 feet below the existing works of the Denver mine. The present force of 200 miners will be increased to 1000 within the next few months. Modern methods will prevail in working this big consolidation. An electric plant will be installed for lighting, ventilating and running power drills. The equipment will include telephone lines, aerial cables and surface tramways.

SIBERIA.

Writing of the regions to be developed by the Trans-Siberian railway, H. H. Pearce, Charge d'Affaires of the United States Legation at St. Petersburg, says:

"That this great railway system is designed to open up a country of great richness cannot, in the light of present knowledge, be denied. The mining regions of the Ural, the Altai and the Sayan mountains have remained undeveloped and, indeed, but little explored, because of the difficulty of the transportation of their product, all the great waterways reaching them flowing northward into the Arctic ocean. Already, in the Urals, enterprise is making progress, and operations in the mining and smelting of iron and copper ores and working of metals are being established.

Oxidation of Amalgamating Plates.

TO THE EDITOR:—In the issue of August 25th, on page 203, I note a "Concentrate" on the oxidation of amalgamating plates in quartz mills, in which such action is attributed to "the oxidation of copper in the amalgam; or it may be due partly to the effect of sulphates in the ore, in which case it would be at least partly a basic sulphate of copper." The above may to a very small extent cause the discoloration of the plates spoken of, but the main cause is the mode of preparing the plates for electro-plating, which is done by immersing the plate in what is technically called the pickle, the chief ingredients of which are dilute sulphuric and nitric acids. Copper is a very porous metal; the acid penetrates to considerable depth and cannot be removed or neutralized by immersion in any alkali. The union of the silver to the copper cannot be perfect, as the pickle has already imbedded itself in every particle of the copper surface and an oxidized surface is presented for silver to be deposited on. The result is that with the oxide of copper working on the lower side of the film of silver on the plate, and the quicksilver absorbing the silver on the upper side, the copper is soon exposed, when "the greenish or greenish gray film shows itself."

Another cause for the exposure of the copper is the use by millmen of nitric or sulphuric acid in the cleansing or dressing of the plates. On one occasion I visited a mine in this State where nearly half the surface was entirely denuded of the silver, and all efforts to recoat it with silver and gold amalgam failed. I asked the owner of the mill if he had used nitric acid on the plates: He said "no," but a few days later I found on a shelf two large bottles of nitric and sulphuric acid about half full. On calling the owner's attention to them, he recollected that one of his millmen requested him to get the acid, and it was undoubtedly used

In the article referred to, discussing the greenish or greenish-gray film forming on copper plates, it is said: "On good electro-silver plated copper plates, it is probably never seen." To this I perfectly agree, and this short sentence disproves the theory that "it

Roasting Ore at Keswick, Cal.

There is considerable present discussion regarding the "smoke nuisance" at the works of the Iron Mountain Mines Co. at Keswick, Shasta Co., Cal., in San Francisco and Shasta Co. papers.

weeks ago the Glasgow Corporation invited tenders for the supply of 1000 tons of cast-iron pipes. The two lowest offers came from the United States, but as the castings were wanted in 9 feet lengths, and those specified by the Americans were 12 feet long, revised



BLAST FURNACES AT KESWICK, CAL.

is due to the oxidation of copper in the amalgam; or it may be due partly to the effect of sulphates in the ore." If it came from the oxidation of sulphates in the ore or from the oxidation of copper in the amalgam, why does it not show itself "on good electro-silver

Complaint is made that the adjacent vegetation is destroyed, and life for all animals requiring oxygen made burdensome by the noxious gases arising from the piles of burning ore. The contra assertion is made that the creation of such fumes is unavoidable, and that the

estimates were asked for, and the amounts of the several quotations made known. The amended offers were opened on Monday, and an American firm again asks less than any of the others. As there are over 200 iron-founders in Glasgow, and most of them deal in pipes, the committee in charge of the contract decided to leave the matter over for further consideration."

How to Store Powder.

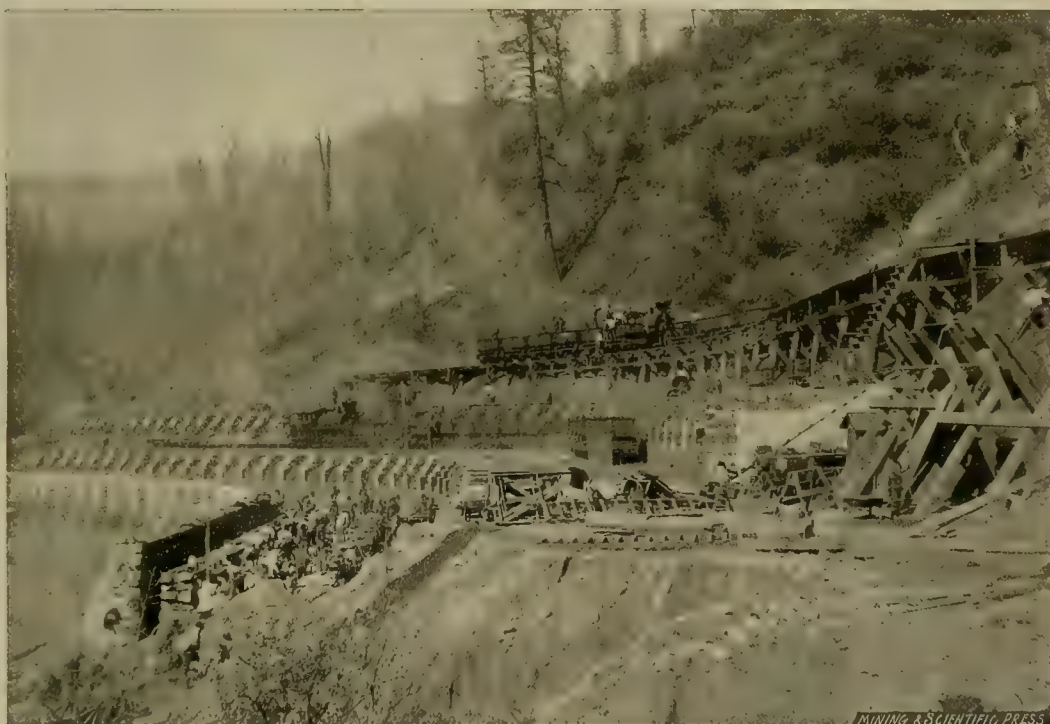
The question "How should powder be best stored?" referred to an expert on that subject, is answered by him as follows:

TO THE EDITOR:—Powder is best stored in a magazine that is properly ventilated, having top and bottom air. The floor should be at least 18 inches from the ground, and the ventilators so constructed as to prevent boys or fools in attempting to tamper with the powder; place the ventilator thus:



Powder properly placed should be at least 6 inches from side or wall of magazine.

Take, for example, 400 cases of powder: You should have a magazine 14x16 and 10 feet in the clear; place the bottom row of cases upon slats, then slats on top of cases, and so on, until you have your cases stored. By this means you get a top and bottom ventilation, which keeps your powder cool. When the temperature outside is from 90° to 110°, you will readily see the good effect. A magazine of the size herein indicated should at least contain eight ventilators. Nitro-glycerine freezes at 46° Fahrenheit, and a miner should always see that his powder is properly thawed in fall and winter, thereby saving himself trouble and the danger of miss shots. Powder at times becomes chilled while not actually frozen, and when a case has been partially used it is always best to keep it covered and allow the sawdust to remain in case, instead of throwing it out, until the case is entirely empty. Storing powder in tunnels or underground is to be condemned, as there is always more or less dampness, and the old saying: "Keep your powder dry" applies with equal force to high explosives.



STALL ROASTERS AT KESWICK, CAL.

in dissolving the silver on the copper, and so thoroughly impregnating the copper with the acid that the amalgam would not adhere to the copper without first scraping off the copper below the point of oxidation.

No acid should be used in cleansing the copper for electro-plating; it could be done perfectly with sand and a weak solution of cyanide of potassium, or even with sand and ammonia or caustic potash. Nothing should be used that will oxidize the copper, and no acid should be used in dressing the plates.

plated copper?" Simply because it is not caused by either, and does not make itself apparent until the film of silver coating the copper liberates the oxide of copper formed by the pickle used to cleanse the copper for the process of electro-plating.

A "52" MINER.

A TON of Atlantic water yields, after evaporation, eighty-one pounds of salt; of the Pacific, seventy-nine, of the Arctic and Antarctic, eighty-five; of the Dead sea, 187.

resultant damage is but a fractional part of the industrial benefit conferred by the continuance of the work. The ore is roasted from 47% down to a residue of 10% sulphur, and the operation is not conducive to increased natural beauty of the landscape. Herewith are illustrated the blast furnaces and stall roasters at Keswick.

"For Further Consideration!"

The following is from the London Mining Journal of Aug. 20: "Some

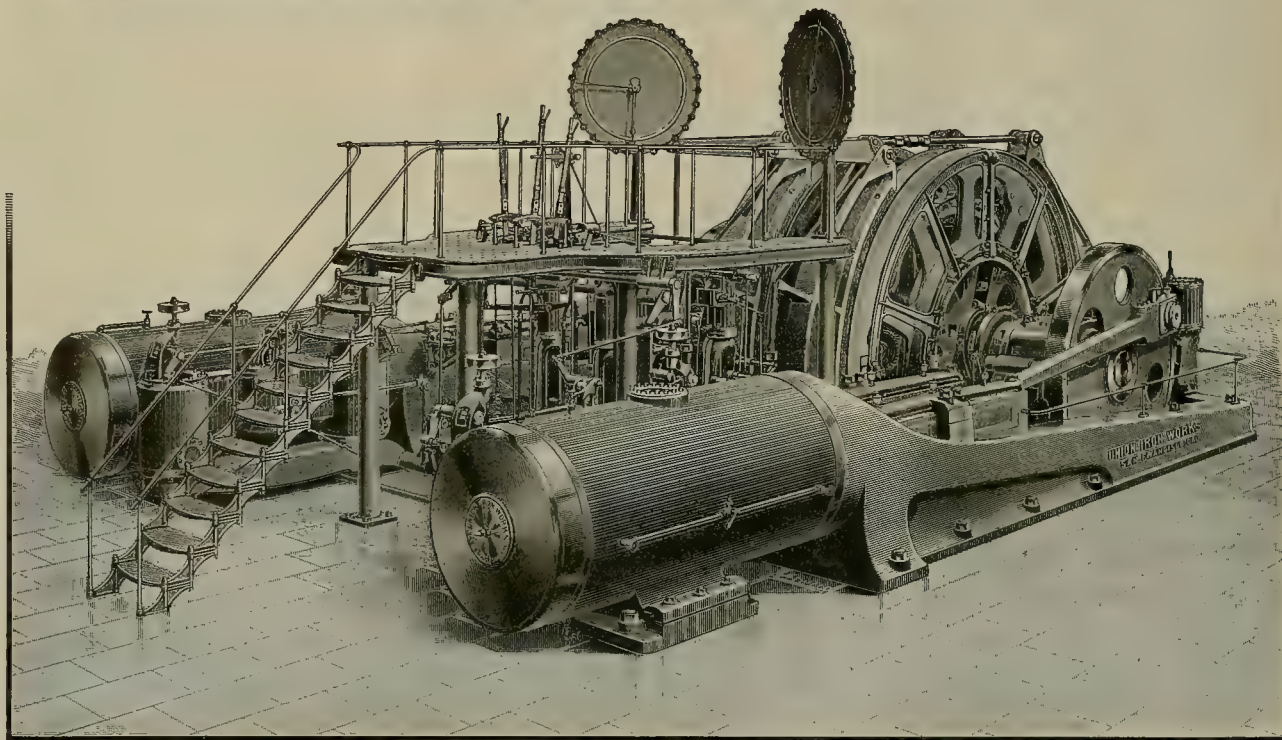
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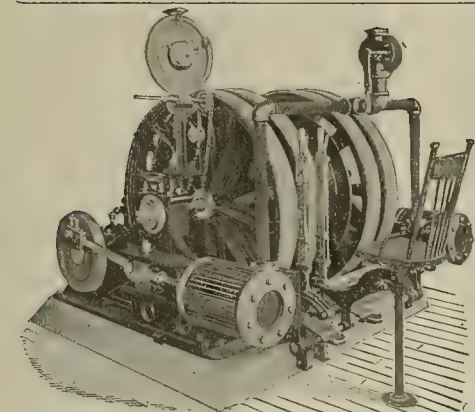
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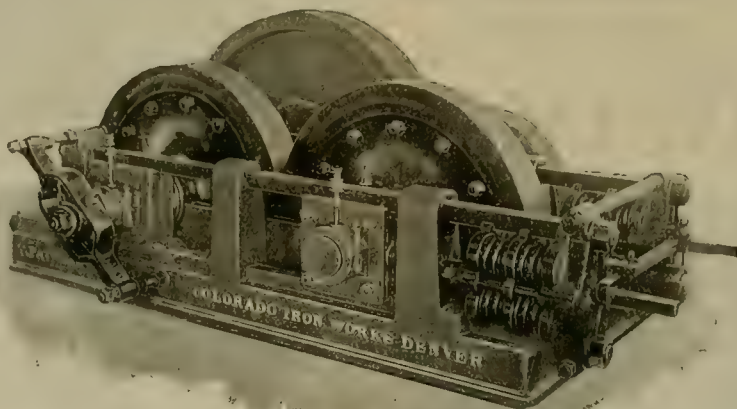
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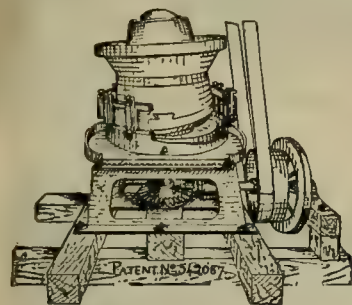
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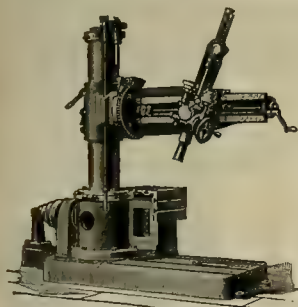
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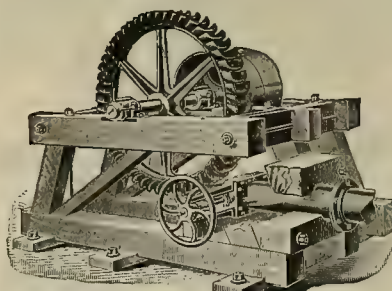
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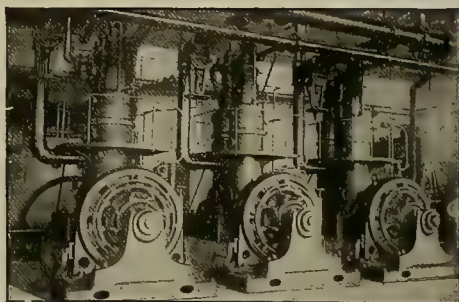
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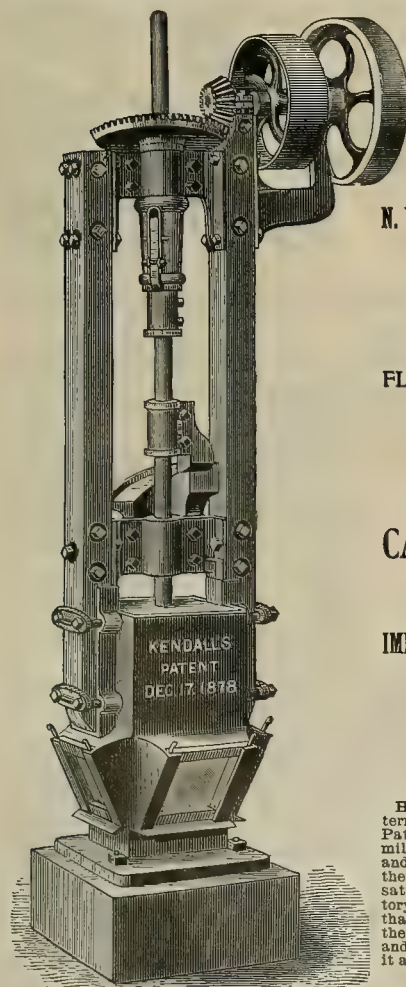
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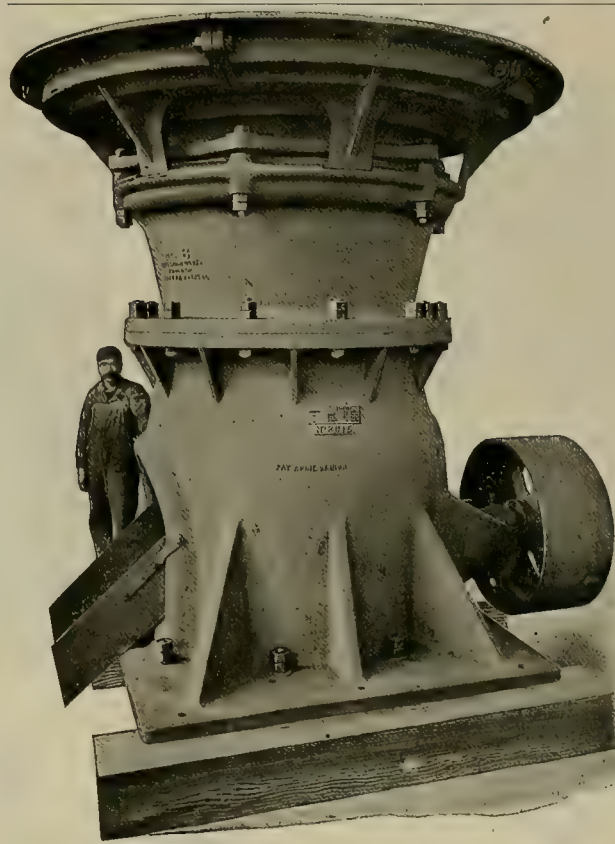
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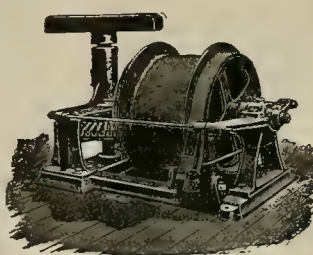
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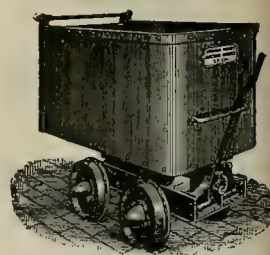
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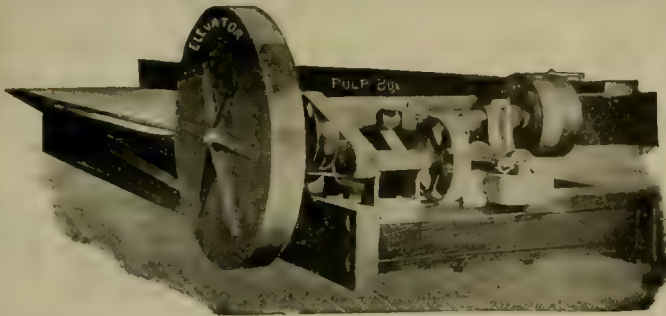
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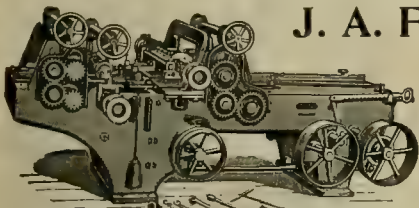
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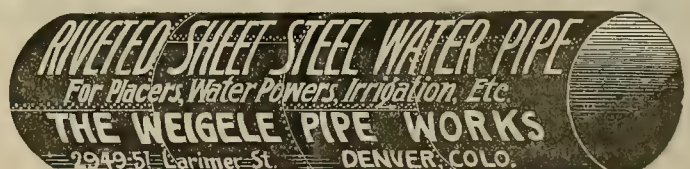
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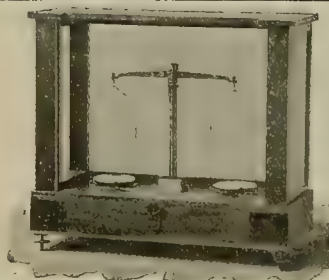
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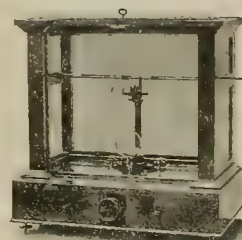
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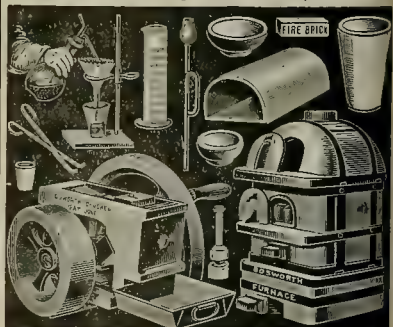
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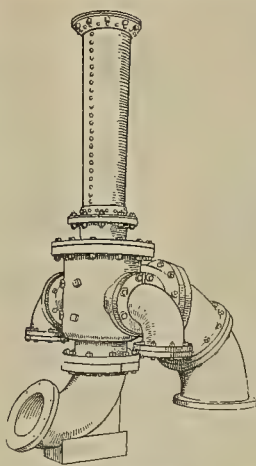
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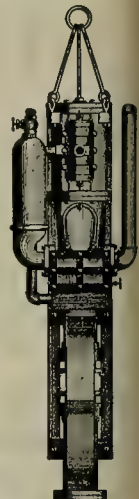
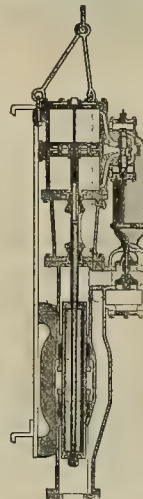
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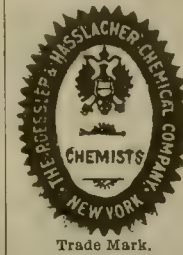
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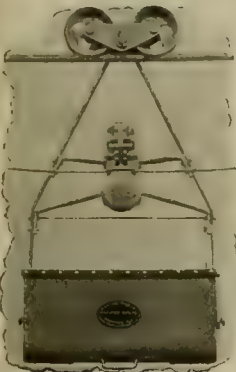
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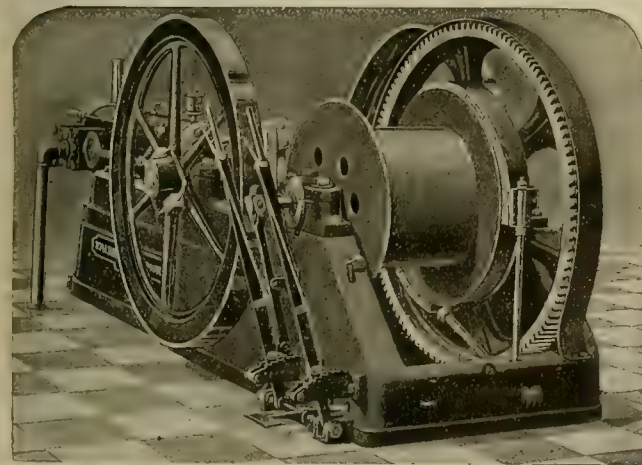
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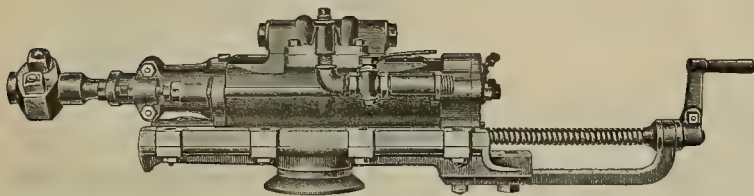
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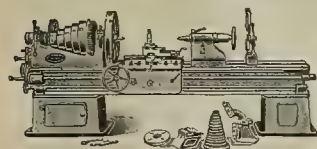
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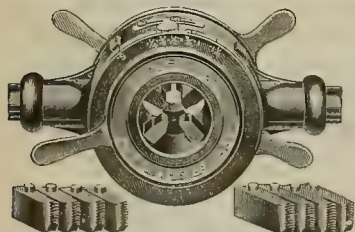
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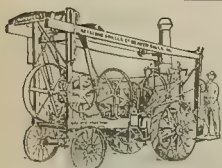
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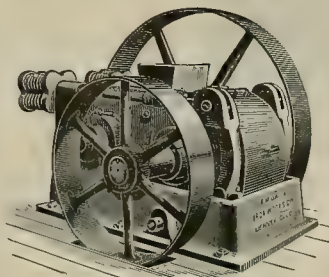
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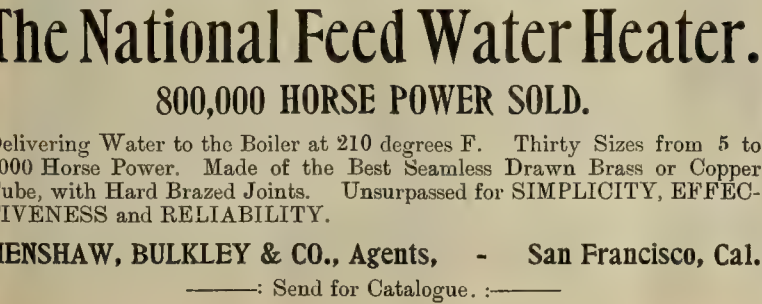


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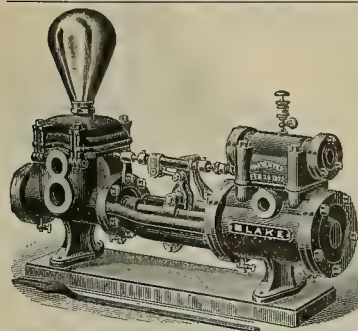
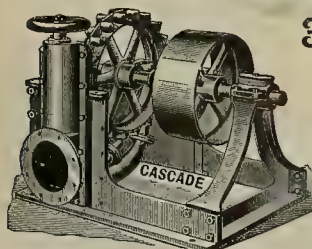
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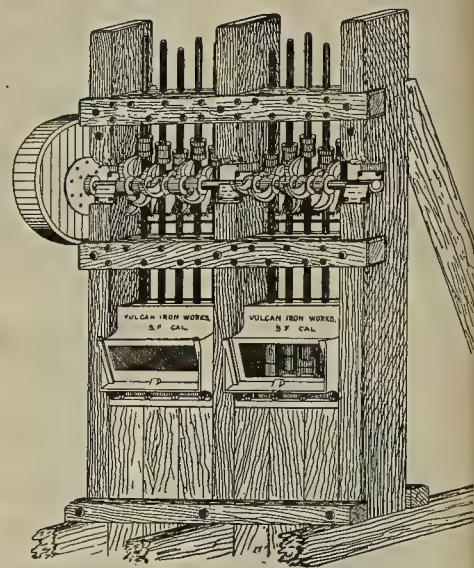
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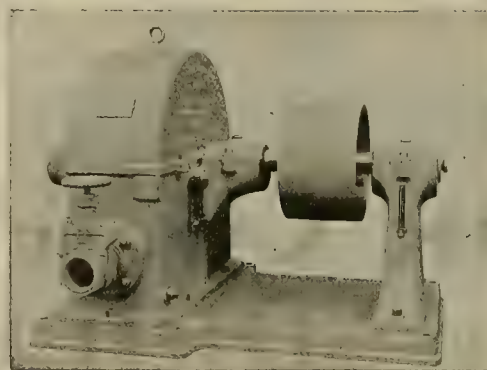
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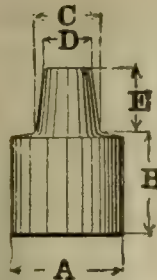
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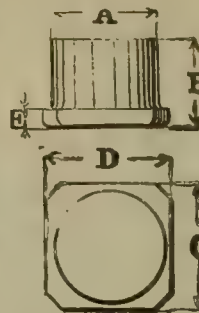
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B=..... "
C=..... "
D=..... "
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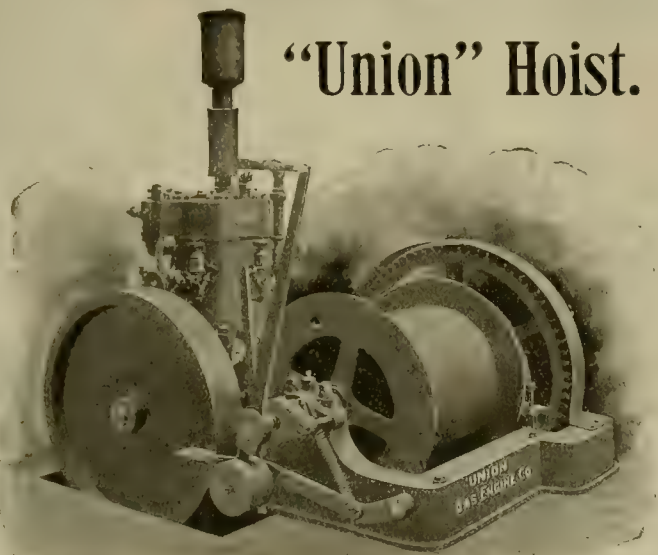
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The above cut represents our 10 h. p. Double Cylinder Engine of latest type, and Hoist combined on strong iron base. This hoist is designed to raise one ton 25 feet per minute from an inclined shaft, or 1500 pounds at the same speed vertical lift. The drum will hold over 600 feet of 3/4-inch cable. The outfit weighs 3500 pounds.

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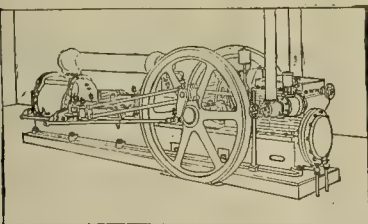
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A book for Civil Engineers, Miners, Millmen, Hydraulicians, Mining Engineers and Irrigators. By P. M. Randall. Contains useful tables for ready reference, in which the results of abstruse calculations are all placed in a form so that one can find what he wants in a moment. For the engineer the principles, formulae, coefficients, etc., are given; and for those not familiar with higher mathematics, examples, rules and tables are prepared. Is especially applicable to the Pacific Coast. Price, postpaid, \$2

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Market Reports.

The Markets.

SAN FRANCISCO, Sept. 8, 1898.

SILVER.—London, 27½d; New York, 60½¢; San Francisco, 60½¢; Mexican Dollars, 46½¢ @46½¢.

COPPER.—Electrolytic 12½¢; Casting 12c. Lake is reported \$12.25@12.37½. A Boston copper operator says: "The copper market has always been renowned for its brilliant changes and powerful pyrotechnics which would sweep everybody and everything like a cyclone before them, but probably never has a change taken place which took most operators and the Street by such surprise as did the recent one, when Lake copper was weak and depressed at 11½¢ and looked like going to 11 and even 10½¢. But, presto, change, and the market rises from 11½¢ to 12c in a twinkling, and it has since risen so that to-day it can be quoted at 12½¢.

Now what brought about this change? There was no misrepresentation of the condition of the market when it was quoted weak and tending downwards at 11½¢. But Europe saw the end of the Spanish-American war. The war had brought to the front the all important fact that every country in Europe must keep on hand a supply of war material, and copper and coal are indispensable war materials.

"The war had brought to the front the fact that copper was an indispensable material, and European governments, through their recognized agents, sent inquiries to this country for copper, amounting in the aggregate to at least 30,000,000 pounds. This copper was to be shipped, beginning Sept. 1st of this year, month by month for twelve months, and it was only one of several inquiries of similar character, indicating that Europe was prepared to contract for an unprecedented amount of copper at the then ruling prices. Copper, which was weak, at once became strong. European offers were promptly declined, and the price has since risen to its present quotation. Where is it going? When will the advance stop? These are questions for theorists to answer and speculators to dream about. I am simply outlining existing conditions, and to my mind the copper market in the present situation is in one of the strongest positions ever known."

The situation abroad: In 1898 the visible supply of copper on hand July 31 was 57,817 tons, price \$45 7s. 6d. Sept. 1, 1898, this visible supply is reduced to 25,380 tons, while the price has advanced to \$51 10s. 9d.

LEAD.—New York reports "lower and weak" \$4 bid, \$4.05 asked. Smelters quote \$3.90; local, pig, 6@6½¢; sheet, 6½@7c; pig, 5½¢; bar, 6c.

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—Unchanged, 5½@5½¢.

TIN.—Menlo Roofing, redipped, 7¢; English, to arrive, \$4.50; Pig, 13c; Bar, 19c.

ANTIMONY.—9½¢, 10.

BABBITY METAL.—10-12-14—best 16c.

QUICKSILVER.—Quiet, domestic \$42.50 @43; export and carload lots, special rates.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½¢; less than one ton, 17½¢. No. 1* 60%, carload lots, 13½¢; less than one ton, 15½¢. No. 1** 50%, carload lots, 11½¢; less than one ton, 13½¢. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½¢; less than one ton, 11½¢. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 738 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8 00; Coos Bay, \$5 00; Seattle, 6 00; Southfield, 7 50.

Cargo lots, Eastern and foreign: WallSEND, \$7 50; Cumberland, \$10 00; Brynbo, 7 50; Cannel, 9 50; Pennsylvania, hd., 14 50; Welsh Anthracite, 12 50; Scotch, 8 00; Rock Springs, 7 60.

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.12 per gal.; bbl., \$1.07; pure No. 2, cs., 85c; bbl., 50c; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.11; less than 200 gals., \$1.20; in bbls., 4c per gal. less than case; Baker's Crystal, \$1.50; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 43c; cs., 43c; raw, bbl., 41c; cs., 40c; lots of 5 bbls., 1c less; Lucol, boiled, bbl., 38c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17c; Astral, 17c; Star, 17c; Eocene, 19c; Extra Star, 21c; Elaine, 22c; Water White, bulk, in tanks, 11½¢; Mineral Seal, in bbls., 21c; wooden bbls., 23½¢; cs., 20c; Mineral Sperm, 27c; Deodorized Stove Gasoline, bulk, 12½¢; do., cs., 18c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½¢; do., in cs., 16½¢; Lard Oil, Extra Winter Strained, bbl., 56c; cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatsfoot Oil, bbl., 65c; cs., 60c; No. 1 bbl., 55c; cs., 60c; Sperm, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 29 @ 30c per lb.; carloads, 27c; sulphuric acid, 2½¢ per lb. for 60%; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½¢ per lb.; blue vitriol, 4½¢ per lb.; borax, refined, 5@6c per lb.; chlorate of potash, 9½@10c; roll sulphur, 2½¢; blue

vitriol, 4c; alum, \$1.90@2.00; flour sulphur, French, 2½@2½¢; California refined, 1½@1½¢; nitric acid, 12½@16c; caustic soda, 60%, 2½@2½¢; 70%, 2½@2½¢; 77%, 3½@3½¢; Cal. s. soda, bbls., 65c; sks., 60c @ 100 lbs; chloride of lime, spot, 2.10@2.25c; to arrive, 2.10@—c; saltpeter, refined, 9c; chlorate of potash, 9½@10c; caustic potash, 8@9c.

CORDAGE.—Net rates on not less than 10,000 lbs., subject to change without notice.

| | Sisal. | Manila. |
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| 1½-in. cir. (7-16 dia. and upward).... | 9½ | 10½ |
| 12-thread (¾ dia.) | 10½ | 11½ |
| 6 and 9 thread (¾ and 5-16 dia.).... | 10½ | 11½ |
| Bale Rope (3 and 4 strand)..... | 9½ | 10½ |
| Bale Rope (2, 6 and 8 strand)..... | 10½ | 11½ |

NAILS.—List per keg: No. 20 to 60d, wire, \$2.35; cut, \$2.25; 10 to 20d, wire, \$2.40; cut, \$2.30; 8d, wire, \$2.45; cut, \$2.35; 6 and 7d, wire, \$2.55; cut, \$2.30; 4 and 5d, wire, \$2.65; cut, \$2.40; 3d, wire, \$2.80; cut, \$2.55; 2d, wire, \$3.05; cut, \$2.95. In carload lots, 10c per keg less.

Mining Share Market.

SAN FRANCISCO, September 8, 1898.

There was a little stir in Comstocks during the week. There was just enough movement to indicate what would result if speculative influence were manifest. As to this whole business, it can be said, as it has been said before of similar situations, that superficial observers sincerely believe that in stock operations skill and judgment count for nothing, but that results are determined, if not by pure luck, at least by causes so deeply hidden from human observation that no calculation can be made in regard to their working. Hence, all the business of stock exchanges is, in their eyes, nothing but gambling, like staking money upon the turning of cards or the fall of dice. On the other hand, many people seriously entertain the conviction, not only that the result, good or bad, of stock operations, is not due to luck, but that it is produced by the exercise of a skill resembling that of sharpers who use stacked cards and loaded dice. What seems to be mere chance, is, in their opinion, the outcome of maneuvers of questionable honesty. It is needless to say to those who are familiar with the course of business on the stock exchanges that both these views are erroneous, and that the truth without lying between them is a compound of both. So far as stock operations are governed by influences which cannot be discovered or foreseen, or so far as the influences which affect them are, though visible, counteracted by others not visible, their result may be said to depend upon luck. So far again as a few sagacious men discern coming events in advance of the crowd, or as a few unscrupulous wire pullers are apt to impose upon the public a belief in the false views, they may be said to profit by their skill. Inasmuch, however, as the laws of nature are immutable, the skillful man who acts upon principle has always an advantage, to which he is honestly entitled, over him who acts upon the impulse of the moment, without reflection.

"The price of a security is the concurrent estimate of its value arrived at between the buyer and the seller, after considering, more or less carefully, the facts which go to constitute it. The trouble with most operators in stocks is that they take no pains, in the first place, to ascertain the facts bearing upon the values of securities they buy and sell; and next, they rely not upon their own judgment in buying and selling, but upon what they conceive to be the judgment of other operators. A disadvantage under which amateurs in the stock market almost always labor is the want of sufficient capital. Their usual mode of operation is to buy for a rise, that being the way of doing business with which they are familiar, whereas selling for a fall is foreign to their habits, and but few of them like to undertake it. When they buy, too, they are not content to limit their purchases to the amount of money they possess of their own, but they buy ten times as much, putting up their own money as a margin. The result is that if the market goes against them, even for one day more than to the extent of their margin, they are compelled to sell out and lose the whole of their investment, whereas if they took only what they paid for in full they could hold it through the crisis

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage.

Money loaned mines.

Mining companies organized, their property experted, financed and managed.

Mines, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

Examine mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

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Finds buyers or working capital for meritorious mines or good prospects. Correspondence invited. W. E. Holbrook, Pres't., L. F. Haskell, Sec'y.
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Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO.,

416 Montgomery Street, San Francisco.

FRESNO, June 25, 1898.

Hercules Gas Engine Works,
San Francisco, Cal.

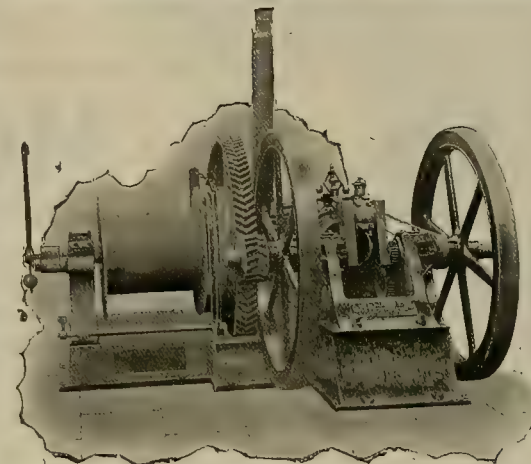
DEAR SIR:—

The fifteen-horse power gasoline engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LOPE
M. & D. CO.,

Per N. W. Moodey, Pres.



We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

and until a more favorable opportunity for withdrawing. Amateurs, however, have this advantage over the professionals, that they need not come into the market unless they choose, and when they stay out, as most of them seem to be staying out now, the professionals are reduced to dealing with one another, and, being evidently matched in point of skill, their profits are small. Over both the amateur and professional operator in stocks hover the uncertainty of all human affairs and the possibility of the happening at any time of the unexpected. It is, therefore, not luck alone nor skill alone which determines the results of stock speculations, but a compound of both. On the whole, a man with skill is more likely to win than one who is destitute of it, because he can turn even bad luck to his advantage and snatch victory from the jaws of defeat; whereas the man dependent on luck alone has no choice but to submit to the course of events, even destruction."

San Francisco Stock Board Sales.

SAN FRANCISCO, Sept. 7, 1898.

9:30 A. M. SESSION.

| | |
|----------------------------|---------------------------|
| 500 Best & Belcher.....18c | 500 Crown Point.....15c |
| 200 Caledonia.....21c | 500 Mexican.....16c |
| 300 Chollar.....16c | 200 Occidental.....66c |
| 200.....15c | 200 Ophir.....20c |
| 400 Con. Cal. & Va.....43c | 500 Potosi.....18c |
| 100 Confidence.....40c | 100 Savage.....13c |
| 400 Sierra Nevada.....62c | |
| 500 Gould & Curry.....16c | 300 Yellow Jacket.....17c |
| 100.....17c | 300.....18c |

2:30 P. M. SESSION.

| | |
|----------------------------|---------------------------|
| 200 Belcher.....15c | 500 Mexican.....16c |
| 300 Best & Belcher.....19c | 200 Occidental.....66c |
| 300.....20c | 500 Ophir.....21c |
| 500 Bullion.....03c | 400 Potosi.....18c |
| 500 Chollar.....16c | 100.....19c |
| 400 C. Cal. & Va.....44c | 300 Sierra Nevada.....62c |
| 500 Crown Point.....15c | 100.....64c |
| 100.....16c | 300 Utah.....07c |
| 200 Gould & Curry.....16c | 100 Yellow Jacket.....19c |
| 900.....20c | 300.....20c |

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Notice of Stockholders' Meeting.

A meeting of the Stockholders of the Portillo Diaz Gold and Silver Mining and Milling Company will be held at the office of the Corporation at the Undertaking Parlor of Craig, Cochran & Co., at 54 Mint Avenue, San Francisco, California, on TUESDAY, the 27th day of September, 1898, at 1 o'clock p. m., for the purpose of electing Directors of said Corporation to serve until the 23rd day of August, 1899, and until their successors are elected.

This notice is given by the order of Stockholders holding more than one-half of the votes and more than one-half of the Capital Stock of said Corporation, to-wit: L. W. Hilliker, Thos. Ryder, E. Fitz, Peter Salting and Jos. I. Davis, and pursuant to call in writing made by them and now on file with the undersigned. W. A. STEPHENS, Secretary.

Dated August 29, 1898.

DELINQUENT SALE NOTICE.

BOULDER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, El Dorado County, California.

Notice.—There are delinquent upon the following described stock on account of assessment (No. 1) levied on the 27th day of July, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|-------|-----------|-------------|------|
|-------|-----------|-------------|------|

Mrs. Marie Malson.....18 1000 \$50 00

And in accordance with law, and an order from the Board of Directors, made on the 27th day of July, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Secretary, room 163, Crocker building, San Francisco, California, on MONDAY, the 26th day of September, 1898, at the hour of 2 o'clock p. m. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office—Room 163, Crocker building, San Francisco, California.

DELINQUENT SALE NOTICE.

WEST SANTA ROSALIA GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, State of Sonora, Mexico.

Notice.—There are delinquent upon the following described stock on account of assessment (No. 1) levied on the 3rd day of August, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|-------|-----------|-------------|------|
|-------|-----------|-------------|------|

And in accordance with law, and an order from the Board of Directors, made on the 3rd day of August, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, No. 310 Pine street, Rooms 15 and 17, San Francisco, California, on MONDAY, the 26th day of September, 1898, at the hour of 1 o'clock p. m. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office—No. 310 Pine street, Rooms 15 and 17, San Francisco, California.

Assessment Notices.

CONSOLIDATED ST. GOTHARD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of August, 1898, an assessment of \$5.00 of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, at the office of the company, 113 Crocker building, sixth floor, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 26th day of September, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on WEDNESDAY, the 12th day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors. J. F. HOLLING, Secretary. Office—113 Crocker building, sixth floor, San Francisco, California.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 22nd day of August, 1898, an assessment (No. 4) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 916 Market street, Room 57, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 3rd day of October, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 31st day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors. GEO. W. FLEISSNER, Secretary. Office—No. 916 Market street, Room 57, San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 8th day of August, 1898, an assessment (No. 20) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 100 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 12th day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 3rd day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors. CALVERT MEADE, Secretary. Office—106 Leidesdorff street, San Francisco, California.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 16th day of May, 1898, an assessment (No. 1) of 1 1/2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 7, fifth floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors. R. L. CHENEY, Secretary. Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 8th, 1898.

Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to August 6th, 1898, and the day of sale to MONDAY, September 5th, 1898.

Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to September 3rd, 1898, and the day of sale to MONDAY, October 3rd, 1898.

Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to November 1st, 1898, and the day of sale to TUESDAY, November 1st, 1898.

Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

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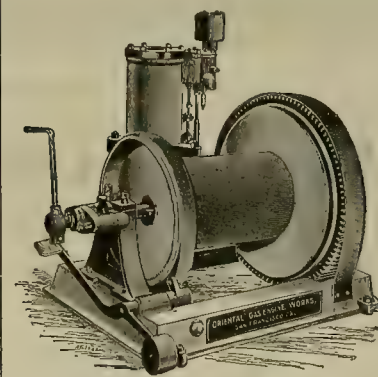
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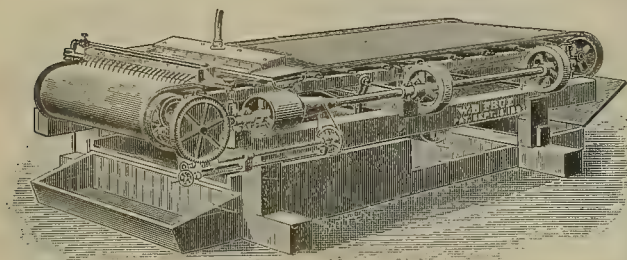
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The results obtained by this machine are the "acme" of concentration, and several cheap and untried machines that have lately come on the market compare by it. The manufacturers will tell you that they are "just as good, and cheaper," etc. The facts are that no other concentrator made has an equal capacity, or will yield as clean a concentrate with as small loss in the tailings as the Frue Vanner. The amount saved from the lower first cost of an inferior machine counts little in the year's results, when compared with the increased output from a Frue. This machine not only gives better results at both ends of the belt (i. e., clean product and poor tailings), but is operated at less expense and requires less attention than any other machine on the market. At the Alaska-Treadwell mine, where they have ordered over 350 Frue Vanners, one man attends 48 machines for 12-hour shift.

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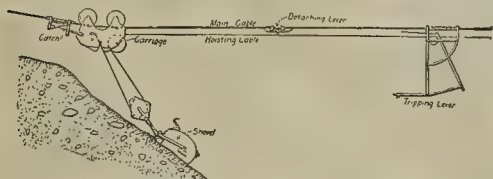


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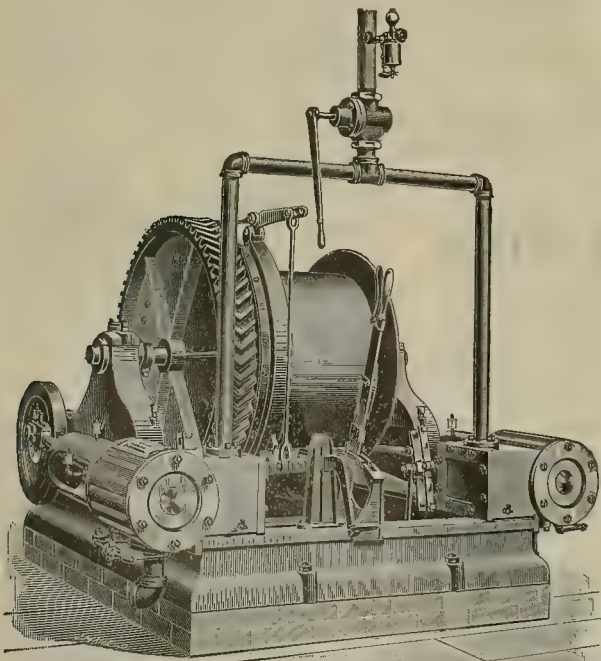
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No. 1993.—VOLUME LXXVII.
Number 12.

SAN FRANCISCO, SATURDAY, SEPTEMBER 17, 1898.

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Some Further Arguments.

The editor of this paper has at times been urged to advance some further arguments regarding the propriety and necessity for the creation of a national department of mines and mining, in addition to those that have already appeared herein. While it is believed that the reasons already advanced are sufficient, yet it may be in order to make additional appeal to the general sense of justice which underlies all public movements in our country.

In the United States the highest tribunal is public opinion. We had a good illustration of that in the late war. Were the merits of this matter thoroughly appreciated by the mining world, the creation of a Cabinet department—a Secretary of Mines and Mining—would be hastened. So long as the question is advocated on local lines, and in a local way; so long as the miner in West Virginia, or Montana or Michigan is permitted to continue of the opinion that the idea is merely an effort of some ambitious California or Colorado or Utah man to achieve notoriety or create a place with a probable chance of filling it, so long the question will be overcome by the tremendous inertia of indifference. When the Michigan copper miner, the Ohio coal miner, the Alabama iron miner, the California gold miner and others can mutually realize that the matter is of common importance and to each an individual necessity, the leaven will work—and not till then. In such things, requiring realization of the identity of interests, our nation is so vast that the movement is necessarily slow. We of the mineral region, the west half of the continent, are partially awake to the needs of the nation's great basic industry. We need the aid of our Eastern co-workers. When they can be shown that this is not a matter of free coinage, nor politics, nor personal hope, nor sectional ambition, the work will be greatly advanced.

Probably the best additional argument that the writer can cite is the fact that our national government has recognized other functions and requirements no more sectional in their scope or character than the great mining industry, as justifying national supervision and administration. Railroads, commerce, agriculture, river and harbor improvement, forestry, the weather, life-saving, mail service, lighthouses, revenue, coinage, receive national recognition and are under governmental control. The great industry that underlies all others has not even a representative clerk in a division in a sub-bureau in a department at the national capital. The late war is an exemplification of the principle underlying our form of government: that the national government should do nothing that any other lesser control can do as well, but when any supervision or direction becomes necessary, that the United States Government can do better than any local agency, it is the province and duty of the Federal Government to take charge thereof. In the late war no State or Territory could cope with Spain; it required supreme Federal authority, the exercise of the national power vested in the Government at Washington, D. C. This principle is so fully established and conceded as to merely require allusion. If in war, or in the pursuits of peace as cited above, why not to other matters of similar national scope? It is only the national Government that can assume charge of so national an industry as mining. No State legislature can properly administer the necessary control, regulation and manifest needs of so great an industry. Interests common to so many different States de-

mand that the common government assume control. In many instances, notably those cited, the national Government recognizes its duty and fulfills it. No less is it the duty of the Federal Government to fill the just measure of demand by the mining industry. "Duty" means what ought to be done; what should be done; that which is plainly and manifestly required of some controlling, directing or governing power interested in the common welfare. This duty the U. S. Government has constantly shirked, disregarded or but partially filled in anything connected with its greatest industry—that of mining. Parsimony and pettiness has characterized the Federal record throughout. This is not a complaint; it is the simple statement of a fact. Take the history of the U. S. Geological Survey, where zealous work, intelligent direction and hearty effort have been hampered and stultified by lack of necessary appropriation. Pettifogging Congressmen peddling seeds gratis (at Government expense) to bucolic constituents, to aid in securing retention of place, are sometimes unable to see the plain path of national duty and governmental requirements.

Much is given and little required from the Government. Nothing but aroused public opinion among the mining men of the United States can bring recognition of the importance of the mining industry by the Federal Government. It is to the creation of favorable public opinion that the advocates of this new departure must address themselves. The present stupid and discreditable ignoring of this matter by the Federal Government does not tend to enhance national self-respect, and is opposed to the first primary rules of business.

A Hand Rock Drill.

To many a miner mention of a hand rock drill usually occasions a smile, and a disparaging remark regarding such a thing. Still, even those who decry hand drills must admit that there is often practical need of that device. The Jones hand rock drill is claimed by its makers to be just what is required: "strong, reliable, simple, light, easily handled by one man, and cheap." The drill, unmounted, weighs about 75 lbs., the column about 45 lbs. It is claimed to be easy of operation in any place or position in which the ordinary drill and hammer can be used. The drill is rotary, the bit revolving one full circle every twenty-two strokes. The manufacturers believe it possesses "the only perfect self-feed ever

invented." There are a good many special features about it that commend it to the attention of practical miners. The illustration shows the drill mounted for lifter hole. The drill is manufactured and sold by the E. P. Allis Co. A treatise giving completed detailed illustrated description of the drill will be sent to any address upon receipt of request by the Pacific coast agency, 9 Fremont St., San Francisco.

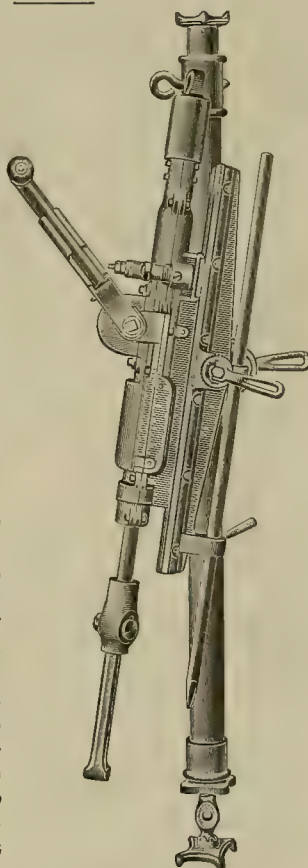
The Sonora Folio.

The Sonora, Cal., Folio adds another to the increasing number of valuable maps which the United States Geological Survey is issuing for the gold belt. The area of this folio is about equally divided between Mariposa and Tuolumne counties, the "mother lode" extending diagonally across it nearly through the center.

Embracing, as it does, so much of the main gold belt of the two counties, it ought to be of great value to those interested in mining. The only criticism to be passed upon it from the miner's standpoint, and one to which the other folios are subject, is that of the scale. It would seem that if the sheets covering the main gold belt were twice the scale their usefulness would be greatly increased. The original topographic sheets are on a larger scale, that of one mile to the inch, and if the geologic maps had been made the same all the mines as well as geologic features could have been placed upon them. It seems that miners generally do not seem to know of the existence of these folios, or how to obtain them. They are sold at such a reasonable price—generally at 25 cents each—that they are within the reach of all, although, as it is, those practically interested often get the least benefit from them. It would have been well, also, if in some of this work the State could have co-operated, as other States have, with the United States Geological Survey, and thus made the maps easier to obtain and more widely known. If collections of rocks illustrating the different formations bordering the mother lode were accessible to miners, it would aid very greatly in appreciating and understanding the maps, which have been gotten up at so much cost.

The maps are valuable not only to the miner, but to the engineer and the scientist. The language of the large amount of information which is there condensed into a few pages is necessarily somewhat technical and not always easily understood by every one. An added duty devolves upon the State, either through the University or the Mining Bureau, to make systematic effort for the dissemination of the elementary principles of mineralogy and geology through the mining communities. The characters of the common minerals, the more simple classification of rocks and of the different geological formations of the State could be appreciated and understood by the miner, and it is not his fault that the publications, which might be of great value, are sometimes beyond his reach. It is not necessary to call everything "granite," "porphyry," or "slate," for the miner to appreciate the classification. His observational powers are good and it is only necessary for him to have the classification indicated to have it understood in a more rational manner.

One of the most important means of dissemination of more scientific knowledge of the earth and its minerals is through the great schools, and those at their head are oftentimes remiss in not insisting that educational work should in the mining communities be more specifically adapted to the needs of the people.



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MINING AND SCIENTIFIC PRESS.

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J. F. HALLORAN.....Publisher

San Francisco, September 17, 1898.

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A Trade School.

Some time ago a resident of San Francisco left by will a large sum of money for the establishment and maintenance of a trade school for boys in San Francisco to be under the direction and control of the Board of Regents of the University of California. By request of the Board, Mr. A. S. Hallidie, one of the Board, visited several Eastern institutions of a similar character to the proposed school during the months of June and July, '98, and made considerable practical research and inquiry, consulting men conversant with conducting such a school as Mr. Wilmerding desired to establish, "to teach boys trades fitting them to make a living with their hands, with little study and plenty of work." As a result of his visit, Mr. Hallidie says:

"In my judgment the existing examples to be studied are the New York Trade School, the Baron de Hirsch School and the Master Builders' Mechanical Trade School as one type and the Williamson Free School of Mechanical Trades as the other. And whoever is selected to take charge of the Wilmerding School should be given two or three months to carefully examine into and study the workings and results of these schools, to note the details of construction of the buildings and their equipment. He should then make a careful study of the conditions on the Pacific coast generally, and of California and San Francisco particularly, and prepare his scheme of instruction, the plan of building and their equipment. If the Wilmerding School is planned somewhat after the Auchmuty system, no expensive machinery will be required; if after the Williamson plan, a large investment in machines and apparatus will be necessary. The man to take charge of the Wilmerding School should be an educated mechanic, with ability to teach. He should have had experience in some such institution as the proposed Wilmerding School and have administrative ability. I do not think we would care to carry out the Williamson plan, and the Auchmuty system probably should be modified to suit the conditions which exist here and the character of the trades to be taught. It must be borne in mind that no school has yet succeeded in turning out a mechanic ready to take up the work of a shop. This is acquired, however, in a short time after leaving the school. It has, however, been proved to the satisfaction of those interested that a young man, by steady and assiduous work; by careful, concentrated and intelligent attention to instruction given in an earnest, clear and simple manner, by teachers who know more than they teach, and who are able to impart instruction from experience based on broad lines, can be taught the intricacies of manipulation in many trades in five and one-half months. There are trades, however, that will take three such terms, and the length of time should be graduated to the character of the work to be taught. While in the school the pupils are more than anxious to learn, and consequently things are kept somewhat under high pressure by general consent. The age of the youths, sixteen and up, and the good bodily health necessary for the physical labor required in such a school enable them to endure eight hours work for these short terms without mental and physical fatigue. The fatigue, in fact, is with the teachers.

"I have conferred very freely with men in and out of these schools in relation to the question, Shall articles be made in the school to be sold? The verdict is generally in the negative. The Worcester Polytechnic Institute supports the commercial view

and makes it part of the shop system. Quite a staff—thirty, I believe—of skilled workmen are employed throughout the year. Contracts are taken and executed, and the young men get their training in the shop, working at stated hours with and under the direction of these skilled mechanics. It is doubtful if the best results are attained in this way, for if the young men without experience have a chance at the work, the work must suffer and the commercial value of the same is reduced. If the commercial aspect has to be considered at all, it must be subordinate to the educational. Whichever plan is carried on, the other will suffer. With the commercial the temptation is to keep a youth at work on that which he does best and quickest, and thus limit the field of his experience; per contra, if a thing is made and put on the market, its commercial value is fixed, and perhaps the ambition of the youth is aroused.

"Shall Wilmerding School be free? The opinion of the three schools I have referred to considerable at length is against free instruction, and this is the opinion of gentlemen in California and of nearly all those connected with the management of manual training schools with whom I have conferred.

"In trade schools there is a great deal of material destroyed and wasted, and the New York Trade School charges are to cover the cost of the same, and no more. A great deal depends on the management of the school, but as much also on the convenience and healthfulness of location, adaptability of buildings and cheerfulness of surroundings. The proper sanitary condition of the neighborhood must be assured. Of this there must be no doubt. The immediate surroundings of the different workshops should be in accord with the trade being taught. Everything should be done to impress the student with that one idea—concentration of mind is essential to success."

Before leaving San Francisco on his Eastern trip, Mr. H. submitted to several prominent men identified with industrial pursuits in California some questions, which, with their replies, are here given:

Queries as to the School: 1.—What trades should be taught? Please name in order of your preference. H. J. Small, Superintendent Motive Power, Southern Pacific Railroad Company, Sacramento City: "Machinist, pattern maker, boiler maker, coppersmith, cabinet maker, molder, steam fitter." John F. Merrill of Holbrook, Merrill & Stetson, San Francisco: "All prominent and useful trades." James Spiers of Fulton Engineering and Shipbuilding Works: "General mechanics, including pattern making, machine shop, foundry, blacksmith shop and foundry, if possible, electrical machinery, carpenter trade, cabinet work, farming work." Asa R. Wells of Wells, Russell & Company, Planing Mills, etc.: "Iron work, electricians, architects, naval construction and engineering." Geo. W. Dickie of Union Iron Works: "Trades being commercially applied within a reasonable distance of the school. Working in iron and wood, cabinet making, all kinds of brass work, molding and casting, work in leather." Irving M. Scott: "All trades possible, especially wood and iron."

2.—Should other than practical instruction be given? H. J. Small: "Yes." John F. Merrill: "No." John Spiers: "Yes." Asa R. Wells: "Yes." Geo. W. Dickie: "Practical instruction should be illustrative. Scientific instruction needed also." Irving M. Scott: "All instruction possible will add to efficiency."

3.—If "Yes," please state the character and limit of such instruction. H. J. Small: "Pupils should be fully instructed in the theory of the trade he selects; also in the mathematics necessary for such trade." James Spiers: "Scientific branches of education relating to the trade or industry should be given." Asa R. Wells: "Technical studies and general information in the practical things of life." Geo. W. Dickie: "Instruction in the different kinds of scientific knowledge that have a direct and practical bearing on industrial production." Irving M. Scott: "Theory and principles, customs and state of the art."

4 and 5.—To what extent should the pupils be taught the use of hand tools; of machines? Replies from all: "Say to fullest extent; of machines, limited by funds available."

6.—Should instruction be free? H. J. Small: "Think it would be more appreciated if a charge was made." John F. Merrill: "No; if the pupil is able to pay even a small fee." James Spiers: "By charging a small fee, I think better attention is secured; but provision should be made for those unable to pay." Asa R. Wells: "No, not entirely so, except in special cases." Geo. W. Dickie: "Depends on class of pupils to be reached. If children of poor parents, instruction should be free. I am afraid that the class of pupils most desirable to reach can not be reached even by free instruction. Such a school could only reach those that most need its help by paying the pupils to attend." Irving M. Scott: "By no means. Teach the value of labor and earnings."

7.—Should the product of the pupils' work be put on the market? H. J. Small: "Think possibly it would be an advantage to place product on market, and solicit custom work. It would have the effect

to necessitate closer work and familiarize pupils with the commercial features of the trades." John F. Merrill: "Think it would have to be. Trades unions might object." James Spiers: "Yes." Asa R. Wells: "Yes; in the spirit of emulation." Geo. W. Dickie: "I should say certainly, if it can compete. The market itself would settle that question." Irving M. Scott: "Work should consist of making articles now imported."

8.—When practicable should custom work be sought? H. J. Small: (See answer to No. 7.) John F. Merrill: "I think not. That would make a direct competition with all factories and shops, and defeat the object for which the school is to be established." James Spiers: "Yes. When an article forming a good subject for education is in the market. * * * The proceeds from sales extends the school's usefulness." Asa R. Wells: "No; for the reason that trades unions would protest." Geo. W. Dickie: "Yes, if practicable; which I doubt." Irving M. Scott: "All work should be made with a view of being used to replace articles imported. With no interest, wear and tear, salaries or wages to pay, the school should be able to shut out the foreign article and build up a home product, by which some of your students will finally establish themselves in good paying enterprises, greatly to the benefit of the State. Kindergarten and show articles fill the community with sham artificers, and do not teach the mercantile value of the cost of products."

Queries as to the Principal: 1.—Should the principal be a practical mechanic? Replies from all, "Yes," except Geo. W. Dickie, who says: "In selecting a principal an effort should be made to get a man of wide experience in that kind of education, by securing the services of some one who has made a reputation in a similar institution. Where he comes from, where he has been taught, what his age is, should not form factors; but simply what the man is, and what he has done in the line of work he is sought for."

2.—In what branch? H. J. Small: "Machinist preferred." John F. Merrill: "Master mechanic, and possess general knowledge of different trades." James Spiers: "Mechanics, or general engineering." Asa R. Wells: "At the bench, or head of skilled labor." Geo. W. Dickie: (See answer to No. 1.) Irving M. Scott: "Many as possible."

3.—Should he have had experience in teaching? H. J. Small: "It would be an advantage." John F. Merrill: "Should be a practical man; well qualified to teach and explain intelligently." James Spiers: "If possible; but not necessary." Asa R. Wells: "Yes; for teaching is an art as well as a qualification." Geo. W. Dickie: (See answer to No. 1.) Irving M. Scott: "Yes."

4.—Should he write and speak English correctly? Replies from all: "Yes."

5.—Should he understand the higher branches of mathematics? Replies from all: "Yes." "With some qualifications" (J. F. Merrill).

6.—Should he understand the theory of applied mechanics? Replies from all: "Yes."

7.—Should he be a good draughtsman? H. J. Small, John F. Merrill, Geo. W. Dickie and Irving M. Scott reply: "Yes." James Spiers and Asa R. Wells: "Not necessary; but should understand drawing."

8.—Should he be a good executive officer and administrator of affairs? Replies from all: "Yes."

9.—Should he have a practical knowledge of book-keeping? H. J. Small, Asa R. Wells and Irving M. Scott: "Not necessary." John F. Merrill and James Spiers: "Yes."

10.—Are there any reasons why the principal should have resided in San Francisco or California for any length of time? Replies from all, "No," except Irving M. Scott, who says: "Only that he may be familiar with Western methods. High interest and wages, no iron, coal, or hardwood, are the problems in profits that must be worked out here on an entirely different basis than those used east of the Rocky mountains."

11.—What should be his age? John F. Merrill: "From thirty to forty years." James Spiers: "From thirty-five to forty-five years." Asa R. Wells: "Not over sixty-five years." Irving M. Scott: "Immaterial, so long as he is full of vigor, mentally and physically."

Queries as to the Pupil: 1.—What class of boys should have the preference in admission? H. J. Small: "There should be no restriction." John F. Merrill: "Boys of limited means, who are compelled to earn their living by manual labor and are anxious to learn a trade." James Spiers: "Those who by their condition will be dependent on the use of their hands for a living." Asa R. Wells: "Boys of good common school education, whose parents, if they have any, are citizens of the United States and live in California." Geo. W. Dickie: "The class of boys should be from the families of working people, as those most likely to derive benefit from such a course of instruction." Irving M. Scott: "Those with an aptitude for mechanical training."

2.—At what age should they be admitted? H. J. Small: "Fifteen to seventeen years." John F. Merrill: "Fifteen to seventeen years." James Spiers: "Sixteen to eighteen years, with exceptions." Asa R. Wells: "Fifteen to seventeen years." Geo. W.

Dickie: "Twelve to fifteen years. After three or four years in such a school, the boys would still have to serve an apprenticeship to any trade they might choose, and for that reason they should leave the schools at from seventeen to eighteen years old." Irving M. Scott: "Fourteen years; although much depends upon the boy's intelligence."

3.—On what qualifications? (a), as to character; (b), education; (c), physique. H. J. Small: "(a), good; (b), grammar school graduate." John F. Merrill: "(a), good moral character; (b), grammar school education; (c), good, robust physique." James Spiers: "(a), good; (b), fair primary education; (c), good, healthy body." Asa R. Wells: "(a), good moral character and aptitude for mechanics; should be excluded if addicted to intoxicants or cigarette smoking; (b), rudimentary; (c), unless crippled or deformed, his physique should not exclude him." Geo. W. Dickie: "(a), read English language fluently, write clearly, and perform quickly the ordinary computations required in the trade he proposes to learn; the school should be responsible for his character, as he is too young to have formed any distinct character; (b), included in a; (c), rules should be broad enough to embrace any physical condition. Irving M. Scott: "(a), honest and industrious; (b), immaterial; aptness for trade selected more important; (c), free from hereditary or acquired disease."

4.—Should rudimentary instruction be given as a grounding before giving instruction in any special trade? H. J. Small, John F. Merrill, James Spiers and Geo. W. Dickie reply "Yes." Asa R. Wells: "Would be well to a limited extent; but most boys, fifteen to seventeen years, know the bent of their capabilities." Irving M. Scott: "No; but should accompany instruction in trade."

5.—Should the principal or the pupil select the trade? H. J. Small: "Inclination of pupil should be considered." John F. Merrill: "The pupil, with advice of parents and principal." James Spiers: "The pupil; but the principal may advise." Asa R. Wells: "The principal's judgment should have great weight; but the pupil should be reconciled, if consistent." Geo. W. Dickie: "If principal and pupil do not agree, pupil would not derive much benefit from remaining in school." Irving M. Scott: "Pupil."

James Spiers' Notes.—A.—The words "little study and plenty of work" were evidently used by Mr. Wilmerding to express his desire that some "study" of a scientific character should be given; but that chief prominence should be given to the education of the hands to "work," so as to enable the scholar to earn a living for himself and family by the intelligent use of his physical powers, and to do this intelligently a certain amount of study (scientific) is necessary, and which Mr. Wilmerding desires the scholar should have. B.—There are many industries requiring the work of the hand that seems to me cannot come within the reach of a trade school; also, that a trade school, with limited means, must confine itself to but few trades, in order to be efficient, so that the choice of trades or industry to be taught will be mostly a matter of expediency.

Irving M. Scott's Remarks.—Referring to some of these queries, for instance those in regard to Principal, from Nos. 1 to 8 inclusive: it would be difficult to find all these qualities in the possession of one individual, although it would be of great advantage to do so.

In case of inability to find such a principal, I should lay more stress upon No. 8 than any of the others, as a good executive officer and administrator of affairs will reinforce all the weak points, supply all necessary requirements, and make a complete and successful solution of the whole question, while he will fail in everything if he has not high executive qualities.

In reference to the query as to the age of the pupil: there should be no rigid rule as to age, which should be governed by the applicant, as some boys are better suited at twelve years than others are at fifteen, while others are not suited at all, and there are cases where boys should be admitted even as old as nineteen. But I am of the opinion, judging from the observation of a large number of boys for a great many years, that the character of the boy is formed between the age of thirteen and seventeen years; therefore, I am firmly convinced that the boy who is taught habits of industry during those years becomes a useful member of the community, and, if he is not rigidly held to some occupation or calling, he is apt to become careless and one of the hoodlum class; consequently, I think it is of the utmost importance to teach boys habits of industry and learning from thirteen to seventeen years.

As to the education of a boy learning a trade: education is not absolutely necessary to make what is called a good workman; but it is absolutely indispensable in making what is called a leading or master workman, or a workman with executive ability. However, a good honest boy with intelligence will learn as rapidly while learning his trade as at any other time, and will pick out the more solid and substantial facts that bear on the trade he is following, and therefore a lack of education, if the boy has natural ability, should not prevent him from being admitted.

As to your queries in regard to the school, Nos. 7

and 8: there is a very large amount of what is known as heavy hardware, which is made in the different prison factories, and under conditions which do not exist on this coast, yet the conditions under which these articles are manufactured make the price; for instance, such articles as blacksmith's tongs, sledges, sash-weights, barndoor hinges, lawn mowers, all of which could be easily manufactured in a technical school. They should be sold, not retailed, to wholesale dealers, and an effort made to quietly supply their trade and diminish their importations. This will injure no one on this coast, and will get people in the habit of buying home products, which in the end will be of great benefit to the entire coast.

In response to a request for further views on the matter, Mr. Hallidie sends the following:

TO THE EDITOR:—There are few boys who do not take an interest in mechanical pursuits, and nothing is so pleasing to them as the knowledge that they can make something useful. And there is a period in boyhood when the habit of industry can be fixed; this period does not come at a stated age, but if the parents will watch they will perceive its development, and then is the time to encourage and to give opportunity for its growth.

Our best boys are those who are industrious; our worst those who are indolent, but indolence in a healthy boy is unnatural, hence the result of indolence is vice, then crime; for this the parents are responsible primarily, the State in the second instance.

I am not saying anything new; it has been stated time and time before, but I would like to emphasize the great truth. A community, like an individual, to be happy must be industrious. Wherever you find an industrious community there you will find schools, libraries, churches and other evidences of comfort, intelligence and progress. Fortunately we have men possessed of wealth who recognize this truth, and among them was the late Mr. J. Clute Wilmerding of this city, who left \$400,000, now increased to \$460,000, to found an institution to teach boys trades. Mr. Wilmerding did not care for academic education, but wanted them taught how to earn a living by their hands "with little study and plenty of work."

Col. Auchmuty of New York was imbued with the same idea when he founded the New York Trade School, and the Baron de Hirsch when he founded his school to teach Russian and Roumanian Hebrew youths trades.

In 1875 I made an extended tour of investigation through the United States and Europe to ascertain in what way the Mechanics' Institute of this city could develop the idea of industrial education in its application to the California youth. I spent half my time for the Mechanics' Institute for ten years building it up, with the hope that something could be done in that direction, only to be disappointed in results at the end. On my return from that tour I embodied the result of my observations in an address on "Trade Tuition: Its Status at Home and Abroad," delivered before the Mechanics' Institute, which was published in a pamphlet of thirty-four pages. Since then I have kept more or less in touch with the subject, and, as you will see from the report to the Regents of the State University, have quite recently returned from a tour of investigation in the same direction.

The various States are well supplied with manual training and technical schools, and the advance in this direction is wonderful since my observations in 1875. The field is well covered and the results satisfactory. Trade schools are still in the experimental stage and none of them to-day turn out finished mechanics or artisans, or, rather, mechanics or artisans finished in any particular calling or trade.

The necessity for thorough instruction in one important industry has been long recognized, but, as a national work, Germany, in her mono-technical schools, is the only country that has fairly and systematically taken it up.

There is a good sample of such a school in Philadelphia in the Textile Fabric School, an institution equipped with apparatus and machinery and supplied with an able teachers' staff, where wool, cotton and silk are taken in the raw state and go through all the processes needed in the art to the article finished for the market.

But although finished mechanics and artisans are not turned out from existing trade schools, they have a start for a profitable vocation which they can pursue and conquer, and rarely with such a start the taste fails to be developed.

Col. Auchmuty believed that if a young man was once given the taste of a mechanical trade it would act on him like the taste for music on some minds, and once get the mind open to receive instruction the rest was plain sailing, and he employed the most practical methods to bring about the results. Mortar was mixed and brick walls were laid up under the direction of a man who knew how to do it, and the knowledge was soon imparted and gradually the student was carried into intricate brickwork, plain and skew arches, groins and so forth, and to the surprise of the student he came out in five and a half months able to do a fair job, able to do well what he had been taught, and with knowledge enough to go

ahead and perfect himself in actual outdoor work.

The building trades are the great mechanical industries in demand everywhere and these are the trades mostly taught in such a school as Auchmuty's, where the methods are radical indeed, but indicate what can be done when you swing the pendulum of experiment the other way; it will swing back again by itself and a mean is soon found.

Col. Auchmuty has been a true benefactor and fearless experimenter; he broke away from the trammels of the old schools and proved to the world that a few months of actual active concentrated work in any trade, taught as he proposed, would save a youth the years of drudgery, waste time, abuse and degradation inherent in the old apprenticeship system.

Anything that can be done to better the condition of the youths of San Francisco, to give them an opportunity to make an honest living, to remove them from the influence of infamous surroundings and of neglectful parents, should be done.

A. S. HALLIDIE.

Concentrates.

COREA's gold export for '97 was \$2,034,079.

AMERICAN miners on the Yukon want a U. S. assay office at Circle City.

QUICKSILVER is reported discovered on the San Joaquin ranch, Orange Co., Cal.

THE platinum production of New South Wales for '97 was 2900 ozs., valued at \$19,575.

THE Parrot Silver & Copper M. & S. Co. of Butte, Mont., has increased its capital stock from \$1,800,000 to \$2,500,000.

THE Oregon Gold Extraction Co. of Portland proposes building a custom reduction and cyanide plant at Baker City, Or.

THE \$2,000,000 for the purchase of the Center Star mine, Rossland, B. C., was paid the Butte, Mont., sellers last week.

THE Glasgow & Western M. Co. will put in a 100-ton concentrator at Six-mile Springs, Cherry Creek, Nevada, by Oct. 1st.

LIKE other mining swindles the Electrolytic Marine Salts Co. was of Eastern origin, and it was Eastern people who were bitten.

THE total equalized assessment of Montana for 1898 is \$133,654,907—a net gain of \$2,897,496 as compared with the assessment of 1897.

IN the Ruby mine, in Jefferson county, Mont., J. Kuffman and H. Andrews, working on the 150 level, were killed last week by a cave-in.

A SENSATION is reported from Australia in the discovery, near Lake Winne, of a gold nugget weighing 115 pounds and valued at over \$30,000.

FROM the Klondike come stories of miners overcome at the bottom of their shallow shafts by smoke and gas from the fire put there to thaw out the gold-bearing gravel.

IT is calculated that during the first half of '98 25,000,000 pounds Mexican copper were imported into the U. S., and of this, 1000 tons per month re-exported to Europe.

IN a double-hand drilling contest at Placerville, Cal., Sept. 9th, G. H. Daniels made 29½ inches in fifteen minutes. In a single-hand drilling, J. Anderson made 16½ inches.

WITH the close of the war came renewed reports of Klondike richness. 'Tis, however, too late in the season for the transportation companies to lure many more victims.

RECENT sinking at the Nigel Deep gold mine, Johannesburg, South Africa, exhibits a good record. During July an incline shaft 14x7 feet was sunk from 946 feet to a depth of 1206 feet.

IT is reported that the diamond drills in the Never Sweat mine in Butte, Montana, have penetrated ore bodies at a depth of 5000 feet and that the shaft is being pushed to that level.

WHERE there has been a bona fide controversy and a compromise thereof, such settlement, in the absence of fraud or mistake, is as binding upon the parties thereto, as an original contract.

THE flourishing mining town of Jerome, Ariz., was almost totally destroyed by fire last Sunday, involving a loss of over \$1,000,000 and the terrible death of twenty people. There was little or no insurance and 1500 people were rendered homeless. The large plant of the United Verde Copper Co. escaped destruction.

A COPY is received of the official proceedings of the second session of the International Mining Congress at Salt Lake City, Utah, last July. By special arrangement, all the technical papers read there appeared in the MINING AND SCIENTIFIC PRESS, and have since been given further publicity by many of our contemporaries. A copy of the proceedings may be had by addressing Secretary W. D. Johnson, Salt Lake City, enclosing 5 cents for postage.

SUPT. ROSS of the Con. Cal. & Va., Comstock, mine, on the 14th inst., submitted the report and recommendations of the committee of Comstock superintendents, which was recently arranged for, regarding the practical determination of the question of resumption of deep mining on the Comstock. The report recommends that the mines be cleared, and that work on the lower levels be resumed, on the lines suggested in the MINING AND SCIENTIFIC PRESS of Feb. 5th, '98. It appears in full on page 287 of this issue.

FROM the 24th to the 31st ult. inquiries were sent to about three-fourths of the superintendents and managers of California enterprises depending wholly or in part on water, for maintenance, inquiring as to general conditions, betterments, etc. The replies are all in, and would fill this entire issue. Briefly, it may be said that nearly all the answers show a unanimity of sentiment and statement, the prevailing idea being that the serious loss and costly experience of '98 will prove of ultimate benefit in readjustment, repairs, and precaution so far as possible against recurrence of the present untoward condition. The low water stage, the worst, seems to have been reached, and most of the operating concerns say they have from one-fourth to one-third their usual capacity. In many instances increased water storage has been provided. As compared with previous dry years, the statement is generally made that '98 has been the driest year since 1864, a few asserting that not since 1822 has there been in California so dry a year as the present one.

The Occurrence of Platinum in the Oural Mountains.

NUMBER II.—CONCLUDED.

Written for the MINING AND SCIENTIFIC PRESS by
R. HELMHACKER, Prague, Bohemia.

In Russia, which now supplies the world with this metal, as most of it comes from the Oural, the platinum was first discovered in the year 1819 in the smelting works estate of Verkh-Tssetsk, then in 1824 with accessory gold in the estate of Nijni-Toorinsk, and at last the richest deposits in 1825 in the smelting works estate of Nijni-Taguisk. The deposits in this estate were worked without delay by Prince Demidov, and most extensively in the Veessim and Martian valleys, affluents to the Ootka, and this to the Chusovaja, and in the Chaoush valley. The deposit discovered on the Is river (a tributary to the Toora), in the estate of Nijni-Toorinsk, were developed since 1870, and they are contributing much to the general output, as in the other placers the Pt is only an inconsiderable attender of the alluvial gold.

Since the newly discovered metal was worked in the Oural, from 1824 to 1895 inclusive, 127,926 kg., or nearly 128 tons, were registered as the total production.

The price of platinum was fixed in the beginning by the Russian Government at 5½ times the value of silver (the proportion of silver to gold was fixed at 1 to 15½): 1 kg. platinum \$225.10.

As there was in the beginning a limited demand, it was made into coin by the Russians. It was used for coinage of 3-rouble, 6-rouble and 12-rouble pieces (3 roubles equal to \$2.316, 6 to \$4.62, and 12 to \$9.26), from which were struck 1,373,691, 14,347 and 3474 coins, affording a total of 4,251,843 roubles, equal to \$3,282,423. The Russian Government used for a while, from 1828 to 1838 and from 1841 to 1845, when the coinage was discontinued, to strike platinum coins of which one 3-rouble coin weighed 10.35332 grams; also, in sixteen years, to the total weight of 14,673.56 kg., or nearly 14½ tons; but soon came to give up the practice, on account of the numerous and sometimes immense fluctuations in the commercial value of the metal, ranging from shorter than four to eight times that of the silver.

The price has ranged higher during the past fifteen to eighteen years and is very high at present, as already indicated, in consequence of the constantly increasing demand for utensils. Since the coinage of the metal was given up the consumption has reached an increased aggregate; in consequence of its power of resisting the action of simple acids, its infusibility in the common furnace heat and its uncorrodibility by oxidizing processes, though its appearance is not inviting as a precious metal for jewelry. The only corrodors of it, however, are alkalis or alkaline earths, if heated with them; but it may be easily alloyed with most of the metals, the alloys being in general much more fusible than pure Pt; hence care must be taken not to heat the oxides of metals of easy reduction, as lead, bismuth, arsenic, antimony, etc., in platinum crucibles, as if any reduction took place the crucible would be destroyed by the fusion of the resulting alloy.

Platinum has long been used in the form of crucibles in the analytical laboratory, for without them, which share the infusibility of porcelain with the chemical inertness of gold ores, the composition of most minerals could not have been ascertained, and chemistry generally could not have come up to its present level. In consequence of this, it is of great service in experimental and manufacturing chemical processes, for philosophical apparatus consuming almost all of the platinum produced nowadays. But a large portion is made up into electrical apparatus, as foil and wire, while spatulas, evaporating dishes, capsules, crucibles, forceps, etc., are employed in every laboratory. But in the great industrial chemical manufacture it is used frequently for the construction of platinum stills—which have been made capable of producing eight tons daily—for the concentration of sulphuric acid, weighing sometimes as much as 30 and even 60 kg., which, although a single one costs a fortune, are cheaper in the long run than the former glass retorts.

All the production of the Oural is bought for years in the future by contracts at the present very high prices, and has to pass through the hands of the London manufacturers, Johnson, Matthey & Co. The production of platinum utensils now employed in the arts and chemistry on a large scale is in the hands of a very few firms, of which that of Messrs. Johnson, Matthey & Co. in London is generally understood to be the most important, as it is believed that of the total annual consumption of about seven and one-half tons three-fourths passes through the hands of the London manufacturers. In Paris, France, the firm of Deville & Debray is working, while Heraeus is established in Hanau, Hesse, Germany and, last, the chemical manufactory of Teutelevo, and the chemical laboratory of Kolbe & Laugsdorfs in Petersburg itself, which both manufacture only 50 to 60 kg. of metal per year. All these establishments extract and refine the platinum from the native metal, which process requires notice.

The native platinum is not the metal-pure ore, but

an alloy of Pt, and never to a greater extent than 86.5%, with Pd, Rh, Tr, Ru, Os, or polyxene metals from 3 to 7%, and with Au, Fe, Cu and sometimes gangue 1 to 3%. The even-named polyxene metals are united with a family—what is known as the platinum group—by a striking similarity in chemical characters and by their association in natural occurrence.

The analyses of samples of native platinum from the Oural, communicated by Berzelius, Osann, Deville & Debray, show the several components, which range approximately as follows:

| | |
|--------------------|----------------|
| Pt..... | 73.58 to 86.50 |
| Fe..... | 8.32 to 12.90 |
| Tr..... | .06 to 4.97 |
| Cu..... | .45 to 5.20 |
| Rh..... | .30 to 4.44 |
| TrOs..... | .11 to 2.35 |
| Os..... | 1.08 to 2.40 |
| Pd..... | .28 to 1.40 |
| Au..... | .00 to 1.40 |
| Sand (gangue)..... | .00 to 1.40 |

The native platinum is tested on its yield of pure platinum by the method suggested by Deville & Debray, as follows: Silver at the rate of 7 to 8 grs. and native platinum 2 grs. are fused with borax and charcoal. The weighed cold button gives the weight of pure Pt and Ag, less the several components which separated themselves from the two resisting metals, which remained unattacked.

The platinum is extracted from the native metal by the wet or dry method. The first process, often described, is the invention of Wollaston and published, though patented, in the year 1828, has been universally employed, and the leading steps are as follows: After the removal of some metals associated with the ore, and soluble by the successive action of the nitric and hydrochloric acids, the platinum itself is dissolved in hot aqua-regia, leaving unaffected the iridosmine. From the solution it is precipitated by a solution of ammonium-chloride in the form of a double salt, the chloroplatinate of ammonium— $(\text{NH}_4)_2 \text{Pt}_2 \text{Cl}_6$. The washed yellow salt (precipitate) is heated to redness, by which treatment the metal is left as a spongy, soft mass—the spongy platinum—when the chlorine and ammonium are expelled. The spongy metal, finely powdered under water, is next shaped by great pressure and then exposed to intense heat in a wind furnace, which cannot fuse it into a compact mass. But, possessing the property of welding, the ingot can be formed by hot and repeated hammering upon its two ends into a homogeneous and ductile mass. By this process improved upon, it is said, by an electrical treatment held secret, Heraeus produces a platinum with only 1% of other reguline components. The firms refining platinum have modified the process of Wollaston and hold secretly their manner of platinum parting.

The dry method was introduced by Deville & Debray in 1860, in forming a fusible alloy of platinum with lead by exposing the native metal with equal weight of galena (PbS) and litharge (PbO) gradually added, and some glass to act as a flux, heating to full redness in a clay-lined reverberatory furnace. The sulphur of the PbS is oxidized to SO_2 and expelled, and the liquid alloy of Pb and Pt is allowed to rest for some time, to allow the iridosmine, not being alloyed by the lead, to sink to the bottom. The upper portions of the alloy are then decanted, or cautiously taken out with ladles and submitted to cupellation, after which the crude cupelled platinum button is melted and refined in a lime furnace by means of the oxihydrogenous blowpipe. This process is also patented.

The platinum alloy with Tr or Rh, or both at once, is harder and withstands a higher heat than pure Pt and for that reason is better adapted for making crucibles. A percentage of 1 to 2 of Tr renders the metal very resistible for the highest heat. Alloys with 47% Tr and 57% Rh can be drawn into wire of high resistance.

The native platinum is associated with some other metals or alloys, or, rather, combinations, from the platinum group, which may be shortly mentioned.

The native iridium is very rare in the Keeshtim estate, Zlatoust district, as well as the native palladium, found in fine, flat scales.

The alloys of Tr and Os, in different proportions, have been named, depending on these proportions as nevianskite (the grayish white) and sissertskite (the tin white) named from Oural localities. The first, or osmiumirid Tr As_4 , is hard, and contains when pure less than 30% Tr; the chemical formula requires Tr = 19.9, Os = 80.1; but, as both metals are isomorphous and yet combined with other metals of the platinum group, its chemical composition is changing, and, according to Berzelius, 24.8 — 25 = Tr; 75.2 — 75 = Os. The second, or iridosmine Tr Os, is hard and should be Tr = 70 — 75, Os = 18 — 20; but its composition is very changeable in the Russian specimens. According to Berzelius, Claus, Deville & Debray, either:

| | |
|------------------|------------------|
| Tr 43.28 — 55.24 | Tr 64.50 — 77.2 |
| Os 49.34 — 27.32 | Os 15.38 — 23.01 |
| Pt 10.08 — .14 | Pt .41 — 2.80 |
| Rh 1.50 — 5.73 | Rh .50 — 7.50 |
| Ru O — 8.49 | Ru trace — .20 |
| Cu trace — .78 | Cu trace — .90 |
| Te trace — .99 | Te O — 1.40 |
| Pd traces. | and some Pd. |

Some newer analyses show that this alloy is on the

Oural sometimes combined even with 33% of Pt, being thus not as hard as the California specimen, which is, on account of its extreme hardness, used to make nibs, or points of gold writing pens, or axle wire, or pillows to watches.

Though the platinum and the associated metals occur in quantities of economical importance exclusively in the Oural mountains, they are in a very slight amount widely distributed in Siberia; and for that account, as there is little or nothing known in science about this occurrence, a short treatise about this matter shall be additionally here inserted.

In the Altai mountains platinum, either alone or associated with nevianskite and sissertskite, is found in the alluvial gold deposits accompanying the placer gold in a minimum amount; from 3800 to 4000 parts of placer gold only one part of platinum and its associates can be picked out. This gives a yield of about $\frac{1}{10000}$ gram in one ton auriferous gravels operated for gold washing.

In some placers in the tributaries of the Mrasa, or Pras river, a right-hand affluent of the Tom, which unites with the Obi stream at right hand, these rare metals are recognized; thus in the exhausted placer Viktorievskii, on the Koozeneligh brook, a left-hand affluent of the Onas, or Bolshaia riechka, a left-hand tributary to the Mras-su. As in the brook valley, a dyke of serpentine is recognized, the original source of the rare Pt and iridosmine and osmirid grains may be guessed.

In the region drained by the right-hand affluent of the Mras-su, the Orton, are two very small rivulets, or, rather, gulches, emptying at right in the Orton, named the Moursinskie sources. In the high waters of the Mras-su empties the Kareechilau brook, at right. These brooks carry traces of platinum in their gold placers. The latter drains a region with uraltite (amphibole) biotite granites, with dykes of uraltite porphyries, which may be the original source of the rare metal.

In the country drained by the Mondum river (Kondoma river) emptying at the left in the Tom opposite the town of Kouzneck; the right rivulets Orush, Tarlash, the left Chooktuk, the source of the left tributary Munja, the right Munja-brook Koore; the left brooks Sherik and Kazil to the Koochoora (left in the Mondum); and the Oiry-Mondum (Malaia Kondoma), with its right brook Chulesh carry traces only of platinum, without iridosmine.

The Obi stream is formed by the two streams Katuni (left) and Bia (right); a right-hand tributary to the Bia, the Koo-oo (Lebedi) which carry in its left-hand fork, the great Koo-oochak, traces of platinum without iridosmine. The Koo-oochak is a right tributary of the Koo-oo.

As the rivers flow in a ground formed from limestone, lidite, mica slate, metamorphous slates with eruptive rock and Ouralite porphyry (metamorphosed pyroxene porphyries) and its tuffas, it is not possible to guess the primitive or original rock from which this rare metal might be derived, and it will require investigation in the future to solve this question.

The Ala-Tau mountains, being the eastern dependencies of the Altai range, form the watershed between the Obi (Tom) and Bia and the Yenisei (with its left tributary, the stream Abakan, emptying at Minusinsk) and at once the line between western and eastern Siberia. Most of the rivulets formed in this range carry traces of Pt, thus in the Balik-su, emptying at the left in the headwaters of the Tom, and its tributaries. The sources of the three rivulets, the White, Black and Great Yus, uniting with the Yus, a left tributary of the Choolim, which is a right-hand tributary of the Obi, gather from the eastern Ala-Tau summits, and are, therefore, in eastern Siberia. The rivulet Ysikiul of the Yus system carries platinum in its gold placers. Though the amount of it, compared with the gold, is very slight, the pieces of Pt are great, weighing to 1 gram, which is nowhere to be observed in other places of its occurrence in Siberia.

The poor gold placers in the valley of the Kiiskii-Shalteer, a tributary of the Kiia river, this a tributary of the Choolim, in the district of Mariinsk, government of Tomsk, also carry very small quantities of iridosmine.

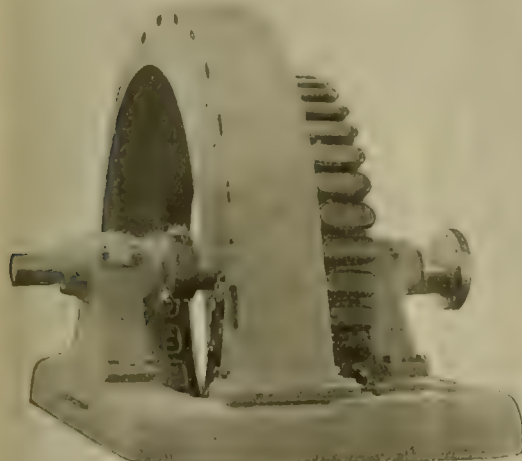
In the government of Irkutsk, district of Nijne-Oodinsk, platinum was met with in gold placers worked from 1855 to 1860, now exhausted, on the rivulet Touksha, a tributary of the Birusa, having its source in the Birusa snow mountains, a range of the southern Saian mountains. The Birusa belongs to the Ona system, the Ona emptying into the stream Angara at the left, not far from the mouth of the Yenisei.

If the attention of the miners would be directed more to the associating minerals in gold placers in Siberia the platiniferous gold placers would be noticed, though it is extremely uncommon that the very slight quantities of granules of this metal, which is always a rarity—sometimes accompanying the gold—are observed, and are detected only occasionally by experienced mineralogists. The conditions under which platinum-bearing and the original rock, from which the platinum or the metals of the platinum group, rarely contained in some of the Silurian gold placers, had been liberated are not as yet determined.

Electric Transmission From Mechanicville, on the Hudson.

NUMBER 11.—CONCLUDED.

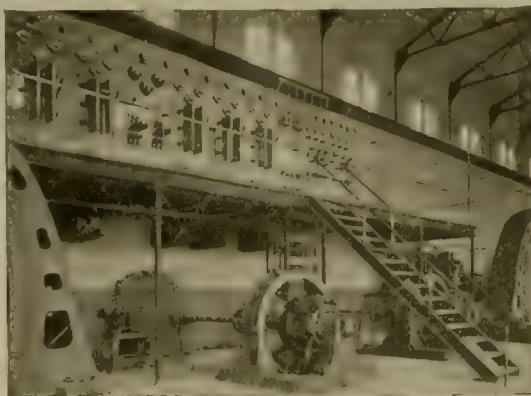
The 550-volt motors in the testing department were supplied from an engine driven multipolar



750 K. W. THREE PHASE ALTERNATOR, REVOLVING FIELD UNCOVERED.

generator of 500 K. W. capacity, while a smaller engine drove a number of exciters which allowed of independent control of the excitation of all machines in this department. The factory is

plant at the works, therefore consists, of two synchronous motors, one of 500 K. W., the other of 100 K. W. and three 400 K. W. rotary converters—the synchronous motors for the testing department, the



EXCITERS AND SWITCHBOARD.

converters to supply current to the factory motors. The large engine driving the 500 K. W. multipolar generator is superseded by the 500 K. W. synchronous motor. This is a 12-pole, 400 revolution machine of the revolving field type, wound directly for 10,000 volts. The small engine driving the exciters is replaced by the 100 K. W. synchronous motor—an 8-pole 600 revolutions per minute revolving field machine similarly wound. The three rotaries supplying 250 volt current to

mand exceeds the supply from the synchronous motor driven machine, they may be connected to give 500 volt current, operating in parallel with the railway generator driven by the synchronous motor in the testing department. The rotaries are operated in parallel and all the factory motors, the factory railway and all the factory lighting are operated from the same direct current circuit.

The officers of the Hudson River Power Transmission Co. are Edmund Hayes of Buffalo, N. Y., president; R. N. King, president of the Stillwell-Bierce & Smith-Vaile Co. of Dayton, O., vice-president; G. H. Furman of Newark, N. J., treasurer; R. J. Richards of Boston, Mass., superintendent; J. S. O'Shea, manager.

A Possible Occurrence.

TO THE EDITOR:—Will you kindly answer the following questions in regard to mineral rights? Prospector "A" discovers a quartz ledge on a very steep slope of a mountain and files his claim thereon in the usual manner. A very large slide off this ledge had occurred, through which the discovery was made. The quartz in this portion of the ledge, amounting to many hundred tons, rolled to the foot of the slope, partly within and partly without the side line of the claim. Prospector "B" finds this large boulder and files his claim upon it.

Question 1—Can Prospector "A" claim the portion of this float which is lying within his side line? Question 2—Can he claim the rest of the float which is rolled outside of his side line?

PROSPECTOR.

While hesitating to attempt giving exact legal interpretation to this unusual statement of alleged facts, we are inclined to favor the claims of Prospector "A" in both instances. Regarding the boulder rolled from a located ledge, it may be considered as having been mined by nature instead of by man, and rolling upon another's ground, this irrespective of whether it weighs 1000 ounces or 1000 tons. If a piece of ore the former size fell from a wagon in transit, the owner could unquestionably pick it up and put it in the wagon again and there would be no one to dispute his act declaring ownership.

It is believed Prospector "A" can claim not only the portion of the float which is lying within his side lines, but the entire boulder and all the rest of the "slide."

The answer to Question 2 is given in the answer to Question 1. Prospector "B" seems to have no standing whatever, as he cannot locate a claim upon a boulder nor upon any ore not "in place." One of the cardinal principles of a valid location demands that the vein or fissure be "in place." Whatever rights in equity Prospector "A" may possess, Prospector "B" does not seem to have any at all.

A NOVEL method of measuring high temperature, capable of accuracy within one degree in measurements, up to the melting point of gold, depends upon the fact that the refractive index of a gas takes the same value when the density is reduced by diminution of pressure as when it is reduced by rise of temperature. A beam of light is divided, one-half passing through a tube of air in which the pressure can be varied and measured, the other half traversing a tube of air which can be heated electrically by a coil of wire surrounding the tube. The two portions of light are then recombined, so as to give interference fringes. The pressure of gas in one tube is varied so as to counterbalance any motion of the interference bands due to rise of temperature in the other, and the rise of temperature is then calculated from the variation of pressure.

A COAL MINE in Scotland which caught fire over fifty years ago, and has been burning ever since, has at last burned itself out. The mine is on the Dalquharran estate, Dailly. It was set on fire by the engine working the fans; and although many costly attempts have been made to extinguish it, they have been unsuccessful. The flames have, from time to time, burst forth from the ground in volcanic fashion. The fire was prevented from spreading beyond the one area by reason of the "dykes" of rock which intersected it.

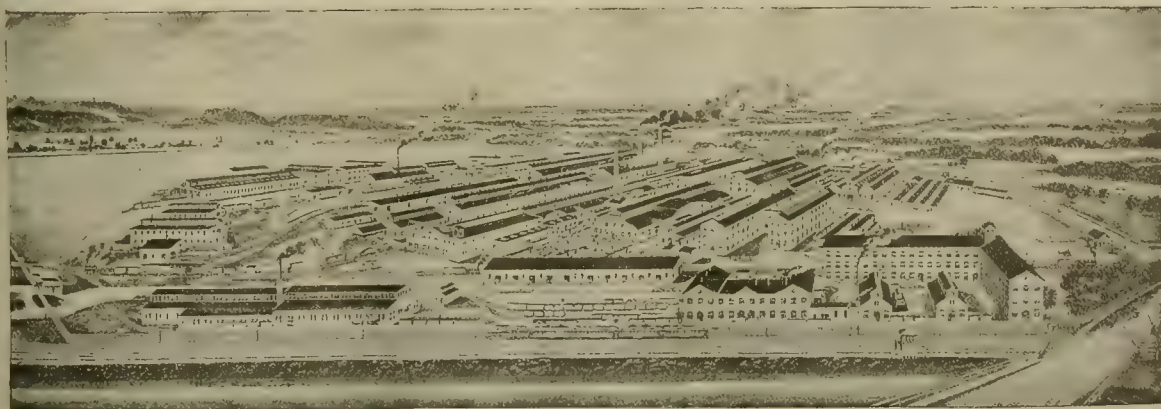


INTERIOR OF POWER HOUSE—DYNAMO ROOM.

operated by a number of 250-volt motors running on the same circuit as the factory lights. These motors are not changed and the steam plant which supplied them is retained as a reserve in case the power from Mechanicville should fail. The electric power plant superseding the present steam

the factory motors are 10-pole, 400 K. W., 480 revolutions per minute machines, receiving the three-phase current from the air blast transformers. When connected in multiple they furnish current at 250 volts, but as they may be called upon to furnish current to the testing department in case the de-

of temperature. The two portions of light are then recombined, so as to give interference fringes. The pressure of gas in one tube is varied so as to counterbalance any motion of the interference bands due to rise of temperature in the other, and the rise of temperature is then calculated from the variation of pressure.



THE SCHENECTADY WORKS, GENERAL ELECTRIC CO.

Is Darwinism True?

NUMBER IV.

W. S. PROSSER.

Bulwarks of evolution are "vestigial remains" and "embryonic recapitulations." In the higher animals are found certain parts, temporary or permanent, which are often useless and seem only "remains" of parts in older forms, as the vermiform appendix and others. No explanation has seemed possible except that they were such vestiges, inherited through an imperfection in the evolutionary process, which eliminated some obsolete parts but left others. Embryology is made to give similar testimony: that derivation by natural means is implied, because the embryos of higher animals go through stages of which the earlier slightly resemble the embryos of lower forms of life.

It seems to be taken for granted that something is explained by calling these "remains of older forms," as though it were a very simple thing for them to "remain." Quite the contrary. If superseded by a different device the cause of the change can only be sought in the power that introduced that new device. If we say the old parts were gotten rid of by atrophy, it has not been explained how or why they were or could be atrophied. Exactly the same explanation would make clear the origin of the new parts. The farmer discards his scythe and hangs it in a tree because he has found a better tool—the mower. The evolution of the mower from the scythe is not a physical, but a mental, process. So also of the animate inventions.

But Darwinism has been compelled to go a step further and claim not only the atrophy of superseded devices, which in certain cases actually happens, but the atrophy of useful parts by natural selection—natural means. The horse and his forebears form the best proofs that evolutionists have ever brought forward. At the beginning of the tertiary, millions of years ago, the eohippus—the size of a fox—had four toes and remains of a fifth on front feet and three behind; thence by several steps to the present horse, gaining size and losing toes at each, and, curiously, for every toe lost a molar tooth was gained.

If atrophy be alleged to account for the loss of toes, how is explained the gain in teeth? Simply that more teeth were needed by the larger animals, which is the exact reason. But Darwinists are barred from this simple and obvious explanation: that the inventor of each animal provided it in advance with all necessary teeth, and have recourse to obscure and impossible schemes of "environment," etc. Consider: for any of this horse line to have grown larger involves more food and digestion thereof. After this he grew larger and after that got more teeth, which therefore were not necessary as he had grown without them—that is, the smaller animal did not have more teeth, but the larger; yet, by the theory, they grew because they were necessary. Secondly, the theory supposes that more teeth grew either from the wish of the animal—a palpable absurdity, for animals have no such abstract wishes as far as known (the human race has wished for better teeth for centuries, yet they grow worse continually)—or from "environment," "external conditions," as, for instance, the food rubbed on the gums, the tongue and the roof of the mouth, but had not the slightest effect anywhere to make new teeth except just back of the other teeth, and here new teeth were created with all their intricate parts by—what? We are left to guess.

Did the first foot that walked on the earth have one toe or five? If five, it is a queer evolution that begins with a complex form and works to a simple. If one, it is equally queer, for it must have worked from one to five and then back again to one—the present horse. In fact, the original foot seems to have had five toes—a very complex arrangement—and one that cannot, fairly and candidly, be reconciled with the supposed development of high and complex animals from low and simple ones.

There is no proof of, and no plausibility in, the idea that one toe descended from two or three toes by atrophy or disuse. If it did, the process must be either special or general. If general, we ought to see everywhere stages of such process—cats and dogs with four, three, two toes; cattle with three or one; sheep, squirrels, birds and even men in the various stages, some with more, some less toes, or with dangling remnants of those atrophies. Going back ten or fifty thousand years, all ought to have more toes. Why is nothing of the kind found? Simply because nothing of the kind is going on. As a natural process, Darwinism is wholly imaginary. If it be claimed that the horse lost toes down to one and the ox down to two, from special causes, such must be produced and proved before they merit attention. If it be claimed that the horse ceased to use two of his three toes, proof is required first of the possibility and second of the fact of such disuse, both of which I deny. Animals, in a state of nature, use their several organs and parts in the same way century after century. If the middle of the foot bears most of the weight and the side toes act partly as buttresses, that does not atrophy them. If it did, all animals would be one-toed. The tails of many animals and the front feet of kangaroos have

no very heavy exercise, yet have not dropped off. Domestic cats have long tails, wild cats short, catamounts intermediate. No theory of "exercise" can account for the difference. The horse and elephant are both annoyed by flies, yet one has a long tail and one a short, while foxes and other furry animals need no fly brush, yet have large tails. If the horse really lost four toes out of five because they were not used as much as the middle toe (and that is the Darwinian case), then all these little used tails, the kangaroo's forefeet and the small toes of men, as well as the human ears and nose and other parts not actively used, ought to have atrophied and ceased to exist. The whole thing is absurd. There is no such process going on in nature, and there never was. All species keep steadily to their average and retain the full use of their various parts as from time immemorial. When, in the course of changes in the earth, conditions so change as to demand new devices to meet them, such can be invented and introduced only by the same power that originated the superseded parts.

(To be Continued.)

Mineral and Agricultural Patents.

TO THE EDITOR:—Articles have appeared in various issues of the MINING AND SCIENTIFIC PRESS during the past few years on the injustice done to the mining world through the classification of land as agricultural that might be, or may thereafter be, proven to be valuable for its mineral contents.

It is claimed that land worth \$2.50 to \$50 per acre agriculturally might be worth millions per acre if mined, and that it is for the greater good that the land owner give way to the miner.

Now, is it not possible that an injustice might be done to the mine owners also by any change in the present law?

Suppose a case, for instance: A mining man finds favorable indications for a mine on agricultural land. The owner objects to having his land torn up by prospectors. Without raising a howl, he quietly buys the land as a farm or ranch, and spends many thousands of dollars in developing a mine. We will say that from lack of funds he closes down the mine before it has been put upon a paying basis. If it were mineral land he would apply for and obtain a patent on his claim, and let it lie until he was able to resume work. A few hundred dollars makes his title perfect. Now, the miner working on land agriculturally patented cannot do this. He must rely on his existing title being perfect. He cannot ask the United States government to upset the title it has given, that he may repent as a mineral location. There is seldom a piece of agricultural land but that the owner is generally only too willing to sell at a reasonable figure.

Let the kickers buy, or interest capital to buy, land they think worthy of investigation for its mineral contents.

Would not the only really just way be for the Government to reclassify all lands through inspection by competent men, buy all lands then reclassified as mineral before known as agricultural, giving owners of mines on such lands ample time to protect themselves, and then throw the land open for location as mineral?

I venture to say that if the inspectors were dishonest Uncle Sam would have more mineral (?) land thrust upon him than would patch hides a mile.

Sept. 9th, '98.

READER.

The above was referred to one of the best mining lawyers in this west half of America, who comments thus:

"The writer is evidently of the opinion that when mineral is discovered in land already patented in good faith as agricultural land, the title of the owner to the mineral so discovered is rendered insecure by such discovery. Such is not the case.

"I know of no better way to state the general propositions of law touching this matter than by quoting from a decision of the U. S. Circuit Court of Appeals for the 8th circuit, rendered March 22, 1897. In that decision the following language occurs:

"If this action of the land department resulted from fraud, mistake or erroneous views of the law, a court of equity might set aside the patent, or declare it to be held in trust for him who had a better right to it. *Bogan v. Mortgage Co.*, 27 U. S. App. 346, 11 C. C. A. 128, and 63 Fed. 192; *U. S. v. Winona & St. P. R. Co.*, 32 U. S. App. 272, 15 C. C. A. 96, 107, and 67 Fed. 948, and cases cited. But in this action at law it is, like the judgments of other special tribunals vested with judicial power, impervious to collateral attack. In the case of *Steel v. Refining Co.*, 106 U. S. 447, 451, 1 Sup. Ct. 389, which was an action of ejectment in which the plaintiff's title depended on a patent issued upon a claim for mineral lands within the limits of a townsite, and the defense was that the patent was void because the land was not mineral, and the patentee was not a citizen, and had not declared his intention to become such, the Supreme Court held that proof of these facts was inadmissible to attack the patent, and declared that the land department necessarily 'must consider and pass upon the qualifications of the applicant, the acts he has performed to secure the title, the nature of the land, and whether it is of the class that is

open to sale. Its judgment in these matters is that of a special tribunal, and is unassailable, except by direct proceedings for its annulment or limitation.' To the same effect are *Heath v. Wallace*, 138 U. S. 573, 575, 11 Sup. Ct. 330; *Barden v. Railroad Co.*, 154 U. S. 288, 14 Sup. Ct. 1030; and *Davis' Adm'r v. Weibbold*, 139 U. S. 507, 524, 11 Sup. Ct. 628. In *French v. Fyan*, 93 U. S. 169, 172, the Supreme Court held that parol evidence was inadmissible to show that land patented to the State of Missouri as swamp and overflowed land was not in fact swamp or overflowed land, and on that account the patent was void. In *Ehrhardt v. Hogaboom*, 115 U. S. 67, 69, 5 Sup. Ct. 1157, that court held, on the other hand, that parol evidence was inadmissible to show that land patented to a pre-emptor was swamp or overflowed land, and was therefore included in the grant to the State of California, and that the patent to the pre-emptor was void on that account. A patent to land or mineral lodes, over which the land department of the United States has the power of disposition, and the jurisdiction to determine the claims of applicants for, under the Acts of Congress, is impregnable to collateral attack, whether the decision of the department on which it is based was right or wrong, and the patent conveys the legal title to the property to the patentee. *U. S. v. Winona & St. P. R. Co.*, supra; *Minter v. Crommelin*, 18 How. 87, 89; *U. S. v. Schurz*, 102 U. S. 378, 401; *French v. Fyan*, 93 U. S. 169, 172; *Quinby v. Conlan*, 104 U. S. 420; *Smelting Co. v. Kemp*, 104 U. S. 636, 645-647; *Steel v. Refining Co.*, 106 U. S. 447, 450, 452, 1 Sup. Ct. 389; *Heath v. Wallace*, 138 U. S. 573, 585, 11 Sup. Ct. 380; *Knight v. Association*, 142 U. S. 161, 212, 12 Sup. Ct. 253; *Noble v. Railroad Co.*, 147 U. S. 174, 13 Sup. Ct. 271; *Barden v. Railroad Co.*, 154 U. S. 288, 14 Sup. Ct. 1030. If a more careful analysis of the authorities upon and a more exhaustive consideration of these questions are sought, they will be found in *U. S. v. Winona & St. P. R. Co.*, 32 U. S. App. 272, 15 C. C. A. 96, and 67 Fed. 948, which was decided by this court in 1895."

A Rich Gold Country.

If a pin be placed at Denver, Colo., on the map, and another at Stockton, Cal., and a string be drawn from one to the other, an air line will be marked, passing through the heart of a wonderful gold territory. Slightly to the north of Denver is Central City, and southwest of that city is Cripple Creek; about thirty miles to the north of the string Leadville will be found; in the southwest corner of Colorado will appear Telluride, Rico and other points where gold is mined; Marysville in Utah, almost due south of Salt Lake City, will appear to the south of the string; fifty miles to the north of it, near the line between Utah and Nevada, will appear Osceola; Deep creek lies north of Osceola and on the southern edge of the great desert west of Salt Lake City; Detroit and several other rich gold camps are almost due east of Osceola; Pioche lies 100 miles south of the string; and the wonderfully rich gold territory of the Monkey Wrench district lies southwest of Pioche.

Now, north and south of the string will appear dotted on the map of Nevada the gold camps of Grant, Freiburg, Reveille, Wawich valley, San Antonio, Gold Peak, Hot Springs, Belleville, Candelaria and numerous others. Almost under the string, in California, we find Bodie, and to the north of it Markleeville and other points—all on the eastern slope of the Sierra Nevada mountains. On the western slope of the great Sierras the string will be almost on the Utica mine, which is located between San Andreas and Sonora. North and south of the Utica mine are hundreds of rich gold mines in profitable operation.

The distance from Denver to Stockton is about 1200 miles. On no portion of the habitable globe is there a region so continuously and enormously rich in gold as the territory described; and yet, notwithstanding this fact, the progressive Yankee has scarcely made a start in opening and developing these riches which have been entombed for millions of years, and which will remain so sepulchered until we awaken to an appreciation of the fact that the States of Colorado, Utah, Nevada and California bear within their bosoms more wealth than was ever dreamed of by Croesus.—J. A. Latcha in September Forum.

AS ILLUSTRATING the triumphs of modern science in the construction of instruments of precision the *Scientific American* instances a chronograph for recording infinitesimal intervals of time, such as a millionth of a second or less, which is stated to have been used to record autographically the compression by a blow of a cylindrical piece of copper. In one case a thirty-three-pound weight fell 15 inches and produced a permanent compression of .1658 inch in a copper cylinder, the time consumed in producing this compression being .0030317 of a second. The machine produces by means of photography a curve showing the precise progress of this compression. The chronograph which reaches such remarkable results consists of a rotating cylinder, with a surface velocity of 100 feet a second, on which is photographed a pencil of light, which is passed through a hole in the end of a rapidly vibrating tuning fork.

Coast Industrial Notes.

—A refinery at Vancouver, B. C., is importing raw sugar from Java.

—Competition has resulted in a \$25 and \$15 rate from Seattle, Wash., to Skaguay.

—The Santa Fe Co. now employs at its Albuquerque, N. M., shops over 600 men.

—The Lacy Co. of Los Angeles, Cal., have built a 36,700-gallon oil tank at San Bernardino, Cal., of steel plates.

—The Gila Valley, Globe & Northern Railroad from Bowie to Globe, Arizona, 125 miles, will be completed Oct. 1st.

—About 30,000 tons of sugar beets have been produced this season in the Grande Ronde valley district, Oregon.

—Victoria Island, containing 8000 acres, sixteen miles from Stockton, Cal., has been sold for \$320,000 to London purchasers.

—The Northwest reports that business with the big cargo lumber mills on the sound is better, foreign and coast orders coming in.

—From Baker City, Oregon, were shipped last Tuesday 23,000 sheep for Chicago. This is the final shipment this season of 73,000 head.

—Failure is reported to have attended the Government effort to discover an entrance for deep sea vessels at the mouth of the Yukon River.

—At La Grande, Or., farmers are paid \$4 a ton for beets containing 14 per cent saccharine and 25 cents for every additional per cent of sugar.

—The California Powder Works of San Francisco has a contract from the Government for 500,000 pounds of smokeless powder at 90 cents per pound.

—The San Francisco Mechanics' Institute has decided to hold an exposition in '99. The institute has held an annual fair for thirty years, but passed this year.

—A disastrous fire last Sunday destroyed the town of New Westminster, B. C., entailing a loss of nearly \$2,500,000. There is considerable resultant destitution.

—The California Oil and Gas Co. of Arizona has incorporated at Yuma, with a branch office at San Francisco. The capital stock is \$2,000,000, with shares \$10 each.

—A cable from San Francisco to the Hawaiian territory of the United States will be a commercial necessity. The estimated cost is \$1065 per mile, in round numbers \$2,500,000.

—The approximate earnings of the Mexican Central Railway for the fourth week of August aggregated \$352,950, against \$313,983 for the same period of 1897, an increase of \$38,967.

—The California Limited over the Santa Fe route will begin running on November 2nd between Los Angeles and Chicago, the fastest train scheduled between California and Chicago.

—Z. L. Tanner, U. S. N., has awarded the contract for building piers and coaling sheds at Pago Pago harbor, Samoa, to Healy & Tibbitts of San Francisco for \$142,900. The work will be finished by Jan. 1, 1900.

—The annual report of the Southern Pacific Co. for the twelve months ending June 30th shows an increase. The gross earnings for the year were \$55,780,337. The net earnings, after deducting the operating expenses, were \$1,160,611.

—Of commercial importance to the Pacific coast is Luzon, the largest of the Philippines, equal in area to Cuba and Porto Rico combined, nearest the Chinese coast. On it is the city of Manila. That island should be obtained by the United States.

—The Los Angeles, Cal., Railway Co.'s system of electric street railways has been bought by Southern Pacific men. The transaction involves the issue of \$5,000,000 in bonds, \$4,000,000 to be devoted to cancelling the bond issue of the old corporation, to the liquidation of indebtedness and to improvements. The bonds of the new company are to bear 5 per cent interest. The price paid is in the neighborhood of \$4,000,000.

—The Union Iron Works of San Francisco, which has received so much deserved commendation in the high character and splendid record of the vessels built for the Government, will be given a contract for the entire production of one of the three new warships and three of the new torpedo boat destroyers, the latter will cost \$281,500 each, and will be built on designs furnished by the Union Iron Works and approved by the Government.

—Till recent years the largest body of fresh water wholly within U. S. limits was Tulare Lake, Cal. Irrigation, etc., gradually reduced its limits, and this year the lake is entirely dried up. A land district has been formed in the lake bed and it is expected that 30,000 acres of the old lake bed will be converted into tillable land. A levee is to be built thirteen miles long, costing \$7000. Wells will be bored to furnish water for irrigation. It is said that the space left by the lake's disappearance has been appropriated, so that there will be room for a stampede. The work of reclaiming will cost some money, but for this purpose share of the purchase price is available, it is claimed, the State's price of \$2.50 an acre being cut to 50 cents, which goes into the State school fund. The claimants of the tract are paid in their assessments to complete the levee.

Catalogues, Etc.

Personal.

R. S. RAW, a mine operator of Placerville, Cal., is in San Francisco.

E. GOODWIN is the new Mgr. Manufacturers' and Producers' Association.

J. J. CRAWFORD has returned to San Francisco from Placerville, Cal.

ROSS E. BROWNE has returned to San Francisco from San Andreas, Cal.

A. N. BUTTS, Supt. Bovee mine, San Andreas, Cal., is in San Francisco.

M. C. HARRINGTON has been appointed Supt. Lucky Boy mine, Custer, Idaho.

F. W. BRADLEY of San Francisco is at the Spanish mine, Washington, Cal.

D. GUTMAN, Pres. Amelia mine, Jackson, Cal., has returned to San Francisco.

M. W. MATHER, Supt. Cramer G. M. Co., Alleghany, Cal., is in San Francisco.

D. HARMON, Supt. Gaston Ridge mine, Graniteville, Cal., is in San Francisco.

CAPT. BUCKLEY, Supt. Gold Valley mine, Downieville, Cal., is in San Francisco.

ALF. TREGIDGO of San Francisco is examining mining properties in Nevada county, Cal.

W. H. MARTIN, San Francisco, has returned from a visit to the Rawhide mine, Sonora, Cal.

O. KORBEL, Pres. Texas G. M. Co., Nevada City, Cal., has returned from a visit to the mine.

T. J. HOUGHTON, Supt. Lighter mine, Angels, Cal., has returned from San Francisco.

J. M. BUFFINGTON, Supt. La Suerte mine, Nevada City, Cal., has returned from San Francisco.

F. W. PAGE, Gen. Mgr. South Fork Gravel M. Co., Forest, Cal., has returned from San Francisco.

G. STEVENS is examining mining properties near Nogales, Ariz., for the Yellow Aster Co. of Randsburg, Cal.

A. B. FRENZEL, who has been exploiting a turquoise property near Tucson, Ariz., has returned to New York City.

C. A. PREVOST, 17 Popstone Road, London, S. W., has gone on a business trip to the Argentine Confederation, S. A.

L. I. SEYMOUR succeeds Hennen Jennings as consulting engineer to the New Modderfontein G. M. Co., South Africa.

J. A. CORAM, not wholly unknown to holders of Merced, Cal., mining stock, is inspecting his properties at Cochiti, N. M.

E. SCHWARTZ has been appointed director of the Wilmering Trade School, San Francisco, Cal., at an annual salary of \$2500.

HENRY T. SCOTT, Mgr. Union Iron Works, has returned to San Francisco from a successful business trip to Washington, D. C.

J. Q. PACKARD of Salt Lake City, Utah, is visiting his Tiptop mine at Hailey, Idaho. He has decided to build a mill upon the property.

W. R. CHAPBOURNE, Mgr. Mikado mine, Leadville, Colo., has returned to San Francisco en route to the Lindsay mine, Maybert, Cal.

H. P. GORDON, formerly foreman of the North Bloomfield, Cal., now fills a similar position for the Pande Basin Co., Sitka, Alaska.

MARTIN KELLOGG has resigned the presidency of the University of California, at Berkeley, Cal., the resignation to take effect March 23, '99.

H. B. WINCHELL, Assistant State Geologist of Minnesota, has accepted the position of geologist with the Anaconda Copper M. Co. at Butte, Montana.

O. O. HOWARD JR. and C. D. RICHARDS, who have been examining the Viznaga mine near Ensenada, Lower California, have returned to San Francisco.

H. W. NEWHALL of the Curtis-Newhall Adv'tg. Co. of Los Angeles, Cal., left San Francisco on the last steamer for Honolulu, Territory of Hawaii.

F. W. WILMANS, Supt. Bonanza mine, Sonora, Cal., has returned from San Francisco. His company is building a mill and expects to operate with electric power.

NELLIE CASHMAN, the famous female prospector, writes from Dawson that she has a tomato can or two filled with gold dust, but won't come out till she has a small barrel of it.

BINGER HERMANN, Commissioner General Land Office, is in San Francisco conferring with State officials on the subject of forest reservations and protection of standing timber.

S. F. EMMONS, of the U. S. Geological Survey, has been examining various copper properties on the coast, and is at Jerome, Arizona, this week. He expects to return to Washington Oct. 1st.

S. C. WILMANS, Supt. Boulder mine, Shingle Springs, Cal., is in San Francisco. He says the company, of which he is a member, is putting in steam power and will soon be able to crush ore independent of the water famine.

R. U. GOODE, geographer U. S. Geological Survey, is in San Francisco. He has been conducting a survey of the boundary line between Montana and Idaho and the boundary line between the United States and Canada in that region.

COL. CHAS. R. SUTER, Corps of Engineers, U. S. A., who for some time has been a member of the California Debris Commission, will on October 15th exchange stations with Col. Sam'l M. Mansfield of Boston, Mass., the latter officer assuming the duties hitherto discharged by Col. Suter.

J. B. REINSTEIN, of the University of California, has gone to Antwerp to attend the meeting of the international jury that is to pass upon the plans submitted in the Phebe Hearst architectural competition of the University of California. The jury will meet on

September 29th. Mrs. Hearst has provided that each of the architects who is successful in the preliminary trial shall be furnished free transportation to San Francisco and that his expenses shall be paid while in California.

E. M. HAND of Butte, Montana, sailed this week to inspect and report upon the mineral resources of the Malay archipelago and the Philippines for a London company. He says he will devote most of his time to Borneo. There is considerable placer gold in that island, and some quartz, a number of stamp mills having gone in during the last two years, but the interior is practically unknown.

Commercial Paragraphs.

CONTRACTS involving 10,000 H. P. are not common. Especially is this true when the agreement is to transmit this enormous amount of power over a distance of forty-five miles. And when the contract further stipulates that the losses in generators, transformers and line shall remain normal, notwithstanding the difficulties involved, the agreement then becomes of still greater interest. Such a contract has just been executed by the Westinghouse Electric & Manufacturing Company, in which they agree to comply with the above conditions. The plant is for the Snoqualmie Falls Electric Power Co., of Snoqualmie Falls, Washington. The power station is to be located at Snoqualmie Falls, forty-five miles from Tacoma and thirty-one miles from Seattle, to which place the current is to be transmitted and then utilized by Westinghouse motors. The contract involves the building and delivery at above points, of four three-phase, rotary armature generators, having a normal aggregate capacity of 6000 kilowatts, and which are to be direct connected to the water wheels: two 75 kilowatt kodak exciter dynamos also to be direct connected to water wheels; high and low potential switchboards, for main power station and sub-stations at Seattle and Tacoma, involving seventy-six marble panels with all necessary instruments, switches, etc.; high tension oil insulated static transformers having an aggregate capacity of 10,575 kilowatts; rotary transformers with a total output of 2700 kilowatts and six type "C" motors developing 1600 H. P. with adequate lightning protection at both ends of the line. These machines when installed will make available for industrial, railway and lighting purposes the power of Snoqualmie Falls. The line potential will be 25,000 volts, and its current will be carried over bare aluminum wires to sub-stations where lowering transformers will sufficiently reduce the voltage for safe transmission within the corporate limits of the two cities.

A MIDDLEBROOK, Denver manager Jeanesville Iron Works Co., writes that his people are building a compound mine pump to carry 500 pounds pressure for parties in Los Angeles, Cal., and that their shops are very busy on mine pump work.

Recently Declared Mining Dividends.

Grand Central, Utah, 12½ cents per share, \$31,250; Sept. 10th. Total paid in four months, \$125,000.

Elkton Con. M. & M. Co., Colorado, 2 cents a share, \$25,000; payable September 20.

Bunker Hill & Sullivan M. Co., Idaho, 7 cents per share, \$21,000; September 5.

Gold Coin M. Co., Colorado, 1 cent per share; payable September 25.

Mercur, Utah, \$25,000; payable Sept. 20.

Silver King, Utah, \$37,500; Sept. 10.

Horn Silver, Utah, \$20,000; payable Sept. 25.

Co-operative Mining Syndicate, Washington, \$1.50 per share; Sept. 17.

Portland, Colorado, 2 cents per share, \$60,000; Sept. 15.

Anchuria-Leland, Colorado, 1 cent per share, \$6000; Sept. 15.

Recent California Mining Incorporations.

Chaparral M. Co., San Francisco; capital stock \$100,000, subscribed, \$70,000; W. Christie, J. H. Middleton, F. L. Fine, F. J. Juchter, N. W. K. Schore.

Leviathan M. Co., Alpine Co., Cal.; capital stock \$1,000,000, subscribed \$60,000; P. Curtz, D. Barrie, F. E. Brooks, J. L. Brooks, H. W. Curtz, P. N. Packard.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPTEMBER 6, 1898.

610,377.—PREPARING PRUNES FOR DRYING—W. C. Anderson, San Jose, Cal.

610,378.—WAVE MOTOR—E. M. Barthel, San Jose, Cal.

610,387.—GANG PLOW—G. W. DeWitt, San Ardo, Cal.

610,436.—ROLLER BEARING—G. W. Dickenson, Tacoma, Wash.

610,393.—TELEPHONE—S. S. Fisher, S. F.

610,481.—ELEVATOR—E. M. Fraser, S. F.

610,353.—GRIP PULLEY—A. S. Hallidie, S. F.

610,181.—TYPE WRITER REGISTER—F. A. Hassler, Santa Ana, Cal.

610,354.—COMPASS JOINT—F. H. Heath, Tacoma, Wash.

610,458.—FRUIT GRADER—G. M. Peterson, Salem, Or.

610,421.—SHIP'S BERTH AND SETTEE—T. R. Turner, S. F.

610,503.—MOTOR CARRIAGE—W. E. Twitchell, St. Helena, Cal.

610,312.—STAND BOILER—F. Walker, Los Angeles, Cal.

29,319.—JEWEL CASE DESIGN—Dora M. Smith, Los Angeles, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

APPARATUS FOR PREPARING PRUNES FOR DRYING.—Wm. C. Anderson, San Jose, Cal. No. 610,377. Dated Sept. 6, 1898. The object of this invention is to provide a continuous apparatus by the use of which fresh prune plums are first dipped in a lye solution for the purpose of removing the bloom and sterilizing any ferment, germs, etc. They are then carried to a second dipping and washing tank and from this delivered into a separator where dirt is separated from the fruit, thence to the graders or an intermediate pricking device, when the latter is used, whereby the skins are punctured, and then to the trays upon which the fruit is spread and conveyed to the fields for drying. These transfers are made successively and mechanically from one part to the other so that the amount of handling of the fruit is greatly reduced, and the number of operators and expense of the work is made much less than in the ordinary means employed for this class of work.

GRIP PULLEY.—A. S. Hallidie, San Francisco, Cal. No. 610,353. Dated Sept. 6, 1898. The object of this invention is to increase the gripping power in that class of wheels or pulleys over which grip ropes or cables pass, and it consists of devices by which elastic pressure may be applied to the gripping pulleys to prevent the rope from slipping, these devices adapting themselves to inequalities of the rope, variation in the truth of the pulley and fluctuation in the hauling strain upon the rope. These devices consist of spring-pressed pulleys or rollers between which the full-curved gripping jaws pass successively as the rope is gripped by the jaws and the rollers act to compress the jaws more closely upon the rope while it is passing around the pulley and between the jaws. These grip jaws are allowed to open for the rope to pass out as it leaves the pulley and are also sufficiently open for the rope to pass between them when it arrives at the pulley and is an improvement upon the grip pulleys previously patented by Mr. Hallidie, and it is particularly applicable for hauling ropes for logging purposes and for transmitting a large amount of power as may be needed in hauling logs long distances through timber regions for ropeway or tramway purposes.

GANG PLOW.—Geo. W. DeWitt, San Ardo, Cal. No. 610,387. Dated Sept. 6, 1898. This invention consists essentially in a mechanism whereby the draft may be applied toward the rear of the triangular frame, as well as the front end, and means by which the draft can be shifted from one side to the other of this portion of the frame so as to hold the plow up to its work and resist the tendency to slide downhill while working upon hillsides. The draft chain is connected with a ring by clevises which allow it to be adjustably attached to the front bar of the plow frame, and rods diverge rearwardly from the clevis to a transverse bar fixed across the plow frame intermediate between its front and rear ends with pulleys journaled at either side of the central line of draft and a lever connected with the chain that the draft may be transferred to one side or the other and regulated at will.

MOTOR CARRIAGE.—Walter E. Twitchell, St. Helena, Cal. No. 610,503. Dated Sept. 6, 1898. This invention is designed to produce an improved mechanism for transmitting the power of any motor such as gasoline, electric or other engine to both sets of the vehicle wheels, and to thus increase the efficiency of the driving. The vehicle body has front and rear wheels turnable upon their shafts and a countershaft journaled to the vehicle body between them. By means of a sprocket wheel upon this countershaft motion is communicated directly from the motor and through a second countershaft journaled essentially in line above the fore wheel axle and sprocket wheels and chain, motion is communicated to the front wheels, the axles of which have hinged or jointed ends and a mechanism by which they are turnable about their hinges to steer the vehicle without greatly changing the position of the driving sprockets with relation to those from which the power is received. Chains from sprocket wheels upon the main countershaft pass around sprocket wheels upon the rear driving wheels so that they are driven in unison with the front wheels. By means of suitable handle and connecting mechanism the gears may be changed to reverse the movement of the machine and the speed may also be changed by a suitable arrangement of gearing.

WAVE MOTOR.—Michael Barthel, San Jose, Cal. No. 610,378. Dated Sept. 6, 1898. The object of this invention is to provide a more perfect means for applying the vertically reciprocating movement caused by the action of the waves to produce corresponding movements in machinery. The apparatus which is built upon a wharf or structure comprises an enclosed open bottomed casing within which a float is freely movable and by which it is protected from the transverse movement of the waves and acted upon by the vertical movement only. A cross-head is slidable upon guides in line above the float with which it is connected and a drum mounted upon the journal shaft has flexible ropes coiled about its periphery, one extending upward to connect with the cross-head and others coiled in the opposite direction around the drum extending down to connect with the float so that the vertical movements of the float are transmitted to produce a rotary oscillation of the drum. By means of a second shaft and pulleys to which the power from this drum is transmitted and suitable ratchet gearing, the alternate rotations of the drum in opposite directions are converted into a continuous movement of the second drum in one direction.

Laws Governing Water Right.

TO THE EDITOR:—1. What is meant by filing on water? 2. How does it affect my interest in a stream of water? 3. How does it affect my neighbors on either side? 4. Can I file on more than one stream? 5. Where is the filing done and at what cost?

Eureka, Humboldt county, Cal.

1. "Filing on water" is probably an expression in the local vernacular, indicating one of the acts to be performed in appropriating the water of a running stream for some useful or beneficial purpose; that is, filing for record in the Recorder's office a notice of appropriation.

2 and 3. The laws of California provide that the right to use the running water in a river or stream or down a canyon or ravine may be acquired by appropriation. The courts of California construe this to mean that the running water of the stream may be taken out of it and carried elsewhere for use, provided that

(a) The land through which the stream flows below the place of intended diversion is Government land, unoccupied or unclaimed under any of the public land laws; or

(b) If claimed under such laws, the attempted appropriation must be of such quantity and for such uses and purposes as will not appreciably diminish the quantity or impair the quality of the water as it flows to the land of the lower proprietor. In other words, after lands of the public domain have passed into private ownership, or rights to such lands have been initiated under the public land laws, no subsequent appropriation of the water flowing through them can diminish or impair the rights of such prior riparian proprietor.

What is an excessive appropriation or an impairment of quality or an infringement of the right of the lower proprietor depends entirely upon the facts surrounding each particular case.

4. Subject to the qualifications above stated, a party may "file" upon as many streams as he pleases.

5. A person desiring to appropriate water must post a notice in writing in a conspicuous place at the point of intended diversion, stating therein, first, that he claims the water there flowing, to the extent of a given number of inches measured under a 4-inch pressure; second, the purposes for which he claims it, and the place of intended use; third, the means by which he intends to divert it, and the size of the flume, ditch, pipe or aqueduct in which he intends to divert it. A copy of the notice must, within ten days after it is posted, be recorded in the office of the Recorder of the county in which it is posted. So far as the expense of this is concerned, it is merely nominal.

Within sixty days after the posting of the notice, the claimant must commence the construction of his works and prosecute the same diligently to completion, unless interrupted by snows or rain. As between two appropriators, the first in time is first in right.

This is a general outline of the law of water as administered in California. It is an expert statement from a lawyer eminent in his profession, the matter being deemed of sufficient general importance to warrant extended and authoritative reply.

Rubber From Corn.

From the waste of ordinary yellow corn chemists, working in a guarded laboratory in a big sugar refinery in Chicago, produce a rubber that will bend and stretch, and which, it is claimed, has the resiliency of Para caoutchouc. Combined with Para rubber in the proportion of half and half, experts say this new rubber of corn will cheapen the cost of rubber goods 25 per cent. In the manufacture of glucose a good deal of corn has always been waste material. Some of this was made into other products, but there has always been a refuse of about 5 per cent which could not be utilized. This is what will be transformed into the new substitute for rubber. Corn rubber has almost exactly the appearance of the ordinary reddish-brown India rubber. The pro-

cess of manufacturing is not perfect enough to make it resist heat as well as India rubber, however. This has offered the greatest difficulties to the chemists, who are now working to remedy this defect. Tendency to oxidation is one of the defects of India rubber. The men who are working on the corn rubber declare that articles manufactured from it will always remain pliable and not crack.

An Odd Irish Railway.

Written for the MINING AND SCIENTIFIC PRESS by ARTHUR GORE.

The single rail railroad connecting the town of Listowel with the pleasure resort of Bally Union, situated on the southwest coast of the county Kerry, Ireland, and near the mouth of the river Shannon, is of unique construction and presents many features of interest not only to engineers, but also to those engaged in the promotion of cheap railroads in new countries. The line was built in the years 1886-87 by the Lartigue Railway Construction Co. of London on the patents of Mons. Chas. Lartigue, a French engineer, and has been in successful operation since that date. It is, so far as the writer is aware, the only one of its kind in Great Britain, the other similar lines having been built in France, Spain and Algeria. The chief traffic on the line consists mostly of passen-

and are in lengths of about 20 feet. Rollers on the engines and cars run against these side rails and prevent oscillation of the train when in motion, while the rail on top carries the entire load. The total weight of the permanent way, excluding switches, bridges, etc., is, roughly, 163,500 pounds per mile. The turntables are about 30 feet diameter, made in the same manner with rails and trestles suitably braced and revolving on a ring of live rollers in the usual way. The rail for turntables and switches is made slightly thicker in the web. The switch is an ingenious device. One of them may be seen immediately in front of the locomotive in the accompanying cut. It is made of a curved length of rail struck with a radius of 90 feet, in the same manner as the turntable and about the same diameter. The center pivot, on which the switch revolves, is not immediately beneath the center of the rail in a vertical direction, but is set at a distance from a tangent to the curve, depending on its radius, in this case about 10 inches. By means of this switch it is possible to shunt onto four or five different tracks. Each switch is provided with a signal and interlocking gear, which secures it simultaneously at both ends. The signal cannot be placed at safety until it is so secured and the key removed from the lock; and, conversely, the first



STATION ON A SINGLE RAIL RAILWAY.

gers in summer and sea sand in the winter months, large quantities of the latter material being hauled from the beach at Bally Union to Listowel, and taken from there by farmers for manuring purposes and reclaiming peat bogs. The road is about ten miles in length, single track, with a station and passing place for trains half way at the village of Leselton. It is constructed throughout of steel. The permanent base consists of a single rail mounted on trestles of a triangular shape, resembling the letter A, with an extended base to form the sleeper on which the engine and cars run. This rail is of double-headed section, about 4 inches deep by $1\frac{1}{2}$ inches wide across the head, by about $\frac{5}{16}$ inch in thickness, and weighs twenty-seven pounds per yard. Each rail is about 30 feet long. It is bolted to the trestles at the top by $\frac{1}{2}$ -inch bolts fitted with washers of a special kind to prevent the nuts slackening back. The top of the rail is 3 feet $3\frac{3}{8}$ inches above the sleeper in the ordinary line as used on level ground. The trestles are spaced at intervals of 3 feet $3\frac{3}{8}$ inches center to center, except at the rail joints, where the distance is reduced to 20 inches. They are made of angle steel $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{8}$ -inch section, riveted at the base to a sleeper about 3 feet 6 inches long of a channel section 6 to 7 inches wide by $\frac{3}{8}$ inch thick. At a distance down of about 2 feet from top of rail is riveted across the trestle a piece of angle steel of the same section as the uprights. Attached to this cross piece at its extremities, and running along either side of the structure, are light guide rails, formed with a web $\frac{3}{8}$ inch thick and single head 1 inch wide on face, laid on their sides. They weigh twelve pounds per yard

operation in connection with unlocking the switch places the signal at danger, and while the switch is open the signal cannot be moved from that position.

The crossings are of two kinds on this line: Where a roadway crosses the line at the level of the sleepers, a gate is formed in the line, hinged at one end, with its outer end moving on a roller path. These gates are interlocked with signals in the same manner as the switches. Where the roadway crosses at a higher level, posts are erected at either side of the line, to which are hinged at a suitable height gangways or doors, raised or lowered by means of chains and counter-weights, somewhat similar to those in use at ferryboat landings to allow for the rise and fall of the tide. The doors, when down, rest on the rail and provide a roadway for traffic to pass. These crossings are also interlocked with signals which show at danger until the doors are tight up against the vertical posts, free for the trains to pass clear. The engines are provided with two boilers of the ordinary locomotive type, connected together both in the steam and water spaces by suitable pipes; they are slung on either side of the line and suspended from cross beams attached at the centers to the frames containing the wheels and motion. They are fitted with copper fireboxes and brass tubes. The wheels are three in number, 24-inch diameter on tread, coupled by side rods. They are of steel and fitted with tires; the leading and trailing wheels have flanges on either side $\frac{1}{2}$ -inch deep, and the center wheel is made broad on the tread and without any flanges. The cylinders are 7-inch diameter by 12-inch stroke; the pressure of steam is 150 pounds per square inch. The ordi-

nary Stephenson link-motion is used for operating the valve gear. The tender is also fitted as an auxiliary motor, supplied when in use with steam from the boilers, and can be used when required with heavy loads on a steep grade.

The motor is thrown out of gear by a special form of friction clutch; the cylinders and motion is contained in frames similar to those on the engine. On either side is a water tank and coal bunker. The tender carries 200 gallons of water and one ton of coal. The weight of engine in working order is about 15,680 and tender 10,000 pounds.

The passenger cars are made to accommodate twenty in the first-class cars and thirty in the third-class cars, equally divided on either side. They weigh about 6700 pounds unloaded and from 9700 to 11,200 pounds loaded. Each car is mounted on two trucks; each truck has two wheels 22 inches in diameter; they are of the Mansell type, with wood centers and steel tires fitted with flanges. All the engines and rolling stock are fitted with the Westinghouse automatic air brake, and the engine is also provided with a hand brake. The freight cars are built to carry 9000 pounds and weigh, unloaded, from 6500 to 7000 pounds. Special ballast cars are used for the transport of sand. They are constructed of angles and thin iron plates with drop doors at the bottom. The usual weight of passenger trains hauled—six cars, exclusive of engine and tender,—is about 64,000 pounds, and the average speed twenty miles per hour. Attached to each passenger train is a dummy car, fitted with steps for crossing to either side of the train. The grades on the line vary from 1 in 40 to 1 in 150, and the sharpest curves are 90 feet radius.

It is claimed by the promoters of this system that it presents many economical features, besides favoring simplicity of construction, especially in mountainous countries or mining districts, as the single-rail permits of sharp curves, and, the rail being elevated, the inequalities of the ground surface can be met by lengthening the supports as required, and the rail level preserved without recourse to expensive earthworks. In running through countries where timber is plentiful, a large amount can be used in constructing the line. In such cases ordinary rails can be used and spiked to the timbers. Where steel is used, though, the section is of course made stronger as the length of trestle increases.

At the exhibition held last year in Brussels an experiment with one of these lines on a large scale was carried out. Three miles of track was laid down, considerably stronger than the line above described, the object being to demonstrate the adaptability of the system for rapid transit, and speeds as high as 100 to 120 miles per hour were proposed. The motive power used at Brussels was electricity, generated at a power station on the grounds and supplied to the motors at a pressure of 700 volts through a copper conductor of channel section running along the line and resting on insulators secured to the sleepers, the return circuit being made through the wheels and rail. The car was 58 feet long by 11 feet wide and was made to accommodate 100 passengers. The total weight, including all machinery, was fifty-five tons. It was mounted on two trucks having four wheels each 4 feet 6 inches diameter on tread. There were four motors, two to each truck—one on either side; two wheels of each truck were driven and two ran free. The motors were of the four-pole type and each developed 150 H. P. when running at 600 revolutions per minute and supplied with current at 700 volts. The car axles ran at the same speed. The connection between the spindle of the armature and train axle was made by means of a steel chain of special make; the armatures were 26 inches in diameter by 11 inches long. The total weight of each motor was 8288 pounds. The car was provided with pointed ends like a boat to diminish the effect of wind pressure. The weight of rail used in this case was eighty-two pounds per yard.

The accompanying illustration represents a station on the Irish line.

Mining Summary.

ALASKA.

F. C. Wade, crown attorney of the Klondike, estimates the gold output this season at \$8,000,000. A recent census shows that there are 16,000 people in Dawson and 10,000 on the rivers and creeks in the district.

A report from United States Consul McCook at Dawson City, written on August 4, says that prices of provisions are very high, exceeding by 25 per cent those of last year, and lodging is hardly to be had at any price. Outsiders, he says, cannot realize the conditions: destitution and suffering is imminent for many unfortunate prospectors, who are unable to get away. No one, he continues, should go to the gold fields without a couple of thousand dollars and supplies for two years. The output of gold has been exaggerated five fold.

ARIZONA.

A Tombstone dispatch says Smith Bros. & Moore of that place have sold to Stein & Borek of Philadelphia seventeen mining claims of wolfrinite in the Dragon mountain. It is used for hardening steel and heavy ordnance. The purchase price was \$200,000.

At Silver Bell the Nelson smelter is turning out three tons of copper bullion daily from ore taken from the Old Boot mine.—The developments on the Young America have produced several thousand tons of copper ore which average, it is said, about 7 per cent. The tunnel which has been run 400 feet has cut the ore body at a depth of 500 feet.—N. Faison's Silver Hill copper mine has developed a large ore body yielding gold and silver as well as copper. A vein 14 feet wide is claimed for it.

The Sterling Placer Co.'s ground and placer machinery at Walnut Grove, costing \$70,000, is being placed in position and will start in a week. The company has 5000 acres of gold-bearing gravel in the Walnut Grove section.

At the Copper King mines in the Dragons near South Pass the company is at work securing water for the smelter, with encouraging prospects. A large quantity of ore is ready for reduction.—At the Oro mine in the Oro Blanco district work has been resumed and preparations are being made for building a mill.

CALIFORNIA.

Amador.

Sinking continues at the Zeila mine. About thirty of the men who were laid off a few weeks ago went to work again last week.—It is locally reported that development work will soon begin on the Summers mine at Plymouth.—Among the improvements contemplated by the Blue Lakes Water Co. are a large reservoir and a new ditch. The ditch is to have an elevation 80 feet higher than the present one. The improvements will cost upwards of \$400,000, and when finished a new electric plant will be built at White's Bar, on the Mokelumne river.

Dispatch: A 10-stamp mill has been erected at the Pocahontas mill, near Drytown, and a three hours' run on Sept. 1st developed that the mine has ore that will pay \$30 a ton in free gold. Owing to the shortage of water, it will not be possible to operate the mill at present, but the work in the mine is not allowed to lag.—The gallow's-frame of the Douglas M. Co., at Volcano, is completed, and the shaft has been unwatered to a depth of 153 feet. The old timbers are found to be as solid as when put in thirty years ago.

Republicans: At the Bay State, Plymouth, work has resumed.—At the Butte Basin M. Co. sinking, suspended on account of foul air in the shaft, will be resumed as soon as the blower is put in.

Ledger: The Tennessee mine at Pine Grove has struck a chute of ore at the 200-foot level which is 2 feet wide, and the average value assays \$54 per ton. This was formerly the Tellurium mine and was abandoned years ago, the rock being so rebellious that the gold could not be extracted in free milling.—The Amador Queen No. 2, at Jackson, operated by an Eastern company, is sinking the shaft.—The operators of the Douglas mine, at Pine Grove, contemplate the erection of twenty stamps as soon as the grading is finished. The new hoist has started and work is progressing.—The Jackson E. & D. Co. has the Amador Queen No. 1 shaft down 1100 feet, and sinking is going on.

Record: Work is progressing at the Balio mine at Sutter creek. The crosscut from the shaft is in 180 feet, and some good quartz has been found. By the time water comes this property will be in a condition to be worked on a large scale.—The Potazuma M. Co. took out a run of ore from their mine last month and had it milled in the Zeila mill at Jackson. They crushed 140 tons, and the proceeds were \$3825, besides 1½ tons of sulphurets worth \$200. The richest rock was not milled, but will be sent to Seiby & Co. for treatment. There is in the neighborhood of five tons of ore, which assays \$200 per ton. The ledge is from 2 to 4 feet in width.—Men interested in the Douglas M. Co. of Volcano visited the property from San Francisco. This company has been in operation for some time and has expended \$20,000. They have sunk 210 feet on the Douglas claim, and on the old Sorocco mine, which in former years was sunk to a depth of 400 feet, the shaft has been cleaned out and repaired 150 feet in depth. The company is well satisfied with the prospects and will push development.

Butte.

The dredgers being built near Oroville will be afloat Oct. 1, and machinery will be placed.

Calaveras.

At Sheep Ranch the Sheep Ranch mine, which has not been worked for five years is preparing to resume work. There is about 1100 feet of water in the shaft, but a tunnel is being run to the shaft at the 300 level. The gallow's-frame is ready to be hoisted. The

machinery will be run by compressed air and electricity. A new mill will soon be erected to be run by electricity.—At the Gwin mine the steam power plant is about completed and it is expected to have everything in running order by the middle of the month.—River bed mining in the Mokelumne this season is carried on to good advantage as the river is low, and a large number are taking advantage of the situation.

Near Angels Camp the water in the Coleman mine broke through and flooded the Lightning mine up to within 125 feet of the surface this week.—At San Andreas the strike of a rich lead while crosscutting at the 700-foot level at the Ford mine is reported. The vein shows a width of 20 feet.

El Dorado.

Work is being done by E. W. Chapman at the Gold Note and Philadelphia mines at Omo. Rollers, engines, hoisting apparatus and air compressors are being hauled in. About fifty men are employed.

Inyo.

The Independent reports a favorable outlook for a deal in the upper belt of mines around Pleasant canyon, Panamint mountains, including the Montgomery properties and Radcliff mine.

Kern.

Los Angeles Review: The Johannesburg Reduction Works cleaned up last week a fifty-eight ton run of Black Hawk ore that averaged \$27.40 per ton.—P. McMahon, Mgr. Wedge mine, has taken a lease to sink 100 feet and drift 100 feet each way on the Little Butte extension, and the Little Butte Extension Co. will soon resume work on the shaft.

Mariposa.

A corporation headed by J. Moss of the San Joaquin Valley railway is developing a slate quarry near Hornitos.—Work has begun on the Houghton mine by an incorporated company.

The following is a Boston report: "G. M. Hyams has returned from his inspection of the late developments at the Merced gold mine, and reports that the company has now at Coulterville a gold mine, but not a large one as at present developed. The single ore chute upon which the last six months' developments have been made, has continued to make a good showing as depth has been attained, and the management is well satisfied that at this point it has a paying gold mine. It has been decided, therefore, to start up the Merced mill and expend the profits from the milling of the present developed bodies of ore in endeavors to find more paying ore chutes. The property is a very extensive one geographically, but does not warrant extensive operation unless more paying gold chutes are uncovered. It is believed that the present ore chute, even if yielding only \$1 per ton profit, will furnish sufficient money to make a thorough test of the entire property."

Merced.

At Hornitos Mr. Hutchings of Coulterville is sampling the tailings from the old Washington mine.—It is locally reported that work will be resumed shortly on the Yellowstone mine.

Nevada.

The bedrock tunnel at the Malakoff mine at North Bloomfield is in about 500 feet and it is expected that the channel will be reached in another 400 feet.—Operations have begun on the old Slide mine at French Corral and twenty men are at work.

A strong flow of water was encountered in the Mountaineer mine, Nevada City, on the 1200 level, and the pumps are having a hard time to handle it.—It is said that operations will begin soon on the Pawning mine at Grass Valley.—J. A. Lipman & Co. have bonded the Rising Sun mine in Maybert district and have begun work.

The Old Home Con. M. Co. has levied an assessment of 2 cents per share, delinquent Oct. 8.

Placer.

Near Rocklin Hart & Ross have been operating eighteen months, and are employing ten men. The pay gravel is 40 feet from the surface and varies in depth. It is of cement formation and is pulverized by the arrastra system.—At Ophir W. P. Black has bonded the Boulder mine and will develop the property.—The Eclipse mine has closed down temporarily.—Development work is being crowded at the Bellevue mine and the prospects are encouraging.

The Mayflower G. M. Co. has levied an assessment of 5 cents per share, delinquent October 10.

Plumas.

Bulletin: Mining on the North Fork in the river bed will be in operation before the end of the month.—At the Golden Gate quartz mine near Quincy the owners sank a shaft and crosscut the ledge, disclosing a body of ore 3 feet wide and prospecting well in free gold. There is ample water on this claim for a mill.—At La Porte the Alturas M. Co. controls three miles of the creek bed. During the last forty years this stream has been the outlet for the debris from the Gibsonville, St. Louis, Howland Flat and other mining districts. A hydraulic elevator is in use. The length of the gravel carrier is 100 feet. The debris piles up in the shape of a levee. The Alturas Co. have two of these machines working and twenty-two men employed. During six months about 1000 feet of a channel 150 feet wide is mined. The property is paying well. The company furnishes its employees cabins, cooking utensils and tools and pays them \$2.50 a day, the men boarding themselves.

Independent: Mrs. Gruss has made a discovery in the Genesee gold mine, near Genesee, of much value. For years the owners of this and adjoining mines have looked for an oxidized black formation, which was rich, the quartz being thrown aside as of no value. Five years ago a cut 12 feet wide was run into the hill and through an 18-inch vein of quartz, which interposed, in search of this black ma-

terial, and, failing to find it, the work was abandoned. Recently it was discovered that the ledge through which the cut had been made was rich in gold. Five stamps are turning out \$1000 a day.

Riverside.

At Winchester Mott Bros. have temporarily discontinued work at their asbestos mines.

San Bernardino.

At Canyon del Oro district the new gold find continues to develop. There are over fifty claims located, some producing high-grade ore.

The Colton Chronicle says the water question at Lytle Creek is apt to get into the county courts, as J. C. Christy claims that he will not stop his hydraulic mining, as his claim to the water is over a quarter of a century older than that of San Bernardino. He has taken out \$55,000 from his mine and does not propose to quit just at present.

Shasta.

(Special Correspondence).—In several portions of this county where properties were abandoned years ago, either because the ores were not free milling or because their treatment was not understood, work is being resumed quite extensively. New prospect work is also being followed to greater extent than has been done for many years. Much of this is due to the impetus given by the Mountain Copper Co. in the purchase and, also, custom treatment of ores. Old dump piles of ore, that were considered waste, have been tested by the newer treatments and found to be of value.

Not all the sections of Shasta county are base metal regions. New properties are being opened that have free milling ores. Mines, too, that have been worked to only 200 feet, are being pushed to greater depth, and find either a lost ore body or an improvement in the existing ledge by smelter treatment.

The Mountain Copper Co. has bought a large group from individuals and the railroad company one mile northeast of the Iron Mountain mine. They have put on a large plant of machinery and done considerable development. The ledge is 60 feet wide, of low-grade ore. The company's railroad will be extended to the property.

The great copper belt of this county begins at Iron Mountain and follows a northeast course in a semicircle for twenty-five miles. At various points on this belt exploiting is going on by men of means. Principal among these are the company of Berlin and Dusseldorf capitalists; the Lewishow Bros. of New York; Salee & McDonnell, and a number of smaller operators.

D. McCarthy is furnishing the Copper Co. thirty tons daily of ore for fluxing, at \$1.75 per ton at his mine. In addition, he is storing a good grade of ore.

The Mount Shasta mine, about two miles from Shasta, in which O. O. Howard Jr. of San Francisco recently became interested, has reached 140 feet depth on a 3-foot ledge containing a streak of high-grade ore. The ore is shipped to the smelter at Keswick.

In the same neighborhood Herrin & Leetch are taking out a blue quartz that carries good values in free milling ore in a ledge running from 6 inches to 4 feet in width.

Near Muletown, J. Christensen is successfully opening a paying property.

In the Black Bear mine work has been resumed cleaning out the tunnels—one 175 feet and the other a 350-foot crosscut. The property has been idle for five years. Ore from the old dump has been sampled at the smelter and shown to be of fair grade.

Pugh & Messell are putting up a mill on Clear creek, near Shasta, to mill ore from two meritorious mines.

In the One section the outlook is encouraging. The Bullychoop mines are about to be reopened, probably by an English corporation.

The old Sunny Hill mine, which in its day has been a rich producer, and is now owned by the Mariscano Co. of San Francisco, is still idle, though it is known to some of the company that this is a property of merit. Together with its regular ledge this mine some years ago yielded a pocket 60 feet long, 3 feet thick and 30 feet high—supposed to be the largest ever found in California. The average value of the ore was \$200 a ton. The property had been worked only 200 feet deep. The present company ran a 1500-foot crosscut tunnel and cut the ledge at 600 feet depth. They found the same character of ochre ore that paid richly when worked by the first owners, but by the latter supposed to be barren, yet, when induced to assay it, found it to run \$153 in gold. Resumption of work on the mine, it is said, will be an agreeable surprise to some of its present owners in the outcome.

The Black Spider mine, near Keswick, is about to be reopened by a San Francisco man.

The old Phoenix, on Clear creek, is being exploited for San Francisco people. This is a 60-foot ledge of low-grade ore running from \$2 to \$4.75 per ton.

Redding, Sept. 12th, '98.

Mr. Campini of San Francisco bought the interest of C. Flick in the Flick, Stolberg & Maurer mining claims near Shasta for \$3000.

Sierra.

The Gold Valley mine near Downieville is down 400 feet, with the 200 and 300 levels well developed, and carries a 10-foot ledge of medium grade ore; it has yielded \$70,000 in two years. It is a contact vein with slate hanging and diorite footwall. It has a 25-stamp mill run by electricity, and a chlorination plant of four tons daily capacity. The reverberatory furnace is 70 feet long and 13 feet wide. The chlorinating vats are of two and one-half tons capacity. Fifty men are employed.

At Gibsonville the Schofield Bros. are running a tunnel, which is in 1500 feet.—The Crown Point Co. has begun operations and expect to strike the pay channel by a tunnel of 400 feet in length.—Spencer & Gould have their claim in readiness for water.

F. B. Hill of Colorado has bought the Ori-

ental mine, near Allegheny, from C. Heintzen, the owner. The Oriental has been idle eighteen years. It has been worked to a superficial depth and has produced \$3,000,000. From one pocket \$740,000 was extracted. Work will begin on the property without delay.—In the Plumbago, after driving 1500 feet, the pay chute has been discovered and is a good body of ore. The air compressor plant is well under way. There will be 120 H. P. generated; and after transmitting it a mile to the mine, the air will be reheated and applied. The improvements at the Plumbago will cost \$25,000.

Siskiyou.

The miners in the several river claims at the Klamath have not been taking out much gold yet, but expect to do well on their second cuts.—In the Pacific mine at mouth of Humboldt creek, Klamath river, night and day shifts are busy, with prospects of success.

The tunnel being run through the Humboldt range on the west side of Yreka, as a prospecting venture by a company of Yreka business men, is in 500 feet, and has tapped quartz containing iron and sulphurets in large quantity.

The Golden Eagle mine, near Fort Jones, idle since 1860, is to be developed in an extensive manner. It is the intention to commence sinking in a few weeks, going down 500 feet and running crosscuts at each 100-foot level.

Alta Advance: J. H. Smith of Portland has purchased the Knownothing mine from Bennet & Bevans for \$20,000, and is developing the property, and as soon as it is in good shape machinery will be added.

Journal: The Barton windmill claim at Oak Bar is paying well. A large force is employed.

McCaw & Co. are opening the ledge on Patterson creek recently purchased from Fry & Macaulay, which prospects well. It is 20 feet wide and is believed to be a lode of value. They have also bought the Lina mine adjoining.—W. G. Stanley & Co. are running a tunnel in the Hoboken mine on Cherry creek. The ledge varies in width from 6 inches to 2½ feet. It contains sulphurets in large quantity.

Mr. Bromley, who has charge of sinking the prospecting holes along Yreka creek, has fifteen more holes to complete the work, and when finished the managers of the enterprise, Souther & Gardener, will come to a conclusion about putting in a dredger.—A Chinese company at work near Oak Bar, in Klamath river, has been taking out rich pay.

Another Chinese company working a bar near Oak Bar is down to bedrock and doing well.—The Distlehorst & Barton Dredger Co. has found rich prospects working into a bar in Klamath river at the mouth of Horse creek. Scrapers have been used in taking off the surface down to water level, and the dredger will remain at that point until the winter rains raise the river.

News: Seattle men represented by J. W. Martin have made the first payment on the Cape mine.—S. R. Gardner of Oro Fino, has purchased a fourth interest in the Bunker Hill hydraulic mine, near Happy Camp, and has secured control of the entire property for \$20,000. He is putting the mine in order for the coming season's work. Two new giants are being fitted up.

Tuolumne.

The Atlas M. Co. are driving a drain tunnel into their properties near Tutletown which will be half a mile in length.

Independent: A good strike has been made in the Sonnet claim near Sonora. The vein is 18 feet wide, 3 feet of this being fair grade. The remaining portion is of low grade but payable. The owners are T. Lane and E. C. Davis.—The Jubilee G. M. Co. are erecting a 40 H. P. steam engine and a four drill compressor. The tunnel is in 400 feet.—E. B. Barner, operating for foreign capital, has begun work on a tunnel to tap the Atlas mine at Jackass Hill 500 feet from the surface, and when completed will be 2000 feet long.

Democrat: The Excelsior mine near Sonora, which has long been idle, has been secured by the Bodie Standard Con. M. Co. R. C. Turner is Supt. Men have been put to preparatory work for the extensive operation to be done in the spring.—The new hoist at the Mazepa will be running the 20th, when sinking will be resumed.—In the shaft on the Brewer & Adams sinking is progressing. The vein is 20 inches wide. A steam hoist is contemplated.—At the Kanaka at Groveland operations go ahead rapidly. The mill runs twelve hours out of each twenty-four, enough water being secured to drive the machinery.

COLORADO.

The Miners' Union at Victor, Colo., is building a \$30,000 opera house.

The daily ore output of the Leadville, Colo., mines is 2000 tons.

BOULDER COUNTY.

While doing development work the Adit tunnel at Ward has taken out during the year \$60,000 worth of ore, which almost balanced the expense of equipment and work, which reached \$63,000. The tunnel has been driven 991 feet this year, making a total length of 2727 feet. The Ni Wot branch has been driven 245 feet. In a crosscut there are 14 inches of smelting and 5 feet of mill ore. A big body of ore is also opened in the upraise. Sixty men are on the payroll.—The Virgin mine in the Eldora district is taking out ore that proves the high-grade values claimed for the camp. The ore shipped last week returned \$11,500 per ton in gold.—In the Enterprise mine on Spencer mountain the shaft is going down 100 feet deeper, and is in ore which improves with depth. There are 500 tons of low-grade ore on the dump, and the amount of high grade is being increased.—The new pyritic smelter, near Ward, will soon start up. If the process proves a success, there are many thousand tons of low-grade ore in the district that will at once become valuable.

CHAFFEE COUNTY.

Ho Hoy, the Chinese manager, is pushing work on the Lalla Rookh at Turret. In the

shaft are 26 inches of ore which gives values from \$46 to \$76 in gold per ton under mill-run tests. The property is owned by a California company. Large veins of low-grade ore are being opened in the Heron Park district. The veins are from 12 to 36 feet wide, and the ore runs from 60 cents to \$12 in gold per ton. A depth of 600 feet will be gained in some of the tunnels. The tunnel on the Ethel T. Whitehorn district, has opened up a vein 2 feet wide composed of thin layers of quartz and slate.

CLEAR CREEK COUNTY.

Denver capital is successfully operating the Edwards placer, at the mouth of Chicago creek. They struck bedrock at 18 feet and found coarse gold. They also found that the shaft was on a well-defined vein in the bedrock. Denver capital is developing a section of Clear Creek county near Idaho Springs that has been considered a ranch region. Float has been found that assays from \$200 upwards.

DOLORES COUNTY.

The Enterprise mine at Kico is again in operation and from 80 to 100 men are employed and the shipments average four cars a day. The average of the ore produced during 1897 was 2.15 ounces gold and 170 ounces silver per ton. The Laura claim of the group will be operated through the Onomo tunnel, which will open the mine at the 250 level and expose a large body of low-grade ore.

EAGLE COUNTY.

The Iron Mask group of Battle mountain is working in high-grade sulphides and making regular shipments of 242 cars a month.

EL PASO COUNTY.

At Cripple Creek the Anaconda Co. is outputting at the rate of thirty tons per day of mill ore running \$20 a ton. From the Kittie M. two shipments have been made from the new strike that went \$30 per ton. The ore shipments over the Golden Circle Railway show an average of forty-five carloads a day for the past month. Goldfield is sending out thirty and the others fifteen. Potvine & Vaine of the Christmas closed a 90-ton shipment recently of ore that yielded \$40 a ton. The ore body found on the 400 level of the Midget is improving with development. The ore chute is 30 feet long, with an average width of 42 inches. Official estimates place the earnings of the Elktion mine, Cripple Creek, during July and August at \$50,000 net. The Vindicator Co. shipped only 1000 tons in August, which was less than usual. The values of ore, however, were of a higher grade. Other portions of the property worked under lease shipped about 800 tons. The total production of the Lafayette last month was 200 tons, some of it running fifteen ounces. R. W. Petie, treating dump ore at the Lillie mine, received from the first carload shipment of sediment saved from the washings of the rock \$110 per ton, while the screenings went \$80. The sale of fifty acres of placer ground near Cripple Creek was made by E. Bell to J. R. McKinney for \$13,000 cash.

On the Johnson lease of the Half Moon the output for August was 1200 tons, with a gross value of \$60,000. The Hart group of thirty acres near Cripple Creek was sold last week to J. R. McKinney and others for \$50,000.

GILPIN COUNTY.

During the month of August there were 460 stamps dropping in the Black Hawk mills. The greater part of the work was done on Gilpin county ores. Some company mills will be added to this list next month. Considerable new ground is being opened and September will show a marked increase. Lessees on the East Notaway mine shipped five and three-fifths tons of ore last week and received \$5,827.90. There were two classes, the first worth \$1200 per ton, the second \$800. A carload of regular ore ran \$45 per ton.

The shaft on the Robert Emma mine, Maryland mountain, has been retimbered. It is 300 feet deep and is ready for the cage. The ore is a good grade of gold and there is enough to place the mine among the big shippers of the camp.

LAKE COUNTY.

The 10-stamp mill of the Penn Leasing Co. at Leadville has proved such a success, and the ore bodies in the mine have increased so rapidly, it is proposed to enlarge the capacity to 100 stamps. From one shaft fifty tons of dry silicious quartz are hoisted daily and sent to the smelter. It is estimated there is \$500,000 worth of ore in sight. The Resurrection G. M. Co.'s daily output is 150 tons. The company owns between 400 and 500 acres of patented ground. The Little tunnel is in 1150 feet and a contract has been let to drive it 300 feet farther. The Ixex M. Co. is daily sending to the smelters about 325 tons of dry silicious oxides and copper iron sulphides. The biggest shipper in the Kokomo district near Leadville is the Colonel Sellers, with its output of 175 tons daily. The ore is an iron sulphide, the iron excess being valuable, and good values in gold and silver are also carried.

OURAY COUNTY.

(Special Correspondence): The O. & N. and the American Nettie, situated on the mountain side, about 2000 feet above Ouray, are known as the gold-belt mines. They produce high-grade gold ores which exist in contact formation and consist of both sulphides and oxidized material. The O. & N. has produced \$200,000 within the last two years. The work on this property now is mainly for development purposes.

Up Dexter creek are the Khedive, Bachelor, Wedge, Caliope and Old Maid, all of which are working good forces. The ores in this belt are a galena and gray copper, the main values being silver and lead. The Bachelor and Khedive, under the same management, operate a concentration mill.

The Caliope, consisting of mine and mill, ships ten cars of concentrates per month to the smelters. This is an old property, reopened within the past year. Mgr. F. A.

Sparks states that the ores run 125 to 200 ounces silver and 40% lead.

The Mineral Farm, near Ouray, was reopened this year after five years of idleness. It has a concentrating mill and is shipping small batches of ore, carrying silver and gold in sulphides and gray copper. The property belongs to R. J. Lucas of St. Louis and is superintended by E. T. Haughey.

The Ouray matte smelter, belonging to the Cleopatra M. & M. Co., is handling about 2000 tons of ore per month. The district furnishes the limited amount of copper ores required to produce the matte. As a fluxing material, iron ores from Ironton are used to a limited extent. This plant disburses about \$20,000 per month at Ouray.

The properties of the Caroline M. Co. are near the base of Mt. Sneffles, eight miles from Ouray, toward Telluride. They consist of the Revenue tunnel, the Virginus mine and a concentration mill of 400 tons per day capacity. The mill, air compressor, ore cars and hoists are operated by electricity, generated by water power in the canyon three miles below.

The Revenue tunnel is about 7x8 feet, double-tracked, electric-lighted and goes in 7500 feet, crosscutting the Virginus vein. Near the breast of the tunnel an incline shaft upraises, at a 45° angle, 1400 feet on the vein to a station, which connects with a 900-foot vertical shaft from the surface. Thus the tunnel, incline and shaft described form the basis of the extensive underground workings. The tunnel drains the property of about 1500 gallons of water per minute, the latter being utilized to some degree in the mill. The ores produced are a sulphide of lead, with streaks of gray copper, the latter carrying high silver values. From 180 to 200 tons of ore per day are shipped from the tunnel, the most of which is concentrated. The mill, in charge of W. A. Garrett, has sixty stamps, six Huntington, four crushers, four sets rolls, twelve Wilfleys and a drier. The concentrates are reduced to one-half inch and one-fourth inch sizes and five tons of ore to one ton of concentrates. Mr. Crusher is mine superintendent, A. E. Reynolds of Denver is Gen. Mgr. A force of 600 men is employed.

The Camp Bird mines are in Imogene basin, on the opposite side of the range from Savage basin. The vein here trends along a few hundred feet below the crest of the range and is opened by four different crosscuts, the principal one cutting the vein at 620 feet. The ores carry high values in gold, about fifty tons of which are milled per day at the company's water-power mill two miles below. The altitude of Camp Bird mine is 11,400 feet above sea level.

Ouray, Colo., Sept. 6th, '98.

The Fowler smelter at Ouray is receiving ore from thirty properties, more than twice as many as were contributing at this time last year.

PITKIN COUNTY.

Aspen: (Special Correspondence).—While the ore tonnage of Aspen has greatly fallen off since the days of the '80s, it still remains one of the most interesting mining districts in the State. The operations here are not only on a large scale, with first-class equipment, but the methods generally have been up to date and scientific. The Cowenhoven tunnel, which penetrates Smuggler mountain a distance of 2½ miles, was not the conception of a stock schemer, nor was there any visionary purpose about it. It was driven primarily for drainage of the then partially exploited mines of Smuggler mountain and for the transportation of their ores. Incidentally, there were other accruing benefits; but with the two main purposes in view, the promoter and executor of the project had the co-operation of the principal property owners on the premises named. It stands to-day as one of the most successful tunnel enterprises in the State, because it has constantly received a profitable revenue from the mines which use it. At present the tunnel is utilized by the Della S., Alta Argent, Homestead, Bushwhacker, Park Regent and Mineral Farm, which ship through it 6000 tons of ore per month.

Near the base of Smuggler mountain are the Mollie Gibson and Smuggler mines, whose workings are by means of shafts which sink 1000 feet below the level of the Cowenhoven tunnel, making it necessary for those two properties to operate powerful pumping plants to keep out the water.

On Aspen mountain, which is on the opposite side of the town from Smuggler, are the Argentum-Juniata and the Aspen groups, the former having to pump its surplus water, the latter being drained by tunnel work. The Durant, Millme, Enterprise, Veteran, Iowa and Camp Bird are likewise important groups on Aspen mountain.

The products of the district, as is generally known, are silver, lead and lime ores. The values in silver range from 20 to 40 ounces per ton; lead values vary from 5% to 12%; ores from various properties carry from 30% to 45% lime. For the lime the smelters pay 10 cents per unit, which often overbalances the treatment charge on a given quantity of silver-lead-lime ore. As a result of the lime ores becoming such a factor of late years, and the reduction of freight rates and smelting charges, it is now possible to ship a lower grade ore from Aspen than in former years, when the price of silver was higher.

In the properties drained by the Cowenhoven tunnel a large proportion of present production is by lessees, who pay royalties ranging from 10% to 50% of the smelter returns.

The Mollie Gibson and Argentum-Juniata, separate properties, but worked under one management, are concentrating about 4500 tons of ore per month. Together they operate a mill equipped with crushers, jigs and twenty-two vanners.

The Smuggler and Durant groups, under the same management, ship 2000 tons per month to the smelters, 800 tons of which are concentrates and 1200 tons crude ore. This

property operates two concentration mills, aggregating about 125 tons capacity per day, in one of which is a new type of concentrator, designed by Supt. S. I. Hallett.

The Aspen group ships about 800 tons of ore per month, which runs about 40 ounces silver and 7% lead, with a high percent of lime. The Bushwhacker, controlled by the Aspen Co., and worked by lessees, ships about 750 tons of crude ore to smelters and 1000 tons to concentrators per month.

The Millme ships about 1500 tons and the Iowa and Camp Bird groups about 250 tons per month.

The Mineral Farm produces 800 tons per month, mainly by lessees. The company, however, is sinking a three-compartment working shaft from the Cowenhoven tunnel, to be equipped with an electric hoist.

The Aspen Contact, on Woody creek, is being worked by three sets of lessees. The Bi-metallic, eight miles north of Aspen, is not working.

The only gold property in Pitkin county, it is claimed, is that known as the Hunters' Pass mine, eighteen miles east of Aspen. It is an old property recently infused with life and managed by C. H. Munger. The property is worked through a tunnel, the ores carrying gold in iron and copper pyrites. A new 30-stamp mill, equipped for amalgamation and concentration, has been operating since July 1st.

The Aspen concentrator, operated by G. W. Thatcher, has forty stamps, twenty-five concentrating tables and is handling seventy-five tons of ore per day, which is reduced in the ratio of six to one.

It is estimated that the Aspen camp ships about 12,000 tons per month to the smelters. The deepest workings in the district are in the Mollie Gibson, reaching 1200 feet.

Aspen, Colo., Sept. 1st, '98. WASCOTT.

PARK COUNTY.

H. E. Pease has sold to the Kansas-Burroughs Con. M. Co. for \$7500 a portion of the Kansas lode, Nevada mining district.

SAGUACHE COUNTY.

Creede never showed more progressive mining activity nor better results. The Old Solomon is keeping up its big output, with twenty-five men on the payroll. A large body of low-grade ore has been opened in the Revenue tunnel in 1500 feet. Prospects in different parts of the camp are looking like mines, and the mills have all the work they can do. The ore is generally a concentration proposition, low grade but with good margins on account of the large and easily handled bodies. The Nelson tunnel is 6000 feet in and the effects are beginning to be visible in the lowering of the water in lower levels of the Last Chance and Amethyst. The camp is working 500 men and shipping an average of 300 tons a day.

SAN JUAN COUNTY.

In the tunnel on the Mabel claim near Silverton a 6-inch streak of talc is found which carries \$50 in gold and \$33 in silver. Accompanying the talc is a small streak of quartz which runs \$180 in gold per ton. The Ridge-way mine is shipping two carloads of ore a week.

SAN MIGUEL COUNTY.

The North American Expl. Co., near Telluride, owner of the Nellie and Ella mines, has bought the Star Gazer lode for \$15,000, a cash payment of \$5000 being made. A company of New York capitalists, headed by Horatio Page and J. N. Huston, has bought twenty-two claims near Telluride, and will extensively develop and equip the property without delay. From the Ophir district weekly shipments have been increasing until they have reached twelve carloads per week. This is from the old mines of the district. The Tom Boy mine and mill, Telluride district, is handling 150 tons of ore daily. It requires 100 men during the day and 75 men at night to keep work going.

SUMMIT COUNTY.

The El Dorado mine at Robinson is shipping forty tons daily of sulphide ore, mined at a depth of 1100 feet. Since the sale of the X. L. mine, in Ten-mile district, men have been put to work and are rapidly getting it on a producing basis. The product is a gold-lead combination, the values being 70 per cent lead and \$20 in gold per ton.

IDAHO.

In the Bull Dog mine near Ketchum the lode is 40 feet wide. The property is being developed by C. Crane of Salt Lake City.

Near Centerville there are twenty-one men working on the Twin Sisters mine and mill.

The Elkhorn is being opened up. A force is at work cleaning out the old stopes and tunnels. The mill has been started. Forty men are working on the Morning Star mine. It is announced that the company contemplate a tramway to the Payette, a distance of two miles, and there erect a 50-stamp mill. Fifty men are at work on the new dredge near Centerville. At Wallace the Father Lode tunnel has 2 feet of ore that is nearly a shipping grade and considerable concentrating ore additional.

The dredge below Warm Springs is running night and day. The boat is lighted by electricity. Magee Bros. of Pittsburgh, who own the Morning Star group of quartz claims near Grimes Pass, have bought the Bunch quartz claim near the Morning Star.

The Twin Springs Placer Co. on the upper Boise has made a satisfactory clean-up since the water was turned in last month. The electric light plant is completed and everything is being put in shape for next season's work. They will run until about the middle of December, and the mines start up again in the latter part of February, making a shut-down of less than three months.

At Kingston the Idaho Antimony M. Co. is again running its plant to its full capacity, employing twenty-five men. It has now passed the experimental stage, and the work from this time on will be of practical nature. This

is said to be one of the few deposits of antimony being worked in the United States.

MICHIGAN.

The Oliver M. Co. is studying the matter of drying their ores before the latter are shipped from the mine. Mgr. N. P. Hulst says that the moisture contained in the ores to be sent out this season represents about 90,000 tons. It is said that, after drying, the ore takes no moisture from the atmosphere when placed in stock. The space occupied by the ore would be the same, and might be somewhat increased, but the weight would be 12 per cent less. More tons of ore could be transported in a boat load. Ninety thousand tons of water is a big amount to ship from one mining concern in a single season.

MISSOURI.

The Joplin News says: "The feature of last week was the tremendous bulge in the zinc ore market. There was a net advance of \$2.50 per ton on high-grade ore, and thirty-two cars sold at that price, but the advance was even greater on ore of the lower grade, the price in some cases bounding up \$3 to \$4. Every mill is running to the limit of its capacity and double shifts are tearing down ore in the mines at a rate to astonish miners of five years ago, all in the effort to make big sales while the price hangs round \$30. The spelter market kept pace with the advance of ore, and the price went up to \$4.60 with no offerings, and the metal strongly held. In fact there is no spot spelter and none for August delivery to be had, and September spelter will sell for \$4.75 this week. The lead market also advanced. Ore sold at \$24 and was in demand at that price, which is 50 cents per 1000 better than last week's price. The big lead market is strong and the metal in demand at \$4 with a certainty of better prices this week."

MONTANA.

At Sterling the lessees of the Galena mine shipped two carloads of ore which netted \$90 per ton.

The shaft of the Anaconda Co.'s coal mine at Carbonade is down 900 feet, and the 50-foot stratum of sandstone which overlies the coal vein has been penetrated. It is expected that the company will be shipping coal in the course of a month or so. The Silver Tip mine at Libby has been bonded to H. G. Lougee for \$15,000 and a cash payment of 5 per cent of this amount.

A fourth interest in the Graham, Legal Tender, Tip Top, Mountain Chief, Fraction, Iron Duke, Mary, Lippett, Golden Butterfly and Roger Williams quartz lodes, sixty acres of placer ground and water rights near Livingston were sold at sheriff's sale last week to satisfy a judgment and costs of \$40,788.78. The property was bought by G. O. Freeman for Receiver Wilson of the First National Bank of Helena. At the Moulton mine at Neihart twenty men were working on the 300-foot level, cleaning out and working on the stopes, but the water raised faster than the pumps could handle it, and most of the men were laid off, and the tanks put to work again to enable the pumps to be lowered and set further down. Temporary guides will be put on and the tanks kept going until the pumps are reset.

Picket: The Rocky Fork Co. at Red Lodge will shortly increase the output of their coal mines from 1000 to 1500 tons per day. To this end an extra track will be laid the full length of the slope, giving the workings 4800 feet of main track. There never was a time in the history of the Rocky Fork mines when the demand for the output was so great as it is at the present, and to keep up with the increase in the orders pouring in the company is extending its underground workings on the main vein 1100 feet. With every foot of extension the large vein increases in width and the deeper the mines the better becomes the coal. The regular monthly payroll of the mines aggregates \$30,000. The Never Sweat shaft of the Anaconda Co. is being rapidly pushed to the ultimate end—5000 feet. It is said that at that depth bodies of high grade ore have been found with the Diamond core drill, and the expense of sinking the costly shaft will not be in vain. Much of this work has been accomplished at a cost not exceeding \$1 per foot. The New Year mine at Fergus Falls, comprising five claims, has been bonded to Wright & Johnson of Denver, Colo., for \$50,000 for two years. The bond provides that the lessees shall expend not less than \$400 per month in development work and pay \$1 per ton royalty on all ore mined, to apply on the payment.

NEVADA.

The ore shipments from the mines of Eureka and Hamilton districts for the last week were 555,660 pounds.

The Wilson Ore Tailings Leaching Works at Pine Grove, Esmeralda Co., were recently destroyed by fire. At Silver Peak work on the Mary mine is progressing and they are extracting good ore. The contractors in the Drinkwater tunnel are making good headway. Case & Jaegels are taking out ore from the Homestake and A. Valencia & Co. are at work on the Bourbon mine and have a large ledge. At New Pass the mill is running steadily at the Bell mine and the returns from the ore are satisfactory. At Tuscarora the Dexter Co. is rushing the work of obtaining additional power and will have their 40-stamp mill running inside of sixty days. The Eira is producing three carloads of high-grade ore per month. L. Parsons is reported to have struck an ore body over 100 wide. Judge Talbot is said to have struck pay ore. Twelve men are employed sinking three shafts. The new mill at the Reno mine in Como is dropping ten stamps successfully. The mill is running twelve hours out of twenty-four. A force of 300 men is employed in performing work on the iron deposits at Lovelock to perfect title for patent. A broad gauge railway to connect with the Central Pacific is included in the plans of the

owners of the property, who are Eastern capitalists.—The articles of incorporation of the Era M. Co. at Tuscarora, recently filed with a capitalization of \$10,000, have been changed to a capitalization of \$250,000.—Supt. Berthelot of the Bald Mountain M. Co., near Elko, has paid off his men and closed down the property until next spring; scarcity of water.—The Alta mine and mill at Virginia are closed down, the last lot of ore not proving sufficiently profitable to warrant a continuance of operations in that part of the mine.

The report from the committee of Comstock superintendents on proposed drainage and deepening was prepared and ready on the day set—the 14th inst.—and on the following afternoon the executive committee met in the Nevada block, this city, to receive it. There were present Charles H. Fish, Charles Hirschfeld, George R. Wells, W. G. Morrow, C. L. McCoy and John Sanders. The report is as follows:

VIRGINIA, Nev., Sept. 12, 1898.

Charles H. Fish, Esq., President General Committee on Comstock and Deep Mining, San Francisco, Cal.—DEAR SIR: In response to the request of your committee for information concerning the levels of the Comstock mines below the Suto tunnel, we respectfully submit the accompanying reports, which are summarized from the weekly and annual reports of the superintendents who had charge of the mines from 1886, before deep mining was suspended, which said reports detail the exploratory work done in the levels below the Suto tunnel in the several mines, to-wit: Utah, Sierra Nevada, Union Mexican, Ophir, Con. California & Virginia, Best & Belcher, Gould & Curry, Savage, Hale & Norcross, Chollar, Potosi, Yellow Jacket, Crown Point, Belcher, Overman, California, Alta and Justice.

The reports show that in several of the mines mentioned pay ore was found below the level of the Suto tunnel, at points ranging from the 1800 to the 3300 level, which was the deepest point reached. The opening and partial prospecting of the lower levels was done in constant fear of encountering water in excess of the pumping capacity, and the history of the Yellow Jacket deep workings shows this fear to have been well founded.

The great width of the Comstock lode calls for an enormous amount of development work in each level below the ground can be said to have been thoroughly prospecting. In illustration of this fact, attention is directed to the great yield of ore from the Crown Point, Belcher, Yellow Jacket, Chollar, Hale & Norcross and Consolidated California and Virginia mines (bonanzas) after they were supposed to have been worked out.

In the light of such developments as were made in the vicinity of the Comstock bonanzas, and the counteracting water in excess of the pumping capacity in the north end mines, it can be truly said that there is not a level on the Comstock lode that has been so thoroughly prospecting that there is not a chance of finding ore in it.

Becker in his "Geology of the Comstock Lode" says: "The first condition for the formation of a quartz bonanza is an opening to receive it. The group of mines worked through the Union shaft and the Yellow Jacket, Crown Point and Belcher mines show peculiarities of structure which point to the likelihood of such openings at lower levels. Openings such as that which contained the Consolidated California & Virginia bonanzas, however, gave almost no warning of their approach from above, and may at any time be struck in the intermediate mines."

With modern pumping appliances placed along the lode so as to pump the greatest quantity of water at the least possible cost, we feel safe in saying that all of the water that was encountered in the lower levels can be handled for very much less than the former cost, and at the same time providing for pumping much larger quantities of water than was found in all of the deeper workings. Such machinery would enable a thorough exploration of all the lower and still deeper levels to be made in safety, while the old system allowed only partial prospecting, and in some cases the levels were barely opened when the work was suspended.

In conclusion, we wish to state that in consideration of the fact that it has been figured that a modern pumping plant can be operated on the lowest levels of the Comstock lode and pump the water to the Suto tunnel for one-twelfth of the cost of pumping by the old system, and assuming that such calculations can be verified, and then considering the favorable prospects that were encountered together with the great area of unexplored ground on the lower levels, we do not hesitate to advise the expenditure of the money necessary to install and operate a complete modern pumping plant for the drainage of the lower levels of the Comstock lode. (Signed)

D. B. LYMAN, ex-Superintendent Ophir, Mexican, Union, Utah and Con. Cal. & Va.
G. McM. ROSS, Superintendent Con. Cal. & Va., Ophir and Mexican.

P. KERWIN, Superintendent Gould & Curry and Best & Belcher.

A. C. KYLE, Acting Superintendent Union and Sierra Nevada.

H. W. GORHAM, Superintendent Savage, Chollar, Potosi and Crown Point.

JOS. R. RYAN, Superintendent Hale & Norcross and Andes.

W. E. SHARON, Superintendent Yellow Jacket, Belcher, Seg. Belcher, et al.

A. JACKEY, Superintendent Overman and California.

E. D. HOYLE, Superintendent Alta and Lady Washington.

JAS. H. KINKEAD, Superintendent Occidental and Kentuck.

CLAYTON BELKNAP, Acting Superintendent Justice.

A. C. HAMILTON, Superintendent Alpha and Eschweiler.

R. PRENDERGAST, Superintendent Bullion.

The report, after being read, was ordered submitted to the immediate consideration of the general committee.

NEW MEXICO.

A strike on the Corena at Cochite assays twenty-three ounces gold.—A large cyanide plant is to be set up at the Crown Point mine.—The Andrews cyanide mill, Sierra county, is treating fifteen tons of ore per day from the Trippie mine.—J. E. Collard is saving 90 per cent of the value of the Mastodon mine ore at the Porter mill, Hillsboro district.—At the Wicks mine Supt. Williams is working eight men and has the shaft from the 300-foot level down 90 feet. At this depth the ore vein is 1 foot wide and two assays yielded \$58 and \$76 respectively, in gold.

Trux Texas at Central shows good ore and a strong vein. The mill will have a capacity of seventy tons per day.—The Kansas City S. & R. Co. has sixty men employed and is shipping forty tons of ore per day from the

Othello and Desdemona mines at Cook's Peak. These mines have produced more than 12,000 tons of ore per year during the past three years.—J. M. DeKiersey is developing properties in the White Signal district. A trial lot of five tons from the Golden Dawn mine gave returns of \$32 per ton gold, \$6 per ton in silver and 5 per cent copper. On the Gold Dust mine, the same owner, the pay streak is from 6 to 18 inches in width and averages \$37 per ton.

The Philadelphia mine at Hanover made a strike last week of an ore body 7 feet wide that averages 26 per cent in copper.

OREGON.

The Eagle group of mines near Baker City, comprising twelve claims in a 500-foot tunnel, has a ledge from 2 1/4 to 4 feet wide that gives an average return of \$17 to the ton. There are 3000 feet of development work done.—The King Solomon mine will soon be a producer. Canadian capitalists have secured the ownership of the property and are making arrangements to put up a mill. A large force is employed at the mine.—Godfrey & Tabor, owners of the Red Boy mine, report their new mill completed and ready to begin work.

At the Baisely-Elkhorn mine near Baker City forty men are at work. The shaft is down 450 feet. The mill is crushing from thirty-five to forty tons of ore every day.—The Landry hydraulic mine near Baker City has closed for the season. Because of water shortage the mine had only a four months' run. The cleanup was considered good.—Some sixty men are working and drifting on Lower Powder river with good results owing to low water.

At Hull & Beck's quartz mine, near Jacksonville, the vein increases in width as work progresses; it is now several feet wide. A 5-stamp mill is crushing the ore taken out by six men.—J. R. Mitchell of Colorado, who represents foreign capital, has bonded the Braden and Alice mines in Kane's Creek district and the Lucky Bart and Gray Eagle in Sardinia Creek district. Development of some of the properties is proceeding.—The Jones Co. has twenty men developing its properties in Mt. Reuben district, Josephine county.—Near Ashland, Molander & Felger of Port Townsend have bought 160 acres of land on Evans creek, Josephine Co., having four claimable ledges which are reported running 8 per cent of quicksilver. One of the ledges is said to be 400 feet wide and 1 1/2 miles long.—L. D. Fay & Co. are getting their mine on Powell's creek fitted up for work this winter. They have 120 acres of placer ground and have their ditch almost completed and have pipe and giant ready for work.

Stith & Phillips have bonded the Free and Easy mine, near Grants Pass, to Bonneau & Mohr of Denver, Colo., for \$10,000.—At the Golden Standard mine, near Jacksonville, the mill will be put in operation as soon as water can be had. A large amount of good ore is ready for crushing.—Fifteen cars loaded with hydraulic pipe, ranging from 15 to 38 inches in diameter, are being put on the J. C. Lewis placer mine, near Leland.—The C. Cook mine at Glendale is down on the ledge 117 feet. He will put a mill on the property soon.—The Victory mine has the reservoir completed. Wood & Smith of the Lincoln mine are also building a reservoir.

UTAH.

Shipments from Tintic for last week were 147 cars of ore, 11 cars of concentrates and 19 bars of bullion.

In the South Swansea, in the 750-foot level, a 4-foot vein of galena has been opened that runs 50 per cent lead and over ninety ounces in silver.

The Swan-Bemis mill, at Bingham, at which operations were suspended three weeks ago to make a change in the elevator, last week started on ores from the Niagara M. Co.'s property.

Mercur Mercury: The Chloride Point, with the changes made in the mill, will handle 150 tons of ore per day. A departure is being made from the usual manner of treating zinc shavings, it being found that strips 1/2-inch wide work well in the settling boxes, better than the fine shavings, the zinc being entirely eaten up by the solution, and combining readily with the silver and gold. The cyanides carry a large percentage of silver, the last shipments being richer than some of the bullion brought from the smelters. As soon as the mine begins to run to its capacity of 150 tons per day, a clean-up will be made three times per week. An experiment has been made to see if a higher grade of ore can be successfully leached, and the result has been satisfactory. Some of the high grade ore was mixed with the low grade, and the leaching has been more successful than in the other cases.—The total output of the Ophir Hill mill for August was 1017 tons of concentrates.

The Herschel Co., after driving a tunnel 2200 feet, have decided to make a change in the method of exploration, and an upraise is being made at one point and a winze sunk in another.—The work inaugurated on the Omaha of West Dip continues with good results. The company has put down three shafts upon the strike of the vein, and in each of them it is said that milling values have been found.—The Mercur shipped 1000 pounds of auro-cyanides. The Annie, in Camp Floyd district, will resume work immediately. The shaft had reached 500 feet, and the ore values were \$5.50 when work ceased.

Mercur Miner: Machinery for La Cigale roaster will be ready for operation within a month. The roaster is of a daily capacity of 100 tons. Only a small portion of the ore will need roasting, as there is no arsenic or other base metal in it.—The Macintosh Sample, at Park City, last week shipped 1,798, 830 lbs. of ore.

Bingham Bulletin: A. J. Bettles is having a test run made at the Markham mill on 100 tons of ore from the Copper Center and Jubilee tunnels. It is liable to lead to important developments in connection with properties of the Boston Con. Co.—Smith & Walker are

starting work on the Yukon, an old claim under relocation at the mouth of Cottonwood.—Indications are that the September shipments will show a gratifying increase over those of August. The starting of the old Jordan and Dewey mills alone insures an increased output.—Good bodies of high grade ore have been opened up the past season in the east workings of the Old Telegraph mine. Some of the assays show 300 ounces silver.

WASHINGTON.

At Colville cleaning out the tunnel of the Old Dominion mine is progressing with three shifts. The length of the tunnel is 4000 feet. Opening the works will not be so difficult as at first anticipated. The Bonanza mine is shipping two carloads of first-class ore per day. The company is preparing to sink to the 500-foot level. When this is completed it will be necessary to put in a new hoisting plant.

The purchase of the Daisy group of claims on Troublesome creek by C. E. Haber, representing a German syndicate, promises to result in extensive mining industries in the Cascade mountains. He is employing fifty men, divided among four camps, and is driving long line tunnels, the main tunnel being 300 feet long. The principal ore so far found is a low grade arsenical iron. The several camps will be connected by a cable tramway.

FOREIGN.

AUSTRALIA.

There were forty-one tons of bismuth ore exported from the colony of New South Wales in 1887, the value being £490. This metal is found in the Glen Innes, Pambula and Nymagee districts, but the demand for it is limited; and the Queensland report states that no ore was raised from the antimony and bismuth mines.

BRITISH COLUMBIA.

In the White Bear, at Rossland, the shaft is down 230 feet. The ore body is 2 to 3 feet wide.—In the Alberta the whole face of the workings is in mineral, and of this about 2 1/2 feet is a good grade of quartz, mixed with arsenical iron and copper. Values range from \$8 to \$50.—At the War Eagle the shipments for August were heavier than during the previous month. The hoisting plant is raising the regular quota of 300 tons daily. No dead work is being carried on, with the exception of sinking the shaft, and toping and drifting continue to monopolize the force.

A Montreal company, in which Hosmer & Mackay are said to lead, has bought the Iron Horse mine at Rossland. The price is said to be \$100,000. The intention of the purchasers is to commence work immediately. It contains the two veins that are in the Virginia, which run through the entire length of the property, and are traceable by croppings. The plan of work has not been decided upon, but it is thought that a shaft will be sunk 300 feet and a drift run to tap the vein.—The Tom Payne Co. have put men to work on the Myrtle group at Ymir.—The Rio Grande Co. have found a 26-inch vein that runs \$26 in gold and silver per ton. The force has been doubled at the Le Roi and 225 men are working in the mine. There are twenty-one machine drills at work. The mine is shipping 350 tons of ore a day. Of this amount 200 tons will be raised from the mine, and the balance, 150 tons, will be taken from the dump, where an enormous tonnage has accumulated since shipments had been suspended.—The Douglas Pine claim, Shoal bay, has been sold to J. H. Adams for \$10,000. A recent strike shows a vein from 5 to 10 feet wide with assays running well in gold. Development work is to be begun at once.—In the strike of a new ore body last week in the White Bear at Rossland, at a depth of 235 feet, the average assay gotten was \$46 and the character of the ore is almost identical with that in the Le Roi at a depth of 350 feet.

LOWER CALIFORNIA.

It is locally reported that the Juarez placer mines, owned by Los Angeles men, and which have been worked by Chinamen and Indians for ten years past by dry washing the surface, without water nearer than three miles, will soon be supplied with water which has been developed by the aid of two pumping plants, one of which is six miles and the other three miles distant. A pipe line has been laid. Either of these pumping plants can furnish an ample supply of water to work the hydraulic and centrifugal pumps used for washing the gravel. It is expected that they will handle from 400 to 500 cubic yards of gravel every ten hours, which the most conservative say will average 75 cents per yard; and from assays made by experts, have shown as high as \$1.50 per cubic yard. The gold taken out is nearly pure, selling at \$20 per ounce. Wood for fuel is to be had in unlimited quantity at \$1 a cord, and labor is comparatively cheap, wages to Mexicans and Indians being \$1 50 a day, Mexican money, equal to about 75 cents of a gold dollar.

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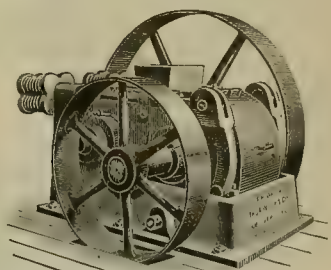
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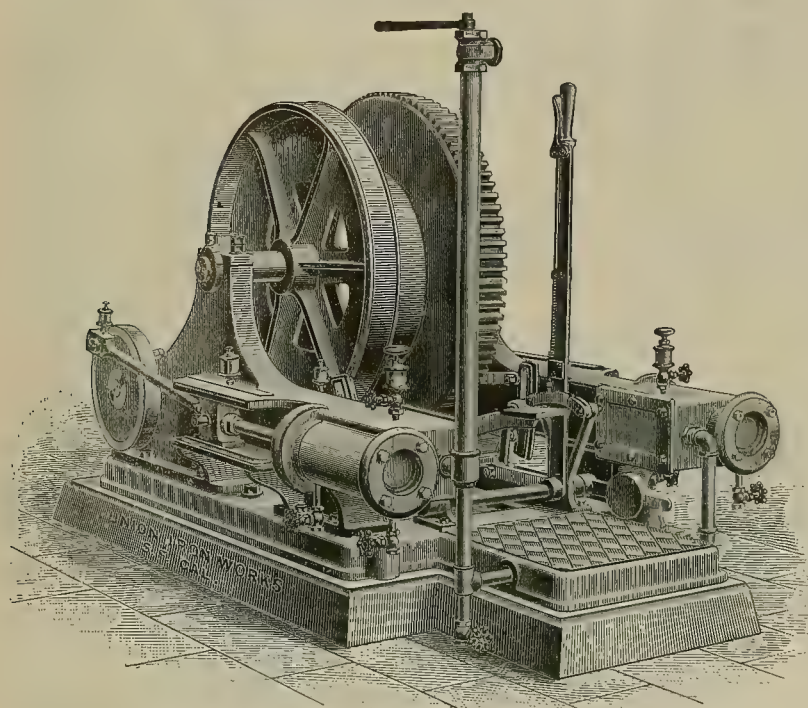


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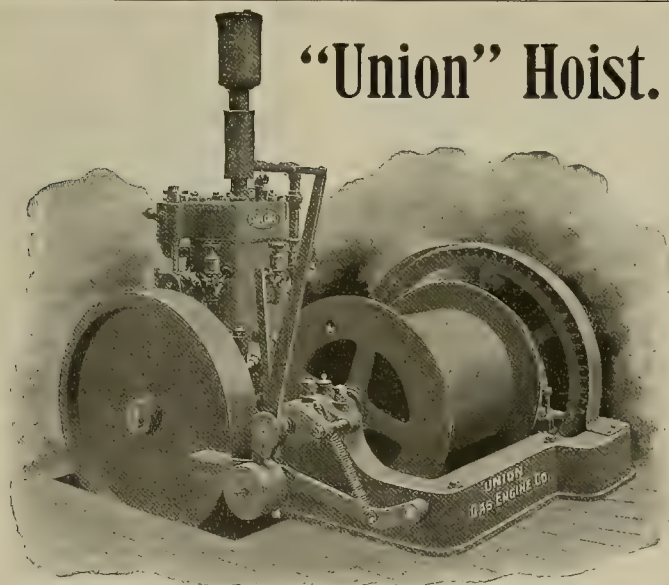
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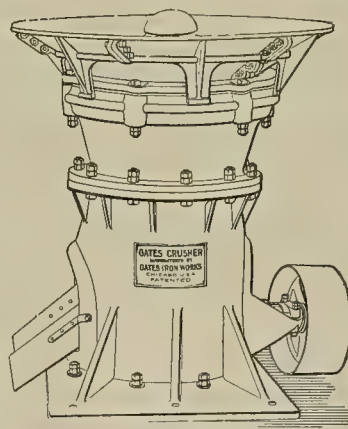
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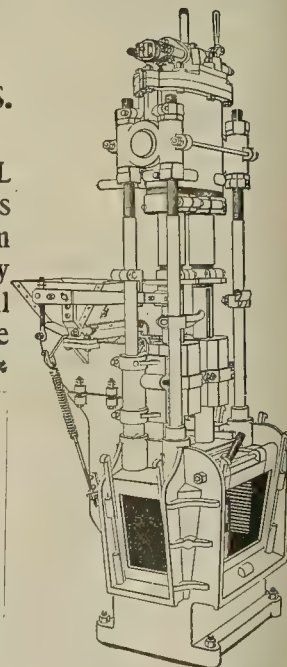
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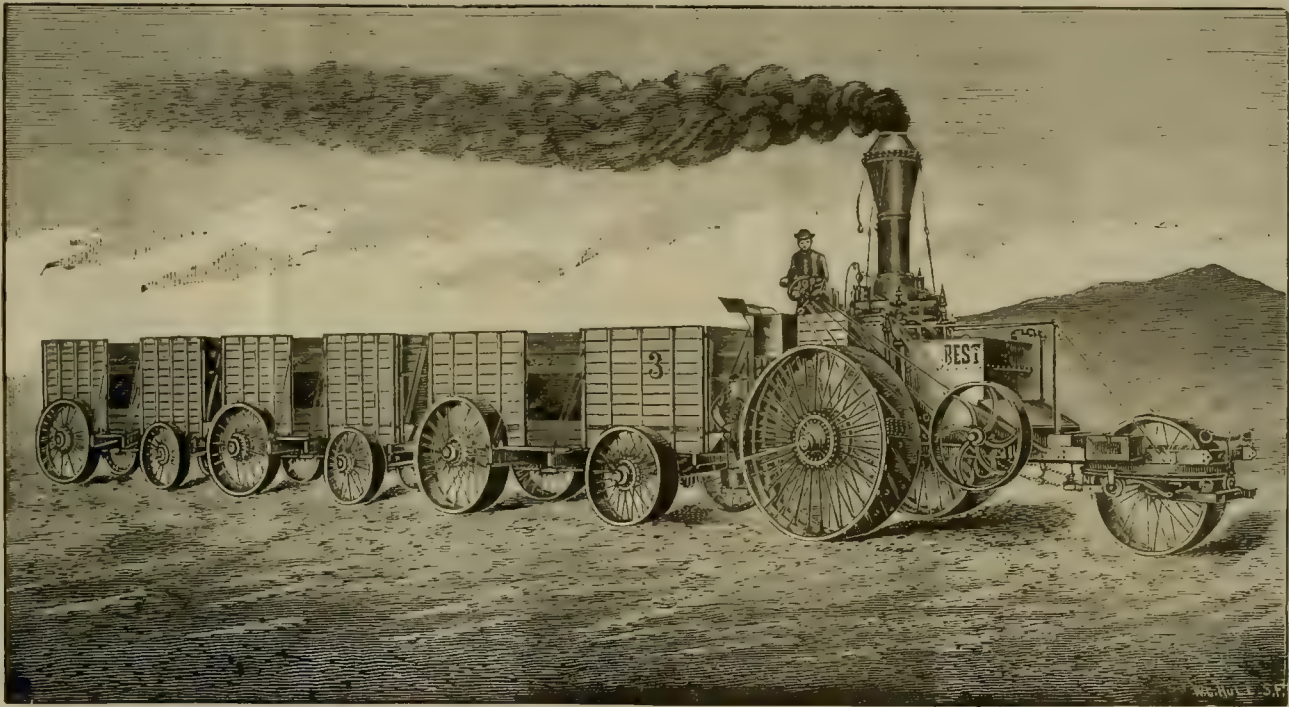
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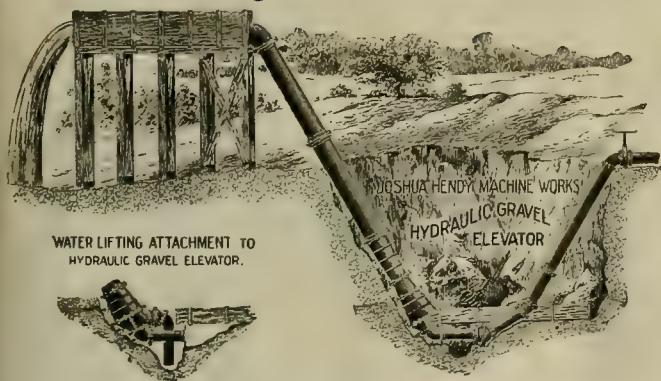
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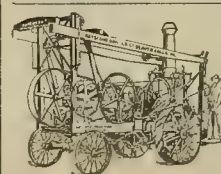
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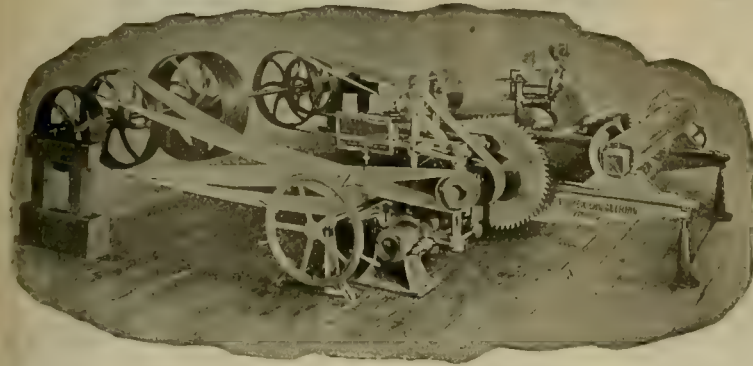
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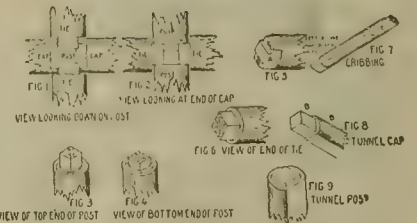
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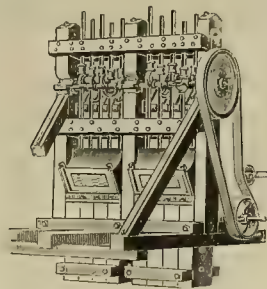


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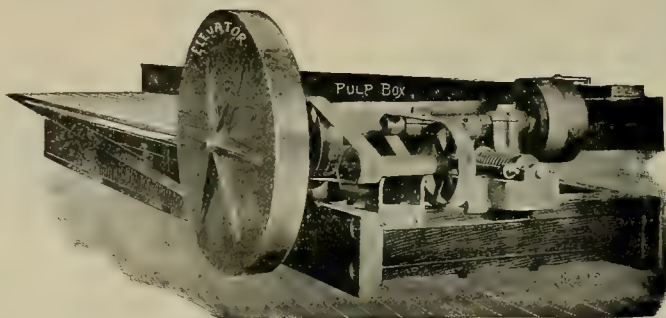
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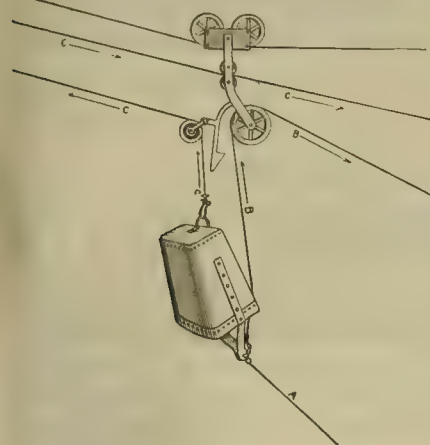
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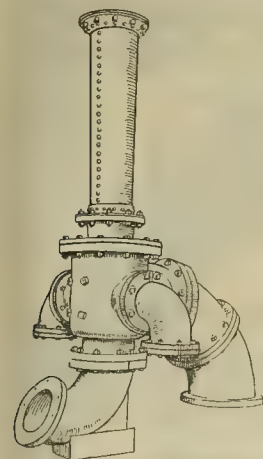
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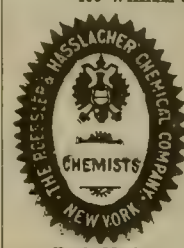
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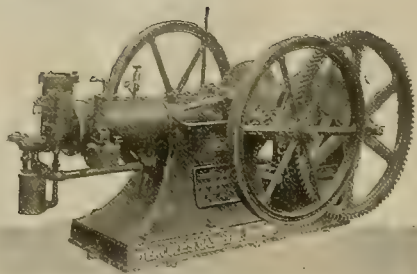


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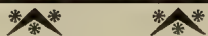
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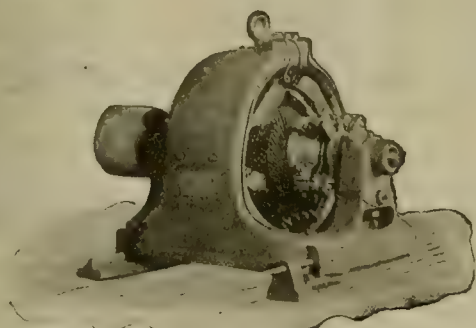
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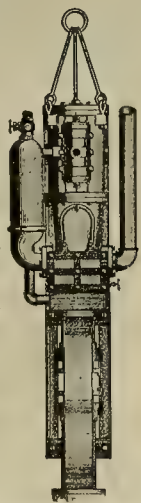
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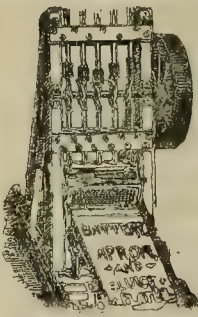


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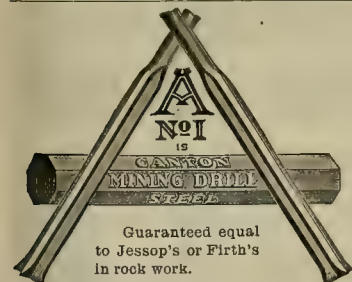
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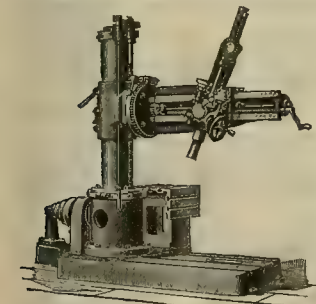
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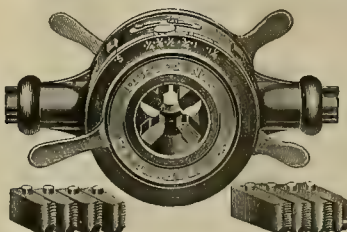


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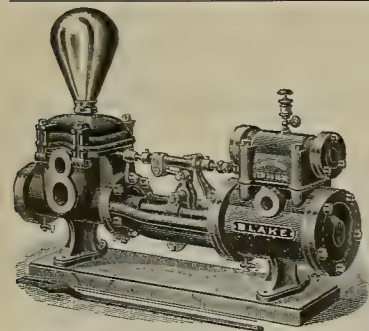
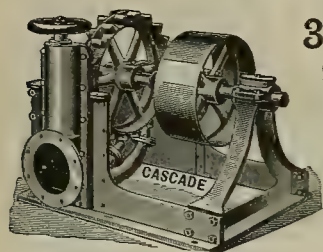
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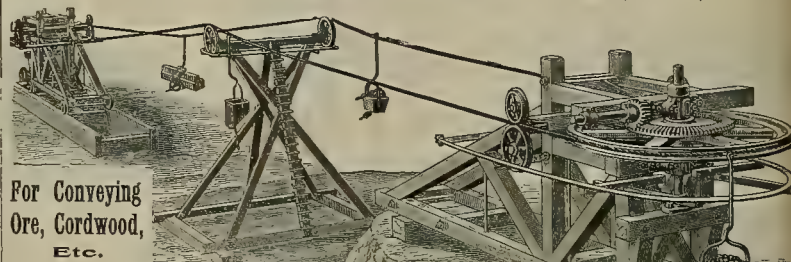
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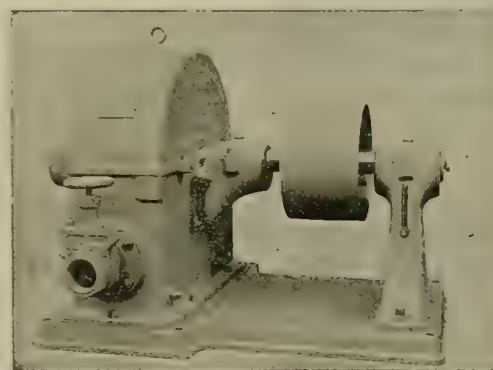
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Etc.

EMPIRE, NEVADA, April 17, 1896.
Vulcan Iron Works.—GENTLEMEN: The Ropeway furnished by your company to convey tailings from Morgan Mill to Mexican Mill, a distance of seven-eighths of a mile, is giving entire satisfaction. We transport 200 tons of tailings in ten hours; one man does the whole business, including elevating tailings from hopper in the ground, operating Vulcan self-loader, and attending to the Ropeway generally. The self-dumper requires no attention whatever. The Vulcan loader I consider the best feature in the whole Ropeway, making it possible for one man to load 200 tons in ten hours.
Yours very truly,
J. P. WOODBURY, Supt.

VULCAN IRON WORKS,

MANUFACTURERS OF MINING MACHINERY,
Office, 505 Mission Street, San Francisco, Cal.

The Pelton Water Wheel Company



Gives exclusive attention to the development and utilization of water powers by the most modern, economic and improved methods.

An experience of more than fifteen years, involving both the theory and practice of hydraulic engineering as relates to power development in its widest range of application, is at the service of its customers.

**Nine Thousand
Wheels**

Now Running,

Aggregating some 700,000 H. P.

ELECTRIC POWER TRANSMISSION.

Pelton wheels afford the most reliable and efficient power for such service and are running the majority of stations of this character in the United States, as well as most foreign countries.

Highest efficiency and absolute regulation guaranteed under the most extreme variations of load.

The Pelton Water Wheel Company,

121 AND 123 MAIN STREET, SAN FRANCISCO, CAL.

THE CHEAPEST PLACE ON EARTH TO OUTFIT A MINE

— IS AT —
THE J. H. MONTGOMERY MACHINERY CO., 1220-22 Curtis Street, Denver, Colo., U. S. A.

Just Listen—Reliable Common Sense Steel
Whim, price reduced to \$100.
Steam Hoisters, \$300 and up; hand
hoisters \$30; steel ore buckets
all prices; prospectors' stamp
mills \$200. A 10-stamp mill,
new, 350 lb. stamps,
high mortars, 1st
test improved.
Only \$800.

Catalogue Free.

Ores tested and amalga-
mation and concentration
mills built to fit the ore
and guaranteed to save
what we say. Coal Mine
equipments, Screens,
Jigs, Trampways,
Arastors, Chillian
Mills, Ore Sacks, etc.
Cornish Rolls, 12x20, weight
6,000 lbs., price \$350; Feed-
ers, Bumping Tables; Blake Crushers,
7x10, weight 8,100 lbs, only \$250. Our
100 page illustrated catalogue **FREE.**

ADAMANTINE SHOES AND DIES

—AND—

***** CHROME CAST STEEL *****

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.

STAMP DIES.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by **CHROME STEEL WORKS, Brooklyn, N. Y.**

MORRIS & TREGLOAN,

141 and 143 First Street, San Francisco, Cal.,

Pacific Coast Sales Agents.



Stamp Cam.

Morris & Tregloan, DEALERS IN MINING MACHINERY AND SUPPLIES.

141-143 First Street, San Francisco, Cal.

IN STOCK:

AIR HOSE,
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL,

RISDON IRON WORKS,

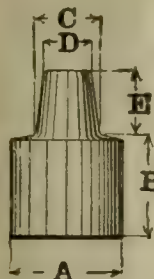
Office and Works, Cor. Beale and Howard Sts., SAN FRANCISCO.

MINERS, ATTENTION!

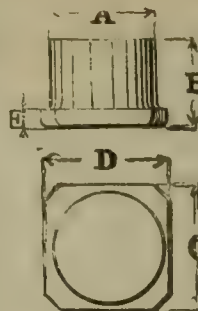
We beg to call attention to our RISDON HAMMERED PROJECTILE STEEL SHOES AND DIES, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density. These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend itself to all mine owners and mill men.



A=.....inches.
B=..... "
C=..... "
D=..... "
E=..... "



A=.....inches.
B=..... "
C=..... "
D=..... "
E=..... "

CHAS. C. MOORE & CO.,

ENGINEERS AND DEALERS IN

BABCOCK & WILCOX BOILERS, McINTOSH & SEYMOUR ENGINES, HAMILTON CORLISS ENGINES, N. Y. SAFETY AUTOMATIC ENGINES, GREEN'S ECONOMIZERS, WHEELER CONDENSERS, BARNARD-WHEELER COOLING TOWERS, HOPPE'S LIVE STEAM PURIFIERS, EDMISTON FEED WATER FILTERS, BUNDY STEAM TRAPS, SPENCER DAMPER REGULATORS, HYATT ROLLER BEARINGS, GOUBERT FEED WATER HEATERS, ATRSTTON STEAM SEPARATORS, SNOW STEAM PUMPS, QUIMBY SCREW PUMPS.

Watch this Space for Description of the Above Machinery.

Send for Catalogues and Full Information.

32 FIRST STREET, SAN FRANCISCO, CAL.

THE COLORADO IRON WORKS CO.,

DENVER, COLO.

Established 1860. ENGINEERS AND MANUFACTURERS OF

Ore Milling and Smelting Equipments.

We beg to call attention to our

High Speed Special Rolls

as being the most efficient and the most economical machine for fine dry crushing ever placed upon the market. The rolls having

NARROW FACES and LARGE DIAMETERS

can be fed evenly over the whole width of faces with certainty, and hence the faces or crushing surfaces are easily kept true. Descriptive pamphlet on application.



HIGH SPEED SPECIAL ROLLS, WITHOUT HOUSING.

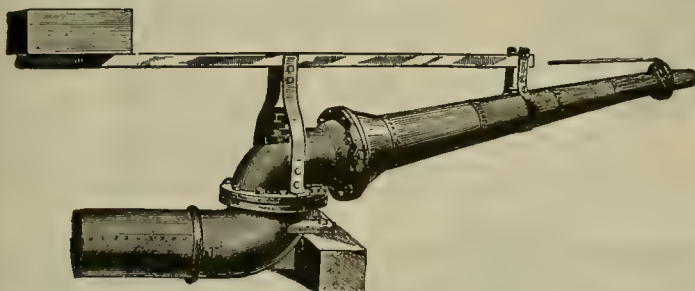
Double rope tramways are acknowledged to be superior to those of the single rope type, and any one contemplating the erection of a tramway should investigate the merits of the ...

THE ONLY AUTOMATIC TRAMWAY BUILT.

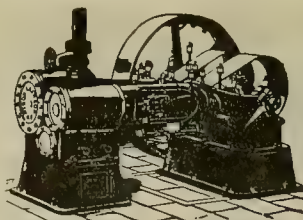
FINLAYSON PATENT AUTOMATIC WIRE ROPE TRAMWAY.

In this system the cost of transportation is brought below any figure heretofore reached. Its tonnage capacity is unsurpassed. Further information on application.

Double-Jointed Ball-Bearing Hydraulic Giants.

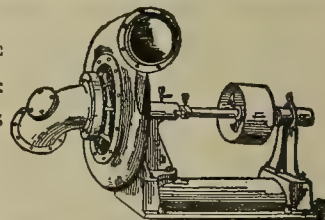


The above presents an improved Double-Jointed Ball-Bearing Hydraulic Giant which we build. The improvement consists of the introduction of a Ball Bearing by which the pressure of the water is reduced to a minimum and the direction of the nozzle changed at will with ease. Catalogues and prices of our specialties of HYDRAULIC MINING MACHINERY furnished upon application. JOSHUA HENDY MACHINE WORKS, 38 to 44 Fremont St., San Francisco, Cal.



WRITE FOR CATALOGUE NO. 15.

Jackson's GAS AND OIL ENGINES.



Cross-Compound Steam Engines and "Whirlpool" Centrifugal Pumps

For Irrigation, Drainage, Dredging, Mining, Etc. Capacities from 50 to 50,000 Gallons Per Minute.

BYRON JACKSON MACHINE WORKS, 625 Sixth Street, San Francisco.



C. H. EVANS & CO. Machine Works

TO 183-185-187 FREMONT STREET,

Where, with Enlarged and Increased Facilities, they are better than ever prepared to do

First-Class Machine Work

Promptly, and at Reasonable Prices, and will continue the manufacture of

Thomson & Evans Steam Pumps,

Deep Well Pumps, Power Pumps, Etc.,

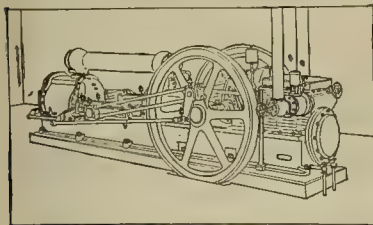
Also Marine Engines, Ship and Steamboat Work, Pipe Cutting, General Jobbing and Repairing.

THE NORWALK Air and Gas Compressor.

In use in every State in the Union, Central and South America, Great Britain, etc. Also by the U. S. Army and Navy.

ESPECIALLY DESIGNED FOR DRIVING

Rock Drills, Pneumatic Locomotives, Engines, Pumps, Coal Cutters,



And Other Mining Machinery. The Best Machine for Compressing Air for All Dynamic Purposes. Send for Illustrated Descriptive Catalogue.

HENSHAW, BULKLEY & CO., Agents, - San Francisco, Cal.

W. & P. Insulating Coating.

No Noxious Smells or Poisonous Gases. Acid and Alkali Proof.

FOR MINING PLANTS, REDUCTION WORKS AND ELECTRICAL MACHINERY.

Pacific Refining and Roofing Co.,

Sold by Dealers. 113 NEW MONTGOMERY ST., S. F. Send for Samples.

FOR REMOVING SLIMES

BROMINE CYANIDE CHLORINATION

And Other Aqueous Chemical Solutions. OUR FILTER PRESS Removes all Slims and Hastens the Deposition of the Metals.

THE STILWELL-BIERCE & SMITH-VAILE CO., Dayton, Ohio.

RISDON IRON & LOCOMOTIVE WORKS, San Francisco, Cal., Sales Agents. C. B. BOOTHE & CO., Los Angeles, Cal.,

DEWEY, STRONG & CO., Patent Solicitors, 330 Market St., San Francisco, Cal.

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 15, 1898.
SILVER.—London, 28d; New York, 60%; San Francisco, 60%; Mexican Dollars, 46% @ 46%.

COPPER.—Electrolytic, 12½¢; Casting, 11½¢; Lake, \$12.25 @ 12.37½. Boston prophecies 14¢ for copper "before the snow flies." The closing down of a part of the Anaconda, Butte, mine is one of the reasons assigned. New York advices to-day report "business sluggish." A Boston financial paper of the 10th inst. says: "The future of the copper market, aside from the supply and demand, and aluminum competition, is in the hands of the Rothschilds, the Lewisohns and the lake people, and it is Arizona, and not Montana, that will control the future price of copper."

Under date of Sept. 1st, James Lewis & Son, 5 Fenwick St., Liverpool, England, report: Gold, 77s 10½d per ounce standard; silver rose from 27½d to 27 13-16d on the 23rd ult., and closes at 27 11-16d for prompt and 27½d for forward delivery; quicksilver from second hands is quoted at £7 12s per bottle; sulphate of copper is more inquired for and sales for forward delivery have been made at £17 per ton; lead is dull at £12 17s 6d per ton for English; soft Spanish, £12 16s 3d; ore of 70 per cent, about £26 per ton and fine silver value; antimony, firm at £36 10s to £37 per ton; nickel, quoted at 1s 1d to 1s 2d per pound net; tin advanced from £71 5s to £75 on the 16th ult., but has since receded to £72 per ton.

LEAD.—New York reports "quiet, with \$4 bid and \$4.05 asked. The firm fixing the settling price for miners and smelters quotes lead \$3.85." Local, pipe, 6 @ 6½¢; sheet, 6½ @ 7¢; pig, 5½¢; bar, 6¢.

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—Unchanged, 5½ @ 5½¢. TIN.—Menlo Roofing, redipped, 7¢; English, to arrive, \$4.50; Pig, 18¢; Bar, 19¢.

ANTIMONY.—92½, 10.

BABBIT METAL.—10-12-14—best 16¢.

QUICKSILVER.—Firm and unchanged, domestic \$42.50; export \$38; carload lots, special rates.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½¢; less than one ton, 17½¢. No. 1* 60%, carload lots, 13½¢; less than one ton, 15½¢. No. 1** 50%, carload lots, 11½¢; less than one ton, 13½¢. No. 2, 40%, carload lots, 10¢; less than one ton, 12¢. No. 2* 35%, carload lots, 9½¢; less than one ton, 11½¢. No. 2** 30%, carload lots, 9¢; less than one ton, 11¢. No. 3 Black blasting powder in carload lots, minimum car 725 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington.....\$8 00 Coos Bay.....\$5 00 Seattle.....6 00 Southfield.....7 50

Coke.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.12 per gal.; bbl., \$1.07; pure No. 2, cs., 85¢; bbl., 80¢; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.11; less than 200 gals., \$1.20; in bbls., 4¢ per gal. less than case; Baker's Crystal, \$1.50; China Nut, 52¢; Linseed, strictly pure, boiled, bbl., 43¢; es., 43¢; raw, bbl., 41¢; cs., 46¢; lots of 5 bbls., 1¢ less; Lucol, boiled, bbl., 38¢; cs., 43¢; raw, bbl., 36¢; cs., 41¢; lots of 5 bbls., 1¢ less. Kerosene—Pearl, cs., per gal., 17¢; Astral, 17¢; Star, 17¢; Eocene, 19¢; Extra Star, 21¢; Elaine, 22¢; Water White, bulk, in tanks, 11½¢; Mineral Seal, iron bbls., 21¢; wooden bbls., 23½¢; cs., 26¢; Mineral Sperm, 27¢; Deodorized Stove Gasoline, bulk, 12½¢; do., cs., 18¢; 86 deg. Gasoline, bulk, 20¢; do., cs., 25¢; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½¢; do., in cs., 16½¢; Lard Oil, Extra Winter Strained, bbl., 56¢; cs., 61¢; No. 1 bbl., 46¢; cs., 51¢; Neatsfoot Oil, bbl., 65¢; cs., 70¢; No. 1 bbl., 55¢; cs., 60¢; Sperm, crude, 60¢; Natural White, 65¢; Bleached do., 70¢; Whale Oil, Natural White, 40¢; Bleached do., 45¢; Cocoa, cs., 55¢; Pacific Rubber Mixed Paints, white and house colors, \$1.25 @ 1.35 per gal.; wagon colors, \$2 @ 2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 29 @ 30¢ per lb.; carloads, 27¢; sulphuric acid, 2½¢ per lb. for 60%; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½¢ per lb.; blue vitriol, 4½¢ per lb.; borax, refined, 5 @ 6¢ per lb.; chlorate of potash, 9½ @ 10¢; roll sulphur, 2½¢; blue vitriol, 4¢; alum, \$1.90 @ 2.00; flour sulphur, French, 2½ @ 2½¢; California refined, 1½ @

1½¢; nitric acid, 12½ @ 16¢; caustic soda, 60%, 2½ @ 3½¢; 70%, 3½ @ 4½¢; 77%, 3½ @ 4½¢; Cal. s. soda, bbls., 65¢; sds., 60¢ @ 100 lbs.; chloride of lime, spot, 2.10 @ 2.25¢; to arrive, 2.10 @ 2.25¢; saltpeter, refined, 9¢; chlorate of potash, 9½ @ 10¢; caustic potash, 8 @ 9¢.

CORDAGE.—Net rates on not less than 10,000 lbs., subject to change without notice.

Sisal, Manila.
1½-in. cir. (7-16 dia. and upward).....93¢ 103¢
12-thread (¾ dia.).....104 114
6 and 9 thread (¾ and 5-16 dia.).....104 114
Bale Rope (3 and 4 strand).....93 103
Bale Rope (2, 6 and 8 strand).....104 114

Yesterday the Tubbs Cordage Co. of San Francisco issued a new price list, quoting invoices of 10,000 pounds as follows: Manila Rope, 10½¢; Sisal Rope, 9½¢; Duplex Rope, 8½¢.

CANDLES.—Electric Light Candles—6s, 16 oz., 7½¢; 6s, 14 oz., 6½¢; 6s, 12 oz., 5½¢; 6s, 10 oz., 4½¢; Granite (Mining) Candles—6s, 16 oz., 8½¢; 6s, 14 oz., 7½¢; 6s, 12 oz., 7½¢; 6s, 10 oz., 6½¢. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8¢; colored, 9¢.

LUMBER.—Retail: Pine, ordinary sizes, \$17 @ 18.50; redwood, No. 1, \$18 @ 20; No. 2, \$16 @ 18.

Mining Share Market.

SAN FRANCISCO, September 15, 1898.
The prompt and affirmative action of the committee of Comstock superintendents to whom was delegated the duty of compiling data and making recommendations regarding the feasibility of drainage of the Comstock, and resumption of deep mining thereon, resulted this week in a material advance in the price of stocks and the volume of business thereon, is an index of future movement, if the recommendations on page 287 can be carried to a successful conclusion.

San Francisco Stock Board Sales.

SAN FRANCISCO, Sept. 15, 1898.
9:30 A. M. SESSION.

| | |
|----------------------------|---------------------------|
| 200 Alpha.....04c | 600 Ophir.....63c |
| 200 Alta.....12c | 300 Overman.....07c |
| 100 Andes.....13c | 300 Fotoli.....24c |
| 500 Belcher.....22c | 100 Savage.....24c |
| 200 Chollar.....24c | 100 Seg. Belcher.....03c |
| 600 Con. Cal. & Va.....93c | 100 Sierra Nevada.....83c |
| 100 Crown Point.....20c | 500 Union Con.....26c |
| 400 Gould & Curry.....30c | 400 Yellow Jacket.....26c |
| 1100 Mexican.....30c | |

2:30 P. M. SESSION.
350 Ophir.....60c 200 Yellow Jacket.....25c
200 Mexican.....27c 100 Belcher.....21c
750 C. Cal. & Va.....90c 200 Sierra Nevada.....80c
200 Savage.....19c 400 Seg. Belcher.....03c
400 Chollar.....21c 100 Overman.....07c
100 Fotoli.....23c 300 Union Con.....24c

To Our Customers and Friends on the Pacific Coast:

Through frequent complaints made to us, we have learned that unprincipled and dishonest dealers on the Pacific coast have counterfeited our trademark numbers and substituted inferior, spurious goods as ours, when ours were distinctly ordered, thus defrauding the customers and injuring our trade and reputation.

Our goods are acknowledged to be the best, and are fully warranted by us, and are marked with our name or initials or with our well-known trademark and catalogue numbers.

We request direct notice if any goods alleged to come from us, or bearing our trademark or numbers, prove to be other than the best, and perfect in every respect, as we will follow up and expose such frauds for our customers' and our own protection. We have no exclusive agents on the Coast, but our goods are obtainable from all respectable dealers in drawing materials, stationery, hardware, artists' material, etc. Respectfully,

KEUFFEL &

ESSER CO.,

127 FULTON ST.

New York.



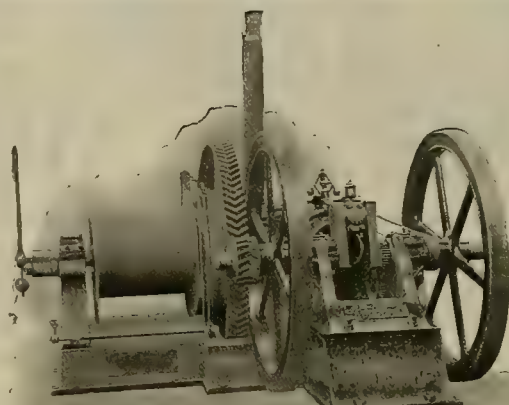
Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.



FRESNO, June 25, 1898.

Hercules Gas Engine Works
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gasoline engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LODGE
M. & D. CO.,

Per N. W. Moody, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

WEST COAST OF MEXICO.

WÖHLER, BARTNING Suc's, Mazatlan (Sinaloa), Mex.

Bankers, Importers, Exporters and Commission Merchants.

Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco.

ORE BUYERS AND EXPORTERS. - MINING SUPPLIES.



MINING HOISTS.

Engines, Boilers, Saw Mills, Hoe Saws, Mill Supplies.

TATUM & BOWEN,

34-36 Fremont Street, San Francisco, Cal.

29-35 First Street, Portland, Or.

HOME MANUFACTURE.

FOWLER'S

Fossil and Asbestos Sectional Covering.
As a Non-Conductor, Unequaled.
Special Rates for Steam Boilers and Drums
G. C. Fowler, 656-58 Howard St., S. F.



PACIFIC EXPLORATION COMPANY

Finds buyers or working capital for meritorious mines or good prospects. Correspondence invited.
W. E. Holbrook, Pres't. L. F. Haskell, Sec'y.
29-30 Chronicle Building, S. F.

MICHIGAN COLLEGE OF MINES.

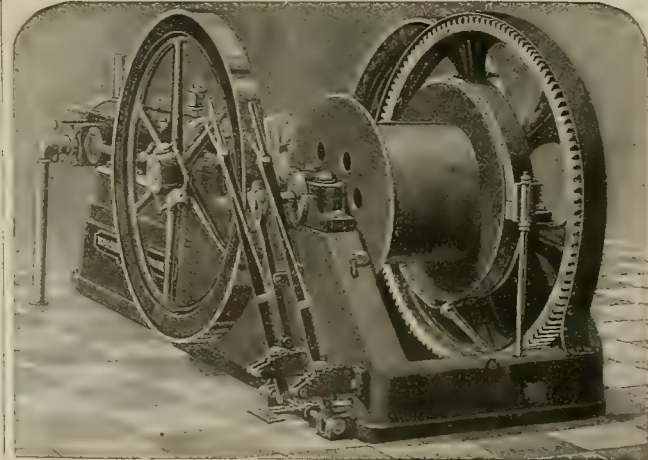
Supported by the State of Michigan. Practical work. Electric system. Special advantages for men of age and experience. For catalogues address
DR. M. E. WADSWORTH, President.
Houghton, Michigan.

FAIRBANKS, MORSE & Co.,
SAN FRANCISCO.

GAS AND GASOLINE ENGINES

— FOR —

Pumping, Milling, Lighting, &c., &c.



This cut represents a New and Improved Combined Geared Gasoline Engine and Hoist with Friction Clutch, Differential Band Brake, Speed Regulator Indicator, and all appliances found in Modern Steam Hoists.

For Efficiency, Economy and Durability It is Unequaled.

Hoisting capacities from 1150 to 6000 lbs.; cost of operation, with gasoline at 10 cents a gallon, 1 cent per H. P. per hour. Also furnished in friction if desired.

Special Descriptive Catalogue of Engines -- Pumping, Hoisting, Electric Lighting, Air Compression.

310 Market St., San Francisco.

201 N. Los Angeles St., Los Angeles.

1st and Stark Sts., Portland, Or.

1600 Seventeenth St., Denver, Colo.

Franklin and Monroe Sts., Chicago, Ill.

WRITE TO

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage.

Money loaned mines.

Mining companies organized, their property experted, financed and managed.

Mines, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

Examine mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

EDW. N. BREITUNG,
Marquette, Mich., U. S. A.

Cable Address: EDBEE.

Codes:

LIEBERS.
BEDFORD MCNEILL'S.
A B C UNIVERSAL COMMERCIAL.

Assessment Notices.

CONSOLIDATED ST. GOTHARD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Nevada County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of August, 1898, an assessment (No. 1) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 113 Crocker building, sixth floor, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 26th day of September, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 12th day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
J. F. HOLLING, Secretary.
Office—113 Crocker building, sixth floor, San Francisco, California.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 22nd day of August, 1898, an assessment (No. 4) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 916 Market street, Room 57, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 3rd day of October, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 31st day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
GEO. W. FLEISSNER, Secretary.
Office—No. 916 Market street, Room 57, San Francisco, California.

EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Forest Hill, Placer County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 12th day of September, 1898, an assessment (No. 13) of one-half cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Nos. 1209 11th Claus Spreckels building, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 15th day of October, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 1st day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
J. J. CRAWFORD, Secretary.
Office—Nos. 1209-11th Claus Spreckels building, San Francisco, California.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 16th day of May, 1898, an assessment (No. 1) of 1/4 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 7, fifth floor, Mills building, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
R. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.
By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 31st, 1898.
R. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.
By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to September 3rd, 1898, and the day of sale to MONDAY, October 3rd, 1898.
R. L. CHENEY, Secretary.
Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.
By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to September 3rd, 1898, and the day of sale to MONDAY, October 3rd, 1898.
R. L. CHENEY, Secretary.
Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.
By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to October 1st, 1898, and the day of sale to TUESDAY, November 1st, 1898.
R. L. CHENEY, Secretary.
Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

Notice of Stockholders' Meeting.
A meeting of the Stockholders of the Eureka Consolidated Drift Mining Company will be held in the company's office, No. 1209 Claus Spreckels building, San Francisco, at 1 o'clock P. M., on WEDNESDAY, September 28, 1898, for the purpose of considering the extension of the options on the treasury stock, expiring October 1, 1898.
J. J. CRAWFORD, Secretary.

DELINQUENT SALE NOTICE.

WEST SANTA ROSALIA GOLD MINING Company.—Location of principal place of business, San Francisco, California; location of works, State of Sonora, Mexico.
Notice—There are delinquent upon the following described stock on account of assessment (No. 1) levied on the 3rd day of August, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|--------------------------------|-----------|-------------|---------|
| J. W. Pew, Trustee..... | 3 | 2,000 | \$60 00 |
| D. E. Alexander..... | 11 | 500 | 15 00 |
| Chas. F. Gardner..... | 12 | 2,500 | 75 00 |
| J. W. Pew, Trustee..... | 17 | 670 | 20 10 |
| L. H. Eckhardt, Trustee..... | 24 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 29 | 2,500 | 75 00 |
| J. W. Pew, Trustee..... | 32 | 100 | 3 00 |
| J. W. Pew, Trustee..... | 33 | 100 | 3 00 |
| J. W. Pew, Trustee..... | 34 | 300 | 9 00 |
| J. W. Pew, Trustee..... | 35 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 38 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 39 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 40 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 41 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 42 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 43 | 5,000 | 150 00 |
| J. W. Pew, Trustee..... | 44 | 10,000 | 300 00 |
| J. W. Pew, Trustee..... | 45 | 50 | 1 50 |
| J. W. Pew, Trustee..... | 46 | 450 | 13 50 |
| D. E. Alexander..... | 49 | 165 | 4 95 |
| Chas. F. Gardner..... | 50 | 165 | 4 95 |
| A. C. Shaw, Trustee..... | 53 | 15 | 45 |
| A. C. Shaw, Trustee..... | 54 | 35 | 1 05 |
| A. C. Shaw, Trustee..... | 55 | 50 | 1 50 |
| A. C. Shaw, Trustee..... | 57 | 100 | 3 00 |
| A. C. Shaw, Trustee..... | 58 | 100 | 3 00 |
| A. C. Shaw, Trustee..... | 59 | 100 | 3 00 |
| A. C. Shaw, Trustee..... | 60 | 100 | 3 00 |
| A. C. Shaw, Trustee..... | 61 | 100 | 3 00 |
| Jas. McNab..... | 70 | 1,000 | 30 00 |
| Jas. McNab..... | 71 | 1,000 | 30 00 |
| J. W. Pew, Trustee..... | 101 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 121 | 14,975 | 449 25 |
| Chas. F. Gardner, Trustee..... | 122 | 500 | 15 00 |
| Chas. F. Gardner..... | 123 | 5,000 | 150 00 |
| Chas. F. Gardner..... | 124 | 11,500 | 345 00 |

And in accordance with law, and an order from the Board of Directors, made on the 3d day of August, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, No. 310 Pine street, Rooms 15 and 17, San Francisco, California, on MONDAY, the 26th day of September, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
J. W. PEW, Secretary.
Office—No. 310 Pine street, Rooms 15 and 17, San Francisco, California.

DELINQUENT SALE NOTICE.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.
Notice—There are delinquent upon the following described stock, on account of assessment (No. 20) levied on the 6th day of August, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|-----------------------------|-----------|-------------|---------|
| Calvert Meade, Trustee..... | 155 | 1,000 | \$30 00 |
| Calvert Meade, Trustee..... | 156 | 1,200 | 36 00 |

And in accordance with law, and an order from the Board of Directors, made on the 6th day of August, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, 106 Leidesdorff street, San Francisco, California, on MONDAY, the 3rd day of October, 1898, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
CALVERT MEADE, Secretary.
Office—106 Leidesdorff street, San Francisco, California.

DELINQUENT SALE NOTICE.

BOULDER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, El Dorado County, California.
Notice—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 27th day of July, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|------------------------|-----------|-------------|---------|
| Mrs. Marie Maison..... | 18 | 1,000 | \$50 00 |

And in accordance with law, and an order from the Board of Directors, made on the 27th day of July, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Secretary, room 163, Crocker building, San Francisco, California, on MONDAY, the 26th day of September, 1898, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
J. M. WILMANS, Secretary.
Office—Room 163, Crocker building, San Francisco, California.

Notice of Stockholders' Meeting.

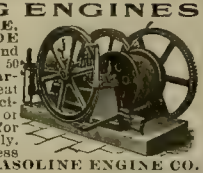
A meeting of the Stockholders of the Porfirio Diaz Gold and Silver Mining and Milling Company will be held at the office of the Corporation at the Undertaking Parlors of Craig, Cochran & Co., at 54 Mint Avenue, San Francisco, California, on TUESDAY, the 20th day of September, 1898, at 1 o'clock P. M., for the purpose of electing Directors of said Corporation to serve until the 23rd day of August, 1899, and until their successors are elected.
This notice is given by order of Stockholders holding more than one-half of the votes and more than one-half of the Capital Stock of said Corporation, to-wit: L. W. Hilliker, Thos. Ryder, R. Fitz, Peter Saling and Jos. I. Davis, and pursuant to call in writing made by them and now on file with the undersigned.
W. A. STEPHENS, Secretary.
Dated August 29, 1898.

.Lunkenheimer's. OIL GAUGES

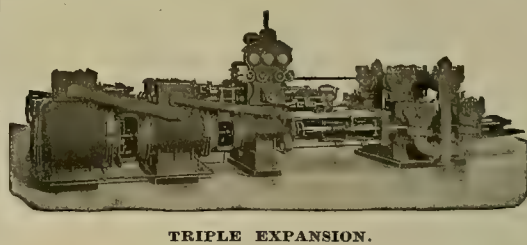
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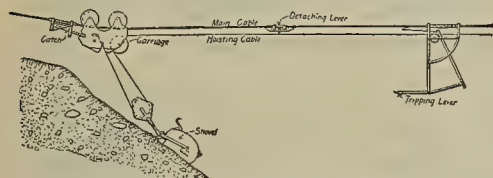
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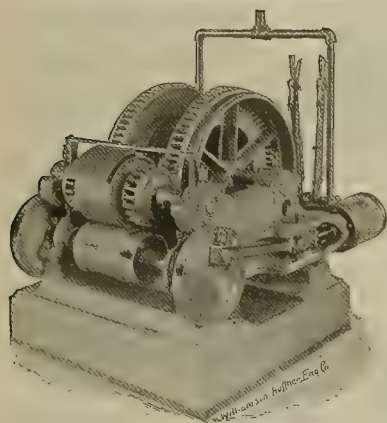
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Extracts from Letters Received from Mr. Philip Argall, Manager the Metallic Extraction Co., Cyanide, Colorado:

January 2, 1897.

"The roasting is invariably good. We can do 80 tons per day to 0.13% sulphur, when everything runs smooth. Our month record which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.16%."

February 19, 1897.

"Our furnace is now running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it."

"For 24 hours ending 7 A. M. to-day 102 tons were roasted."

The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, Utah (one furnace); The Metallic Extraction Co., Cyanide Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, Colo. (three furnaces); The Selby Smelting & Lead Co., Selby, Cal. (two furnaces); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); Broken Hill Proprietary Co., Broken Hill, New South Wales (four furnaces); Puget Sound Reduction Co., Everett, Washington; Colorado Ore Sampling & Reduction Co., Cripple Creek, Colo.; Consolidated Kansas City Smelting & Refining Co., for the Arkansas Valley Smelting Works, Leadville, Colo.; Robert Lanyon's Son's Spelter Co., Iola, Kansas (two furnaces); Mountain Copper Co., Ltd., Keswick, Cal.

Catalogue on Application.

MINE BELL SIGNALS.

Adopted, Used and in Force in Accordance with State Law.

For the convenience of our readers in the mining counties we print in legal size, 12x36 inches, the Mine Bell Signals and Rules provided for

in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness. 50 Cents a Copy.

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AND PACIFIC ELECTRICAL REVIEW.

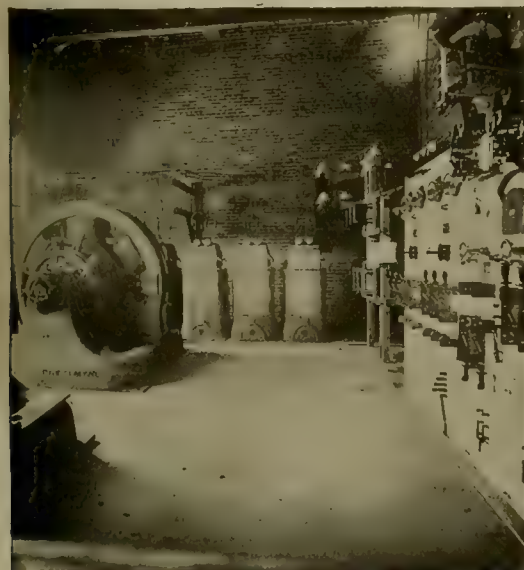
No. 1994.—VOLUME LXXVII.
Number 13.

SAN FRANCISCO, SATURDAY, SEPTEMBER 24, 1898.

THREE DOLLARS PER ANNUM.
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Latest in Electrical Transmission.

The most recent application of electricity to the steam railroad, superseding, with faster schedule, the steam locomotive and steam schedule, was made August 15th on the Buffalo & Lockport Railway, a branch line of the Erie Railroad from Tonawanda to Lockport. The total length of the tracks owned or leased by the company is twenty-nine miles. Work was commenced May 17, 1898, and at midnight Au-



INTERIOR SUBSTATION, LOCKPORT, SHOWING
AIR BLAST TRANSFORMERS, ROTARY
CONVERTERS AND SWITCHBOARD.

gust 14th the steam service was suspended. Nothing has since occurred to mar the perfect and punctual operation of the road on the new schedule. Power is obtained from the Niagara Falls Power Co. by tapping its long-distance transmission line between Buffalo and Niagara Falls. It is carried at a pressure of 10,500 volts alternating current over bare copper wires to the rotary converter substation at the Lockport terminal of the Erie branch, there led into six 150 K.W. static transformers of the air-blast type, in which the pressure is reduced to 350 volts. At this pressure the current passes to two rotary converters, where it is converted into continuous current at 500 volts. The rotary converters

are standard General Electric six-pole, 400 K.W., 500 revolution machines.

The switches for the high tension current are of the quick-break type, each blade being separated from its next neighbor by a marble barrier. The blades are pulled open by means of a hooked stick, the hook being inserted into an eye let into the end of the blade. The fuses on the high potential circuits are of the expulsion type, in which the fuse is held between two springs, so that at the moment of fusing the two ends, between which the arc would ordinarily spring, are instantaneously pulled apart. Each of the direct current panels is equipped with a "K" automatic circuit breaker. The line is protected by General Electric lightning arresters of the short gap type, so successfully employed in local high-voltage, as well as on the Niagara transmission circuits. As soon as their present plant is completed another rotary converter substation will be erected at Tonawanda, taking current also from Niagara Falls.

From the starting point in Buffalo to the city limits the cars are operated by current from the Buffalo Railway Co.'s station. The new converter substation at Tonawanda will feed seven miles to Lockport and half way in the direction of Niagara Falls, the converter at Niagara Falls feeding half way back to Tonawanda. The arrangement will be such that the Buffalo & Lockport Railway system can give current to or take it from the Buffalo & Niagara Falls Electric Railway. The Lockport converter station will then feed back seven miles to Lockport, and supply current also to the city lines in Lockport itself.

The new rolling stock consists of two 36-ton electric locomotives, supplied by the General Electric Co., for freight service, and ten electric motor cars mounted on eight wheels.

The theory of handling the passenger service has been entirely changed from that in force with steam traction. Instead of long intervals between trains, the cars are run on half-hour headway. This requires five cars to operate the twenty-five miles between Lockport and Buffalo. The speed is high. Over their own right of way the cars ran on their first trip at the rate of fifty miles per hour, including stops. The running time from Lockport to Tonawanda is twenty-six minutes; to Buffalo, one hour and fifteen minutes. In this trip thirty-three minutes are spent in the city of Buffalo in a distance



END VIEW OF LOCOMOTIVE UNDER TEST AT
SCHENECTADY.

of six miles, where the speed has to be kept low to conform to city ordinances. Even with this drawback, however, it is expected that soon the running time between Buffalo and Lockport will be reduced to one hour.

The passenger and combination cars are 31 feet 8 inches long over the end panels, and, with platforms 4 feet 6 inches long, measure 42 feet 4 inches over the buffers. These cars are run on T rails at a speed that will enable them to average forty-five or fifty miles per hour. Electric brakes are provided upon each axle, the discs being cast upon the wheels themselves.

The baggage and passenger combination cars are 31 feet 8 inches long over the end panels, 7 feet 8 inches wide at sills, and 8 feet wide at the widest point. The platforms are 4 feet 6 inches long. The total length over the angle iron buffers is 37 feet 10 inches. Each car is equipped with four General Electric 57 (52 H. P.) motors and B8 controllers. The weight of each car loaded is from twenty to twenty-five tons.

The two locomotives have been built for the purpose of handling the freight business of the road exclusively. The road being a feeder to the main Erie system, the traffic is considerable. To haul it, therefore, powerful locomotives were necessary, and in them the General Electric Co. has incorporated such improvements as the actual operation of its locomotives on the Baltimore & Ohio Railroad, the New York, New Haven & Hartford Railroad and Hoboken Shore road has dictated. The design follows closely that of the locomotives just mentioned, two sloping shields being placed one on each side of a central cab, the whole carried on two swiveled trucks. The cab frame is made of 1½ x 1½-inch angles, covered with a sheathing of ½-inch iron. The



LOCOMOTIVE AND TRAIN AT LOCKPORT.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....Publisher

San Francisco, September 24, 1898.

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platform or main frame is built up of 8-inch channels, running the entire length of the platform and securely riveted to cross plates at the ends directly over the center truck bearings. Heavy oak buffer beams, to which are attached drawheads and pilots, are secured to the ends of the platforms.

The locomotives are equipped with pneumatically controlled trolleys. With this arrangement it is no longer necessary for the engineer or helper to leave the cab to replace the wheel on the wire or reverse the trolley. This is effected by a handle conveniently placed over the engineer's head. The downward motion is obtained by admission of air to a cylinder, the piston of which in moving compresses the spring holding the pole in place when running. The upward motion is accomplished by the spring and the movement sideways by hand, both pole and handle being on a swivel plate. The end view of the locomotive was taken while it was being tested at Schenectady. Here, for convenience, the current was taken from a third rail, and this explains the absence of a trolley pole.

The transformation of this line from steam to an electrically operated road marks an important step in the employment of current on the steam road. If in its operation it successfully attains the results expected, it will conclusively prove that electricity can be economically applied to the operation of branches and feeders of steam trunk line systems. It would be too much to expect an immediate conversion of these latter main lines from steam operation to operation by electricity, but with electric locomotives and motor cars profitably carrying on both freight and passenger traffic on their feeders, the entering wedge will be driven still further and the ultimate result will be so much nearer of attainment.

THE unusual drouth in California will seriously affect the aggregate gold yield of that State for '98. Not for a generation has there been such a scarcity of water in every part of the State. In probably no other section of the country is annual mountain and foothill rainfall so necessary by reason of the nature of the country, the California miner in many parts of the State depending on the ditch system. There are comparatively few springs, the bedrock being so often slate with vertical cleavages, through which the water readily percolates, that the streams depend upon mountain snowfall, and when that is lacking they are very low early in the season. Upon the ditch system depend largely the quartz and hydraulic mines; and when, as in the present year, the ditches are unable to furnish the usual water supply, the result, in many instances, is a general cessation of work with a corresponding decrease in the gold output.

Assessment Work on Unpatented Mining Locations.

As is usual at this season of the year, comes a multitude of inquiries regarding annual assessment work. It is customary to answer many questions with what is usually a sufficiently accurate reply in two or three lines in "Concentrates," it being of little general value to publish a column of questions all practically asking the same thing.

During this week thirty-seven questions on one point have been received. They can all be answered by citing Section 2324 of the U. S. Statutes, as amended Jan. 22, 1880, as follows: "Provided, that the period within which the work required to be done annually on all unpatented mining claims shall commence on the first day of January succeeding the date of location of such claim."

So that, in the case of a mining claim located any time after Jan. 1st, '98, the locator or locators have till Dec. 31st, '99, to do the \$100 worth of work required by the above federal statute. So far as California is concerned, holders of mining claims must remember that, in addition to the \$100 in work or improvements required by the U. S. Government, a State mining law which went into effect May 26, '97, makes it mandatory that on all lode locations after that date \$50 worth of work must be done within sixty days after posting the preliminary notice, and in the case of placer claims \$10 worth of work must be done on each twenty acres of placer ground within sixty days after location. This in the case of either lode or placer claims is not to be counted and will not be allowed as part of the required federal assessment work.

From Halleck, San Bernardino Co., Cal., comes what is practically the same question as asked by the other 36, with the exception that it asks, in addition: "Is there any way in which the \$50 already expended in compliance with the State law can be applied to the \$100 in work required by the U. S. law?"

The close of the preceding paragraph answers that question "No;" but it must be qualified, as there are possible cases where "Yes" might be a correct answer. In this State, where a mining claim is located, say, Nov. 20th, '98, it would be possible to do the required \$50 worth of work after Jan. 1st, '99, within sixty days after location, thus complying with the California law, and, at the same time, making that a part of the required annual assessment work specified by the U. S. statute.

Relative to points raised in some of the letters to which this is a general answer: Colorado has a State law that requires that a 10-foot shaft or tunnel must be dug at the point of discovery, to show by such work a lode or deposit of mineral in place, to complete the location; Nevada has a similar State statute; Utah has a law the same as the California statute cited, except that it gives ninety days instead of sixty, which is better. Sixty days are not enough, and that law has created considerable dissatisfaction, as there are many sections of California where compliance with that law is a hardship on the miner and prospector. The object of the framers of the California law was to compel development and prevent holding claims without work, but its practical working is not satisfactory.

THE Secretary of the Interior has made another decision or ruling of interest to miners. On April 16, '98, in the case of McFadden vs. M. V. M. & M. Co., State of Washington, plaintiff filed an adverse claim in the local land office, which was rejected for reasons (1) that it was not evidenced in manner prescribed by the rules of the department; (2) plat of adverse claim was not made by a deputy United States mineral surveyor; (3) no showing as to value and ownership of labor and improvements upon the claims as required by the rules of the department. These objections were sustained by the commissioner of the general land office. The Secretary of the Interior overrules this decision and holds that the adverse as presented at the local land office by McFadden was sufficient and that it was not necessary for a deputy United States mineral surveyor to make survey and plat which was filed with the adverse. The Secretary follows the decision in the case of Anchor et al. vs. Howe et al., 50th Federal Reporter,

366. The Secretary further holds that rules made by the commissioner of the general land office cannot be binding when said rules exceed the scope of the law, therefore the rule requiring that a deputy United States mineral surveyor shall make the plat and survey for an adverse claim is not binding and does not have the force and effect of law.

"WHAT is the chief present need of the mining world?" is asked. 'Tis a difficult question to answer, but a most suggestive topic, and one that can not be compressed into ordinary limits. Even assuming that the questioner means to ask what is of most present practical demand in daily duty, the field of answer is a broad one. Narrowing the scope of the query still more, and viewing but one little section of the domain of gold quartz mining, comes to the mind a swarm of suggestions as viewed from different standpoints. Probably were the question asked quartz miners as they came from work they would answer, "Something to make our work easier;" a foreman, manager or superintendent might say, "Something to make it cheaper;" an owner, "Less legal entanglements and more direct results for outlay." The problem of quartz mining is often a costly one to successfully solve. The miner has to contend with hard rock, water, soft ground, timbers and air. In many instances the first is the greatest obstacle. "Something to break rock easy" would probably be the prayer of many a worker. There is something defiant in the face of a hard rock drift that makes miners feel how small and weak are their efforts, and few things are more discouraging than to pound on a drill in hard rock. In the same line something that would better solve the water problem would be a boon to the working miner, this in particular as allied to deep mining. This is meant to be merely indicative of the vastness of the subject and the manifest impossibility of an answer that could more than touch the smallest segment of so mighty a circle.

WHETHER from a desire to influence the market, or other cause, there is a present Eastern attempt to make it appear that copper is about to fall in price. It is claimed that new discoveries and improved processes will soon make copper worth less than it is now: that presently, the increased output will soon reach an enormous annual total. While that part of the statement is true, it cannot be inferred that copper will decline in price, nor that copper properties will be less valuable. It must be borne in mind that the demand is also "enormous," and shows signs of being greater than at present. The claim is also made that aluminum is fast superseding copper, and that it can be commercially substituted therefor. This is also unlikely. The possible output and price of aluminum preclude probability of its entering into competition with copper to any great extent. It is true that for some purposes aluminum is preferable to copper, but the cost of the lighter material will constantly militate against its economic superiority.

THE Fresno Co., Cal., recorder has presented to the board of county supervisors a claim for \$1056.88, the amount of fees collected for recording mining claims. The money had been paid into the county treasury by the recorder, who now insists that he made a mistake in turning it over to the county, and seeks reimbursement. He claims that under the law he is entitled to the money so collected, and cites in support of his contention a decision of the Supreme Court in a Riverside, Cal., case. The recorder of that county had retained the money so collected and the county sued for its recovery. The court held that the official was entitled to it.

EXTENSIVE circulation of a mining journal sometimes has its disadvantages. An Arizona mining engineer, writing of a method of handling ore, says: "I want to write a technical article on this subject, but your paper has so many readers in this section that publication of the contemplated article might interfere with proposed transfer of the property." Apparently, there are three solutions of the problem of publishing that article—to sell the property, to transpose the location, or to stop having so many Arizona people read the paper—though that last would probably be the most difficult of the three.

Concentrates.

SMARTSVILLE, Cal., will be lighted with electricity.
The Trade Dollar mine at Silver City, Idaho, is said to be paying \$50,000 a month.
The Porterville, Cal., Development Co. will buy a 75 H. P. engine for its pumping plant.
The Cariboo Con. mine, Cariboo, B. C., in the six weeks of its spring run took out \$87,000.

ENSENADA, Lower California, last week shipped \$2000 in gold bullion to San Diego, Cal.

The Portland mine, Cripple Creek, Colo., has yielded a net profit in six years of \$3,000,000.

It is estimated that within five miles of Sandoz, B. C., 1000 men are employed at mining.

Mill sites are not mineral entries. The land so entered must be shown to be non-mineral.

The Hamilton mine and mill in Summit Co., Colo., have not suspended work one day in three years.

The Tharsis copper mine, Spain, has paid over \$6,000,000 in dividends during the past eighteen years.

The Boston & Montana mine of Butte, Mont., is designated as the Calumet & Hecla of the Butte camp.

A TEN H. P. gasoline engine in the Sonora, Cal., water works raises 400 gallons of water per minute.

To correct "knots" to geographical miles, multiply by 1.15. Twenty "knots" equals twenty-three miles.

The El Dorado County, Cal., Miners' Association holds its annual meeting at Placerville, to-day, Sept. 24th.

POLYBANITE is a metallic, iron-black silver sulfantimonite, Ag_2SbS_4 , crystallizing in the orthorhombic system.

From the safe of the Golden Cache mine, Lillooet, B. C., on the 18th inst., were stolen 800 ozs. amalgam, locally valued at \$8000.

In the Morning Star mine, Boulder Co., Colo., three lessees cleaned up in four months \$9000 net, after paying 30 per cent royalty.

In the Smuggler-Union mine of San Miguel county, Colo., there are said to be twenty-seven miles of underground workings.

The Mollie Gibson mine at Aspen, Colo., is putting in an electric plant and an underground trolley line to haul its ores to the shaft.

The Anaconda Mining Co. of Montana, has bought the plant of the Blackfoot Milling Co., at Banner, the largest concern in the State.

The Canadian Smelting Works at Trail, B. C., employs 400 men and has a monthly payroll of \$30,000. It has a capacity of 700 tons a day.

The Eagle-Shawmut M. Co. of Jacksonville, Cal., has donated \$1600 for the erection of a school building for their employees' families.

At Volcanoville, El Dorado Co., Cal., forest fires have destroyed the mill on the Josephine mine and the sawmill of the Channel Bend M. Co.

In a crevice in the Morning Star mine at Iowa Hill, Cal., were found last week nuggets worth from \$10 to \$400; a total of \$1500 was taken out.

The Highland Boy M. Co., at Bingham, Utah, will build a tramway from the mine to the Denver & Rio Grande railway, a distance of 12,700 feet.

A LOCATOR of a mining claim may abandon a portion of his original location without forfeiting any rights he may have to the remainder of the claim.

J. J. AND J. F. NEARY, splitting a round of twelve holes in the Green Mountain mine at Butte, Montana, last week, were killed by a premature blast.

In Butte, Mont., it is stated that it takes 200 tons of Butte & Boston rock to get the same result as is obtained from 100 tons of the Boston & Montana ore.

The smiths who sharpen the drills in the iron mines of Grangesberg, Sweden, are paid not by the number sharpened, but by the number of meters bored.

In the iron mines of Grangesberg, Sweden, the amount of rock broken for every pound of dynamite used averages 5½ tons, each ton representing 12 feet bored.

TO GUARD against the smoke settling around the works the United Verde Copper Co. at Jerome, Ariz., is building a stack 25 feet wide at the base and 155 feet high.

THE Russian Government has issued a decree for the removal of all duty on mining machinery during the next ten years into the Ural and Siberian provinces.

At Smartsville, Yuba Co., Cal., thirty years ago, it was not uncommon for a gravel mining company there to have three tons of quicksilver in the sluice at one time.

At Minas Prietas, the mining camp of Sonora, Mexico, the recently completed reservoir, holding 34,000,000 gallons, is full to overflowing, ensuring a water supply for a year.

It is locally reported that the De Lamar, Nev., Company will change the process of working the ore from a dry-crushing to a wet one. About 500 men are at work there.

The Sierra Railway Co. has let a contract for the extension of their road from Jamestown to Sonora, Cal., and say they will have trains running to the latter place by Jan. 1st, '99.

CERANGYRITE is a resinous, variously colored silver chloride, $AgCl$, crystallizing in the isometric system; horn silver. It occurs massive or crystallized, is colorless, when perfectly pure, to brown, and is easily cut.

MINE INSPECTOR BYRNES of Butte, Montana, says that some miners estimate that a fuse will burn one foot a minute, but that this theory is wrong. He maintains that the standard of a foot of fuse is only thirty seconds.

AFTER an adverse claim has been filed, and suit begun, no relinquishment or other abandonment of suit will be accepted by the U. S. Land Office or Interior Department. It must be a fight to a finish so far as legal forms are concerned.

THERE is no limit to the number of mining claims any person or corporation can take up, but there is usually a limit to the number that can be held, being ordinarily determined by financial ability to do the necessary assessment work.

It is calculated that in ten years of the Comstock workings over 5,190,000 cords of wood were burned in the sixty steam hoists and pumping plants. Between the years 1874 and 1879 over 4000 men were employed in the underground workings.

The Old Jordan and Galena mines at Bingham, Utah, were located Sept. 17th, '63, and have been operated almost continuously, thirty-five years. It is estimated that they have pro-

duced 10,000,000 ounces of silver, 30,000,000 pounds of lead, some copper, and \$2,500,000 in gold. The deposit is exposed to only 65 feet vertical depth, yet there are thirty miles of workings in the grounds.

THE Bloss & McClary hydraulic mine at Trinity Center, Cal., comprising 1000 acres, was sold last week to McDonald Bros. & Co. for \$50,000. A contract has been let for 400 M. feet of lumber to build a 4-foot flume for a perennial water supply.

ANTIMONY found near Havilah, Kern county, Cal., recently sent to the National School of Mines, Paris, France, by A. Blanc, of Alameda, Cal., assayed, quartz and argite, 9.30; antimony, 90.00; arsenic, trace; lead copper, silver, none; total, 99.30.

THE Yellow Boy and Tam O'Shanter mines in Pitkin Co., Colo., are 14,000 feet above sea level. The Jumbo mine in Chaffee Co. is 13,500, whilst the King Solomon in San Juan Co. is 14,000 feet. They are in a formation of limestone connected with porphyry.

THE Camp Bird mine near Ouray, Colo., comprising thirty-five claims, is owned and operated exclusively by citizens of Ouray. The property is above timber line, and, though amid snow peaks and in the line of snow slides, the men are well housed and the mill runs steadily.

W. A. KEARNS, superintendent of the North Star mine at Silverton, Colo., furnishes the following recipe as an aid in welding steel: Carbonate of ammonia, ¼ lb.; soda of borax, 2 lbs.; muriate of ammonia, ¼ lb.; black oxide of manganese, ¼ lb. Grind and thoroughly mix.

ANY mineral lands in any forest reservation, shown to be such and so subject to entry under the existing federal mining laws, are not included in the recently promulgated rules regarding forest reservations. Mineral lands in those reserves are subject to location and entry the same as before.

THE advance in sulphur in the early weeks of the war caused the profitable working of Utah, Nevada and California sulphur deposits, thousands of tons having been shipped. The price has fallen to its former figure, but it is believed that the new trade connections made will enable the home industry to compete with the foreign product at a slight margin of profit.

ACCORDING to G. T. Brilby the world's annual production of ferro-cyanide and cyanide, calculated as yellow prussiate of potash, is estimated at 8700 tons. The consumption of cyanide is estimated at 2600 tons, equivalent to, say, 3300 tons of yellow prussiate. Prof. Wm. Ramsay reported in 1895 that it was possible to produce cyanide, commercially, at a cost of 10 cents per lb.

THE recently organized Klondike Miners' Association held its first meeting August 29th and drafted a letter to the Canadian Governor-General, appealing for the appointment of a Commission of Inquiry to inquire into the manner in which Gold Commissioner Fawcett has conducted his office, and also making specific charges against him and other Canadian officials.

WHAT is believed to be the largest piece of gold free of quartz ever found in the world was taken from Beyer & Holtermann's claim, Hill End, New South Wales, on May 10th, 1872, its weight being 640 pounds. It measured 4 feet 9 inches long, 3 feet 2 inches wide, and averaged 4 inches thick. Its value was \$148,800. It was found embedded in a thick wall of blue slate at a depth of 250 feet from the surface.

DOUBLING the length of a board or timber reduces the stiffness eightfold and the strength one-half. Doubling the width of a board doubles the stiffness and strength. Doubling the thickness of a board or the depth of a timber increases the stiffness about eightfold and the strength fourfold. If, therefore, it is desired to double the length and retain the same stiffness, it is necessary to double the thickness or depth.

THE statement going the rounds that some time ago responsible men of Butte City, Mont., offered \$10,000 reward for the discovery of a process whereby the destructive smoke of the smelters might be done away with, but that so far the reward has not been claimed, interests the officials of the Mountain Mining Co., at Keswick, Cal., who would like to find some feasible solution of the smoke problem in that vicinity.

THE copper mine at Falun, Sweden, has been worked for 700 years. From records it is learned that the mine has yielded 500,000 tons of copper, 15 tons of silver and 1¼ tons gold, representing a value of about \$27,500,000. The mine is 1200 feet deep. Its greatest production of copper was in 1651, when 3066 tons were made; the lowest was 338 tons, in 1838. The mine, in addition to its metallic products, yields large quantities of red ochre.

FOR 1897 the United States' production of lead was 196,295 tons, of which amount the Cœur d'Alene, Idaho, lead belt produced 69,600 tons of metallic lead, having shipped during the year 116,000 tons of concentrates averaging 60 per cent lead and 30 ounces silver to the ton. The output was made up from the three districts—Canyon Creek, Gardner and Mullan, as follows: Canyon Creek, 54,565 tons; Gardner, 36,715 tons; Mullan, 23,660 tons.

THE revenue collected for the Canadian Government in the Yukon for the seven months ending July 31st, '98, is thus stated: Sale of lots in Dawson, \$28,450; liquor permits, \$6829; certificates and licenses issued by Gold Commissioner, \$90,964; fines, \$1695; lease of water front for three months, \$7500; Crown timber account, \$923; customs, \$38,000; royalty on gold produced, \$351,738; total, \$526,145. In addition, \$24,000 was collected on behalf of the Northwest Territorial Government for saloon licenses.

SOMETHING new is noted in the employment by the Anaconda, Mont. M. Co. of a "geologist"—straight. This company recognizes in this way the fact that, while a mining engineer knows something of geology, the relation of that useful science to economic mining is sufficiently intimate to justify the employment of a specialist therein, in addition to the mining engineer who usually has his time fully occupied with more pressing daily problems.

It has been decided in California courts in case of a working bond or sublease that where the owner or owners of the mining property so bonded or leased gave due public notice of the fact that he or they would not be responsible in any way for labor or supplies bought or secured or bargained for by the bondor or leaser, that the property could not be attached for any debt contracted by the bondor or leaser in connection therewith. A notice setting forth the detailed facts and conspicuously posted on the leased or bonded premises, or published in the nearest newspaper, should secure the owner or

owners from any financial responsibility. What is required is that the owner or owners shall make their disclaimer public and of general knowledge to all interested so far as possible.

SOME surprising statements are made by South African papers regarding surface conditions in the mining world there. One paper—the *Critic*—asserts that thievery of gold is a governmental practice there; that "the machinery of the State is used for the purchase of gold stolen from the mining companies by dishonest employees. The gold thefts from the Witwatersrand mines amount to at least 50,000 ounces per month." That would be over \$10,000,000 a year. The Government denies the charge.

PROGRESS during the last few years in the smelting of lead and silver ores has been mainly in improvement of construction, better knowledge of the chemical requirements for the constitution of the ore charges, greater care in the choice and preparation of the fuel used, and more perfect arrangements for the collection of flue products. The competition among smelting works has raised the prices they pay to the miners for ores, and the incentive to find more economical methods, and practice greater economy in the methods already known, has been strong, and the results correspondingly remarkable.

THE congressional enactment exempting U. S. soldiers owning unpatented mining claims from the customary annual assessment work, and exempting them from their share of such work in any case where they are jointly interested, went into effect June 1st, '98. Briefly, it provides that at any time prior to January 1st of each year if a U. S. soldier file with the county clerk or recorder in the county or district in which the claim is located a statement that he is in the volunteer service of the U. S., no one can relocate his interest in the claim, the assessment work being deemed done by the Government as to his interest.

REGARDING the so-called "selective action" of potassium cyanide for gold, W. A. Dixon considers the term "selective action" as inappropriate, and points out that in the treatment of ores with solutions of cyanide, the cyanide dissolves the free metal, which is generally gold, so long as free oxygen or its equivalent is present, and subsequently any remaining cyanide attacks the compounds of its base metals, hence when comparatively much cyanide and little oxygen is present, as in strong cyanide solutions, much base metal and little gold is dissolved, but in dilute cyanide solutions the conditions are reversed, and so also is the result, so that much gold and but little base metal pass into solution.

It is not always practicable to prevent electrical insulation from being spoiled. Soldering acid, as commonly used, is a solution of chloride of zinc. If this falls on cellulose it turns to a paste. It never evaporates, always takes up moisture from the air, and will gradually eat its way through quite a thickness of insulation. Whether it is acid or neutral makes no difference so far as its action on the insulation is concerned, though the neutral solution does not corrode the wire. Resin has the disadvantage that it is not a fluid and is clumsy to handle. By shaking up powdered resin in very strong ammonia, an ammonia soap is produced which works well in most cases. The ammonia dissolves the copper oxide and evaporates afterwards, leaving the powdered resin, which is an insulator.

THE borax works in Harney Co., Or., mentioned recently in "Concentrates" are in Rose Valley, fifteen miles from Disaster peak, Nevada. Water for domestic use is procured by condensing steam arising from the hot springs, the hot water itself being too strongly impregnated with borate of soda to be used. The borax is the result of evaporation of the water from these springs upon the desert, and the product is obtained by scraping up the dirt, boiling in the tanks and condensing the solution, employing a small proportion of sulphur to crystallize the borax while in the tanks. The crystals adhere to the sides of the tanks or to any article hung in the solution. The water is then drawn off, the crystals knocked from the sides of the tanks and sacked for shipment. The sulphur used is obtained on the surface of the same ground where it is found in large flakes.

THE Nogales Oasis tells of a deposit of sodium carbonate, recently discovered in Sonora, Mexico, two miles inland from Adair bay, an indentation from the Gulf of California, 100 miles south of the mouth of the Colorado river. The deposit covers an area about seventy acres in extent, in the center of which are several flowing springs, the water being strongly impregnated with the salts. This water has spread over the surrounding area, and evaporation has formed a crust of the crystallized salts, 1 to 3 feet in thickness, beneath which is a foot or 18 inches of water. As this crust, which is the product, is excavated and taken away the water from below quickly fills its place, and very shortly, by evaporation, it is completely renewed, making the deposit practically inexhaustible. It is estimated that there are fully 100,000 tons available in the deposit, and a trial shipment to San Francisco yielded handsome returns. Sodium carbonate is used in the manufacture of acids, glass, bi-carbonate of soda, etc.; the demand is steady.

GRATIFYING indeed are the daily words of commendation received from subscribers and readers everywhere. One, writing from Douglas Island, Alaska, this week, says: "I feel every heart-beat of the mining world through your paper." A Prescott, Arizona, man says: "Other mining journals rarely have their wrappers removed, but yours is grabbed, and often carried off before I have time to read it." A Los Angeles, Cal., reader writes: "You folks seem to know just what is wanted." Another from Nogales, Arizona, somewhat critically says: "The advertisements are the most interesting part of the paper," which opens up another field of thought. Probably the most satisfactory of the commendations received during the week is that from a Cœur d'Alene, Idaho, subscriber, who says: "I long since learned to believe what I see in the MINING AND SCIENTIFIC PRESS." Reliability and accuracy are the constant aim, and, though not infallible, it is believed very little gets in that is not exact truth. Not all is commendatory. Frequently come sharp little reminders of remissness and caustic criticism on sins of omission or commission. These are of value when just and deserved, effort being made to deserve such comment as little as possible. This journal deems itself fortunate in having so many kindly critics in the mining world, for if they did not feel so intimate an interest in it they would not take the trouble to point out its occasional errors, mistakes or omissions. The standard demanded is a high one; much is expected; and, because of this, is gladly welcomed such candid expressions of opinion.

Mining and Mill Practice in Arizona.

TO THE EDITOR:—To a Pacific coast Zaccheus roosting up a tree, and with some knowledge of California practice as applied to the milling of free gold ores, it would appear that with the innovation of a crew of mill hands approximating a man to the stamp, with a rock crusher, on friable quartz, mortar plates, a single 12-foot amalgamating plate, and a 6-foot belt concentrator to herd, the highest efficiency would result, and at the least 80 per cent of the assay values be won, the gold essentially free and visible—shot, wire and flake, no float gold—the sulphurets and hematites of a premium concentrating kind.

Yet so perverse are these hitherto free ores of the desert that they will not respond kindly to the Colorado method of mill manipulation, as practiced here. So, approximately, 50 per cent of the gold values go to fatten the tailings pond.

Again, heavy draft horses are doubtless of peculiar and abiding worth in the transportation of Cripple Creek, Colorado, ores. But in this locality, when the summer heat reflects from off the sun-burned mesas, they do not fit the environment.

A mule is an unpretty, non-esthetic creature, but he is "powerful handy" and the only reliable element in remote desert transportation.

However, one learns many new wrinkles in an unfamiliar country, though sometimes the knowledge comes high. Reference is here made, and these practical examples are cited to illustrate upon what ground many mining ventures founder, *i. e.*, in trying to bend the local conditions to meet the requirements of a totally different locality, instead of making the "practice" fit the locality.—

"Thus sickness doth inflict
The very life-blood of an enterprise."

The several failures by mine operators from other sections in this desert region are generally traceable to this self-sufficiency. It is often "money in thy purse" to absorb a bit of local experience with the ozone of a strange country.

That Colorado produces and has some of the most skillful, progressive and competent mining engineers, mill men and miners of any locality is beyond the shadow of a doubt; but in so far as the desert region bordering the Colorado and Gila rivers is concerned, with their "sweet" ores, the truly competent mine manager is yet a resident of Colorado.

And here, by way of parenthesis, the writer would suggest to any Colorado people who would emulate the success of the California miner in this desert field that, as a preliminary starter, he procure and carefully study the difference in the Colorado practice and the California method of gold milling, as ably and fully recited in "Stamp Milling of Gold Ores," by T. A. Rickard of Colorado.

Briefly related, here is one Colorado fiasco as an illustration of which the writer has personal knowledge:

Given a partly developed group of gold claims—thickness of vein 12 to 20 inches, dip of 80°, walls of granite, gouge cased both sides, gold free and visible in clear grit quartz, easy breaking ground to strip ore, ready of access, five miles from mill and down-grade pull, wood in abundance (mesquite delivered at \$2 per cord at mill), average assay of ore \$25 per ton, with the 5-stamp mill now on ground, a practical California manager should net from \$40 to \$75 per day.

But there's the rub—"practical manager." This factor was wanting. This property of merit was secured under bond and lease by Colorado sporting men. They incorporated, sold shares for twelve head of heavy draft horses, Colorado breed. These unacclimated animals were driven overland from Colorado City at a large expense, with them low-wheeled logging wagons. With the teams came a nondescript crew of "swampers"—unskilled labor—to whom were added from time to time barroom rounders, all under pay. There was at no time a head; the manager, a sickly man, from pure physical weakness and want of force and positiveness let this harmful element do about as it pleased.

In the regular, defined ore shoots of the mine occurred rich pockets of friable and fragile honey-comb quartz, holding a value of from two to five ounces gold per ton. This was taken down carefully in the mine on canvas, and often sacked before sending on top. This and all classes of ore was sent down in a car to an open platform, from whence it was shoveled into wagon beds, none too close as to cracks, as so much sawdust would have been handled by teamsters more familiar with sawdust than rich gold ore. Arriving at the mill, it was again carelessly shoveled into the mill ore bin. In every instance ore rich in metallic gold and dust, from which a good string of colors could be panned in the naked hand, could be taken from the ground in both places, mine and mill. The superintendent, an Arizona man, kicked and growled and fought (as would any true miner) at this uncalled-for loss, but the general manager moved in his easy way, and the Colorado contingent voted "the 'supe' a damned crank."

At the mill a somewhat similar condition obtained.

There were five to six men herding the 5-stamp mill plant. The Colorado millman, though given too much to slow drop of stamps of the Colorado mill practice, was gradually getting the mill into higher productive condition, though assays showed the tailing pond enriched from \$7 to \$13 per each ton of ore crushed from \$30 rock. The concentrates had gradually advanced from \$40 to \$243 per ton. Discord and unhappy quarrels between principals and stockholders determined them to make an example of some one, so the millman—the most efficient member of the outfit, and who was fast catching the swing of the ores—was relieved and a so-called "mining engineer" and world-beating amalgamator was installed. Taking full charge, the mine was gutted to the surface from the 75-foot level, and one of the most wonderful creations, I venture to say, that ever was seen in a thin-veined metal mine is in evidence of his methods of mining; and 50 feet below the 75-foot level there is sunk a shaft, or rather a cellar, 14 x 11 feet, on a 14-inch vein, and that is in the center of this chasm.

Space will not permit mention of the general reversal of all fixed rules of economical mining. Too many men by half were worked, and, worst and saddest of all, they were not paid their wages and never recovered a cent, as the owners of the property, not liking the turn of affairs, had in a legal way estopped any claims as liens against the mines.

The manager skipped; the residue of hobo-miners, with a sprinkling of good men, looted the commissary and would have damaged the property if the owners had not choked them off.

Thus ended what might have been a dividend property under competent management, for the mine is conditioned to-day, as a tangible, "going concern," with ore of good commercial value in all headings, and will be worked by the owners, if not sold, and a paying mine result.

Should this story, showing the prime necessity of having a practical business man at least, if not miner, to supervise affairs, as manager, and one not too "wise in his own conceit" to learn the ways an unfamiliar country, tend to warn one embryotic mine investor that something more than sleek talking or a "jolly good fellow" are factors to be considered in successfully winning gold from the rock, then this letter shall not have been written in vain.

TAYLOR D. MACLEOD.

Yuma, Arizona, Sept. 3rd, '98.

Why Sandstone Was Used.

TO THE EDITOR:—In reference to an article published in your paper of Sept. 10th, '98—"Carrying Coals to Newcastle"—regarding the use of sandstone in the new courthouse at Sonora, Tuolumne Co., Cal., allow us to state that the members of the Board of Supervisors and ourselves would only have been too pleased to use Columbia marble if the same could have been had, or even granite. Those owning the quarry and those having the bond on said quarry could give no satisfaction to us regarding the furnishing of material, and after trying for months to come to some arrangement whereby marble could be used, we were forced to give it up and therefore adopted sandstone. It does seem a pity not to have used marble as we were very much in favor of it. As the fault does not lie with either the Board or yours truly, we nevertheless agree with you in this article: that when stone can be had near by it should be used.

WM. MOOSER & SON.

San Francisco, Sept. 14th, '98.

Gasoline Engine at an Arizona Mine.

The illustration herewith shows the parts of a complete 10 actual H. P. Weber gasoline engine, recently built by the Weber Gas & Gasoline Engine Co., 430 Southwest Boulevard, Kansas City, Mo., and installed by the Decatur Copper Mining Co., near Jerome, Arizona.

The complete plant set up weighs 7200 pounds. The plant was sectionalized for burro transportation, bringing all the parts down to required weight. In addition to hoisting, the engine will be used for operating a Cornish pump and power for ventilation. The Weber people have built several of these machines for out-of-the-way localities, especially in southern California, Arizona and Mexico. The manufacturers say that a single burro can carry fuel enough on one trip to operate a 10 H. P. gasoline hoist ten days, operating twenty-four hours per day, which makes these engines valuable where all



fuel must be freighted, or where water is scarce, as a 10 H. P. hoist ordinarily uses only two gallons of water in twenty-four hours.

Zinc-Lead Ores in Colorado.

TO THE EDITOR:—In reply to "Utah Miner's" request for information regarding a market for zinc ore, in your issue of the 3rd inst., I will state that I have marketed that class of ore and have devoted considerable time to finding a market. The Missouri and Kansas zinc smelters pay \$20 per ton at the smelter for 65% zinc ore, free from iron or lead. The Canyon City, Colo., plant of the American Zinc-Lead Co. buys zinc-copper-lead ore. The zinc and lead is manufactured into paint; the gold and silver values are retained in a copper matte. A zinc-lead ore containing copper, say, from 2% up, will find a ready market at these works with, say, a treatment charge of \$5 to \$8 flat, 95% of New York price on silver, market price for copper and about two-thirds of the market price for lead. The railroad rate on zinc ore is about one-third less than on lead ore.

The Bi-metallic Smelter at Leadville, Colo., also buys it. Zinc ore (sulphide), containing 25% lead, would get a treatment on car lots at Leadville smelters of 10% to 15% of 50c a unit excess, or 8% of 30c unit excess; lead 53c per unit, 5% off for loss in treatment of silver, New York price. The treatment charge will depend on the character of the ore: if the gangue is iron and lime, the charge would be less than if a silica base. Suppose the ore contains 25% Zn., 25% Pb., 25% S., 15% CaO, 10% Fe., the treatment charges would be about as follows:

| | |
|---|--------|
| Neutral charges per ton (up or down)..... | \$4 00 |
| Zn. 25%, 15 of 10 excess @ 50c..... | 5 00 |
| Sulphur 25%, 13 of 12 excess @ 20c..... | 3 00 |

| | |
|------------|---------|
| Total..... | \$12 00 |
|------------|---------|

| | |
|---------------------|---------|
| 15% Lime @ 10c..... | \$1 50 |
| 10% Iron @ 10c..... | \$1 00— |
| | \$2 50 |

| | |
|---------------------------|--------|
| Net smelting charges..... | \$9 50 |
|---------------------------|--------|

Or say the ore contains: Zn 25%, Pb 25%, Sulphur 25%, Lime 5%, Iron 10%, Silica 5%, Baryta 5%:

| | |
|-----------------------------------|--------|
| Neutral charges (up or down)..... | \$6 00 |
| Zinc 25%, 8 of 17% @ 30c..... | 5 10 |
| Sulphur 25%, excess @ 20c..... | 3 00 |
| Silica 5%, excess @ 10c..... | 50 |

| | |
|------------|---------|
| Total..... | \$14 60 |
|------------|---------|

| | |
|----------------------|---------|
| Lime, 5% @ 10c..... | 50 |
| Iron, 10% @ 10c..... | \$1 00— |
| | \$1 50 |

| | |
|--------------------|---------|
| Total charges..... | \$13 10 |
|--------------------|---------|

These charges will vary considerably at the different reduction works. On a large tonnage, contracts can be made on far better terms than these. Zinc ore is plentiful in this State. Immense bodies of zinc blende and sulphide are exposed in the mines at Robinson and Kokomo. The Col. Sellers and Moyer mines at Leadville could ship thousands of tons on short notice. The Clear Creek and Georgetown mine ores contain a considerable percentage of zinc.

At Aspen the Smuggler mine contains large bodies of zinc-lead ore, which is separated at the company's mill, making a 70% to 80% lead concentrate. There is more or less zinc ore in nearly every silver mining camp in the State, and all the large smelters have special facilities for roasting and smelting zinc sulphide ores.

MINER.

Aspen, Colorado, Sept. 18th, '98.

British Investors and California Mines.

TO THE EDITOR:—By those who are truly desirous of making a legitimate business in the matter of promoting an interest in California mining properties in this country, the closing sentences of your article on "London Stock Jobbing Sharps," in your issue of the 6th inst., saying: "There is neither sense, honesty or business in such work, and the sooner it is ruled out the better. An owner who desires to make success of a sale should determine upon his price, allow the promoter a reasonable advance to pay him for his trouble and business service, then demand in writing that no additional loading under any circumstances shall be put upon that price. This would enhance the likelihood of a sale. The English buyer would thus have value received for his money, and the American mine owner and promoter would be credited with fair dealing,"—can not but be honestly endorsed and heartily welcomed. You may have remarked that the reports recently issued from the British Consulate in San Francisco extensively endorse and strongly commend much that has been temperately and judiciously advanced in your editorial and in your columns, during the past year or so, in respect to the buying and selling of, or interesting foreigners in, California mines.

The British investor, when once interested in any enterprise that has merit and is honestly managed, is an individual worth cultivating, for he, unless returns are wholly wanting, rarely complains, and is seldom unwilling to respond to a call for additional capital, if made by a capable management in

which he has confidence. It is to be hoped that in view of the important and favorable notice given to Californian mining by the British Consulate, together with your well-timed advice that mine owners may perceive it to be in their own interest—apart altogether from any general advantages that must necessarily arise in connection with all mining negotiations—not to be too unreasonable in their demands as to terms, etc., but to be prepared to meet business proposals on business lines.

AN ENGLISH READER.

London, Aug. 20th, '98.

Two-Stamp and Three-Stamp Mills.

The Parke & Lacy Co., 21 and 23 Fremont St., San Francisco, have just completed and placed on the market a two and three-stamp mill of new design, embracing several notable features. In designing the mortars particular attention has been given to the distribution of the metal in such a manner as to avoid unequal strains in cooling, with the object of lessening the liability of the mortar to crack when in use or through rough handling during transportation. The mortars have three discharge openings, on the front and on both ends, and the pulp from the end discharges is brought to the front by means of

Oregon pine battery posts, oak guides, inside amalgamating plates, cam shaft, pulley and all bolts, nuts and washers for the frame, mortar block and foundation. The mortar block, sills and stringers and the outside amalgamating plates are not included.

| TABLE OF SIZES, ETC | | | | | | | | | |
|---------------------|-----------------------|-----------|-----------|-------------------------|----------------|------------------------------|-------------|----------|--|
| No. of Stamps. | Weight of Stamps..... | Pulley. | | Diameter Cam Shaft..... | Diameter Stems | Diameter Shoes and Dies..... | Mortar..... | Complete | |
| | | Face..... | Diameter. | | | | | | |
| 2 | 900 | 48" | 10 1/2 | 4 1/2 | 3 3/16" | 8 1/2" | 2,872 | 8,200 | |
| 3 | 900 | 52" | 10 1/2 | 4 3/4 | 3 1/8" | 8 1/2" | 3,615 | 10,800 | |

Floating California Mines in England.

TO THE EDITOR:—Notwithstanding that the requirements for the end of August, occasioned chiefly by a keen demand for gold on American account, caused a sharp twist-up in the money market, the

hardly see how we could be on the lines you propose. To know whether a successful flotation could be made here or not, one would require to frame or prepare a prospectus, with the view of securing underwriting or guaranteed subscriptions for, say, £——, and if this could be done you would then have a certainty of working capital, whether you were able to dispose of many more shares or not. A capitalization of, say, £——, £—— of which to be for providing working capital, would appear to be by your letter a fair basis to proceed upon, and would give to you and your co-owners £—— in cash or shares, in accordance with how the proposal might be responded to by the public. In order to ascertain whether underwriting is attainable, a prospectus is imperative, and to formulate one it would be necessary to have a superintendent's report, supported by a separate one from some mining engineer whose name is known on this side, and of such there are not a few in California. The initial expense in this respect need not be great, while the cost of printing proof prospectuses, underwriting letter forms, and providing for other indispensable items, should not exceed, say, £50 or £60 (\$250 or \$300). Whether you would care to risk this expense is for you to determine only; we can see no other way of your being able to do anything with the property on this side that would be half so advantageous to its owners, as with the underwriting assured, they would have the essential working capital, as well as the management of the mine. In other words, without underwriting or guaranteed subscriptions for a portion of the capital, no one is likely to risk the heavy costs associated with registering and advertising a company; neither will anyone not already interested in the mine—unless they are without experience—entail even the preliminary expenses above alluded to. So it is simply a question of whether you are willing to hazard the trifling costs in order to ascertain whether underwriting is or is not attainable."

The time has gone by when either individuals or companies can be induced to put up, say, £1000, or \$5000, for a month or so extension of an option on a "dead" mine. A dozen years or more ago it was alleged that old man Davis received such a sum several times for an extension of time on the Allison Ranch mine, when it was filled with water; but gold mines are much more numerous now than they were then, and the methods of dealing in them have altered accordingly.

A LONDON PROMOTER.

London, Sept. 10th, '98.

Grade of Plates in a Gold Mill.

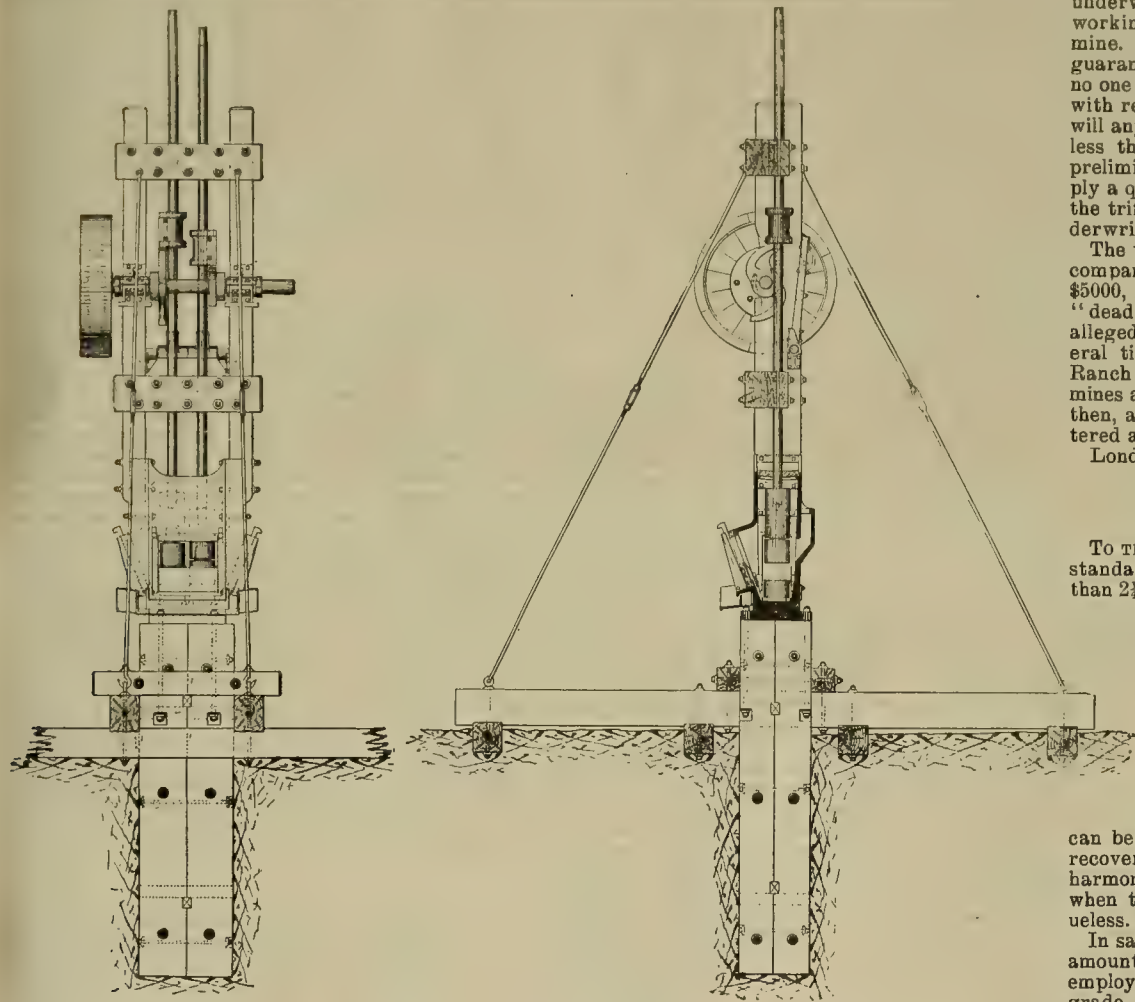
TO THE EDITOR:—In the best modern practice the standard grade for a full-width plate is never less than 2 1/4 inches per foot, and this is only employed where the ore is a clean quartz, with no slime, and a very small percentage of sulphurets. On average ore this grade will be 2 1/2 inches per foot; on the 16-inch sluices a grade of 2 inches per foot, and on the 4-inch sluices a grade of 1 inch per foot is essential, unless 1-inch angle strips are put on each side of the sluices, when 1/2 inch can be employed.

The aim of millmen is steadily directed to saving everything of value in the ore which can be done without expending more in cash than is recovered. To do this the various operations are harmonized as much as possible, so that the tailings, when they finally leave the mill, are practically valueless.

In saving the sulphurets to a high percentage the amount of water used is absolutely limited, and to employ only this fixed quantity a certain minimum grade has been established from practical experiments by experts, extending over many years and on ores of every locality.

It took a long time to overcome the objections of those accustomed to slight grade and, in consequence, an excess of water, as they could not be persuaded except that the loss in free gold and quicksilver would create a big deficit in the immediate returns, and it certainly did as long as the habit of using wet amalgamation was adhered to. But, to the astonishment of all these objectors, when the amount of quicksilver was reduced to its proper quantity, the free gold saved on the plates was materially increased, and it was caught very much nearer to the battery.

The explanation of this can be readily understood on watching the course of the pulp down the plates. All ores contain gold in various sizes, the finest being called "float gold," and also the hardest to save. Yet it is the recovery of this, owing to the steeper grade and the smaller quantity of quicksilver employed, which increased the total yield, to the astonishment of the early amalgamators. The coarse gold remains in the battery or is held on the lip plate, owing to its weight and specific gravity, but the fine gold is carried along by the current, above the sand, and would be lost if a good deal of water were used. With the proper amount of water for subsequent concentration, the pulp is observed to run or rather roll down the plates in a succession of waves, each surface of a wave touching the amalgamated plate, when the gold is at once seized and held. Wherever quicksilver goes, fine gold in solution



TWO-STAMP MILL OF NEW DESIGN.

an apron or trough, where it joins that from the front discharge, and all then flows over the plate. This apron is cast separate from the mortar, to which it is attached by bolts, this form of construction being considered preferable to that in which the apron is cast to the mortar, as there is less liability to breakage during transportation, and, in the event of breakage, a new apron can be substituted at small cost. Silver-plated copper plates for lining the mortars are furnished with these mills and are included in the price. They are 1/4-inch thick and a wrought iron plate is riveted onto the bottom to stiffen them. Each end of these plates is held in place by a key, which can be loosened, and the plate raised or lowered to suit the height of discharge and the wear of the dies, the use of chock blocks being thus dispensed with to avoid the possibility of an accumulation of heavy matter to choke the discharge. Two sets of screen frames with different widths of rails are furnished with the mills, so that the height of the discharge can be regulated as the dies wear.

The cams are built on approved lines or curves, designed to lift the stamps with a minimum of friction and power. The cam shaft is set into the boxes from the front side of the mortar, and the stems are set into the guides from the back, so that either can be removed without disturbing the other, thus enabling the operator to make repairs quickly.

They are built in but one size (900 lbs. stamp); the price includes the ironwork complete for the mill,

accuracy of the following, which appeared in a leading financial paper on the 29th or 30th ult., is but little affected: "The prospects are not so inspiring as they might be, and it is quite on the cards that continued inaction will prevail until circumstances are more favorable for the charming of fresh capital from John Bull's pockets, which are still well lined." That there is no lack of what may be termed inactive capital in this country, there can be little room for doubt. Though, in such a connection, the question arises: How can it, or any portion of it, be made available or "charmed" for the development of mining or other enterprises located, say, on the Pacific coast? To answer this question satisfactorily is well nigh impossible, and as individual capitalists or speculators seldom interest themselves in mining property, unless with the object of offering it for public subscription, which they rarely do in a fashion that is either fair to the mine owner or to those who subscribe for shares, it occurs to me to observe that the mine owner might do much for himself in the matter of advancing his own interests, as well as those of likely investors, providing he is not adverse to adopting in some degree the suggestions embodied in the following excerpts from a letter written in answer to inquiries made by a California mine owner in search of "development" capital: "If you have an option on the whole property, and are inclined to promote or float the mine yourself, we could possibly be of some service to you; but we

goes with it; and to prevent a loss in this way the amount of quicksilver employed is reduced so much that to a person brought up under the old regime it appears as if the loss must be excessive. It is not; but, on the contrary, a gain is obtained, owing to recovery of the float gold from the small loss in quicksilver.

W. J. ADAMS, E. M.
San Francisco, Sept. 20th, '98.

Tabulated Results of Mill Work.

TO THE EDITOR:—I was greatly interested in the article from E. L. Ballou, in the issue of Aug. 20th. I enclose blank form which I have used for

usual size. Sometime ago Supt. Jackling got a dose of the gas, and for some time his life was despaired of.

A Short Account of Cyanide Practice in New Zealand.

There are at present substantially three systems used in the application of cyanide. First, the process as recommended by the Cassel Co., after a number of experiments and till recently adopted at almost every mill. In this process the ore is dried in kilns of varying construction. In some cases it amounts to a partial roasting, this being particularly

An Electric Foundry.

The electric appliances that run the Reading, Pa., Car Wheel Works are the first electrical equipment ever installed in a foundry. The current is taken from the Metropolitan Co.'s wires. Several times when the bottom of the cupola has been dropped the motor has been splashed with molten iron, but this occasioned no trouble. Motors run the elevator and the drop used for breaking old car wheels. This drop has a fall of 40 feet. The carriers have a capacity of about 800 pounds to the floors. These ladles are operated by a small reversing motor, which can be run by the man in charge of the pouring ladle. The five-

MILL WORK.

| DATE. | Ore Bins. | | Hours Run. | Product. | | | Gross Value. | Amalgam Won, Ozs. | Retorted. | | Melted. | | Fineness. | | Value. | | | Shipped. | | | | | | | REMARKS. |
|-------|-----------|--------|------------|------------|--------------|----------------|--------------|-------------------|------------|---------------|---------------|-----------|-----------|-----|--------|-----|--------|------------|----------------|---------------|-------------------|-----------|--------------|------------|----------|
| | No. 1. | No. 2. | | Sks. Conc. | Est. Dry Wt. | Value Pr. Ton. | | | Ozs. Amal. | Ozs. Cr. Bul. | Ozs. Cr. Bul. | Ozs. Bar. | Au. | Ag. | Au. | Ag. | Total. | Sks. Conc. | Actual Dry Wt. | Actual Value. | Actual Net Value. | Ozs. Bar. | Gross Value. | Net Value. | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

some time to tabulate results of our mill work. It goes without saying that this form must be made to fit the conditions existing at each mill, or other reduction works, where used, and may be extended or curtailed as desired. Only the most important routine of mill work needs permanent record and minor matters may safely be left to the notebook of the foreman, or omitted entirely. This idea has guided me in working up the blank forwarded. First, the amount of ore crushed and its product, both in concentrates and bullion. My assay of these products serves as a check on the smelter returns, though on concentrates they are not expected to be exact, owing principally to the varying amounts of moisture contained in them.

I have long since abandoned the "battery sample," as being practically impossible to take with accuracy, but if my tailings are satisfactorily low my mind is easy on that score, and returns show the value of the ore milled. At the end of any desired period add the various columns necessary and you have at once the aggregate of work done, etc., from which it is easy to ascertain the daily averages, per ton values, etc.

Our ore is delivered from mine to mill, a distance of 3600 feet, by running water in a flume, and one bin is being filled while contents of the other bin are being worked, the ore being entirely used from each bin alternately. The test made by Mr. Ballou, in feeding quick inside and outside of battery, is very interesting, but it would be more satisfactory were he to continue the test for several weeks in succession. Might it not be possible that a slightly different grade of ore went to the different batteries, thus accounting for the considerable difference in amount of amalgam won? Supt. BALD EAGLE MINING Co. Sum Dum, Alaska, Sept. 4th, '98.

Killed by the Fumes.

At Mercur, Utah, recently, W. E. Ward and J. Weinhart, employes of the Golden Gate mill, died from inhaling arseniureted hydrogen.

In the Golden Gate the ore contains sulphur and arsenic. In roasting some of these remain, associating themselves with the cyanide solution. The gold is separated from the cyanide by sulphuric acid and the arsenic and zinc brought into contact with a strong acid will produce this gas, which is colorless with a garlic smell, the sulphur and hydrogen combining, forming sulphuretted hydrogen with a "rotten egg" smell. From the tank in which the precipitation of the gold is accomplished both gases are generated, the first deadly in its effects, the second comparatively harmless except as far as the nauseous smell is concerned. Over this tank is placed a hood and electric fan to draw the fumes out of the room, and it is impossible for the gas to escape into the room where the men are at work.

After the work of precipitation the solution is drawn off into another tank. Here the solution has been tested time and again, but no trace of arsenic has ever been found. On this particular occasion the solution appeared cloudy and some zinc dust was screened into the tank. One of the men, Gilson, sifted the dust into the solution while Ward and Weinhart stirred the mixture. In a few minutes Ward was overcome and was taken out. No evil effects were felt by the other two for some hours. Ward died two days after, while Weinhart lived six days.

An examination was held over the body of Ward to find out how the gas affected the system. The gas has the effect of disintegrating the red corpuscles in the blood, leaving only a yellow fluid, unable to perform the regular functions of carrying oxygen and nutrition to the various parts of the system. The disintegrated corpuscles are thrown out of the system in the shape of clotted blood, through the liver and kidneys. It was found in the case of Ward, that both these organs were increased to twice their normal size and the spleen was at least five times its

beneficial if the ore is at all clayey in its nature; then crushing in stone breakers and stamps, a 40 or even 60-mesh screen being used, the dust being conveyed to hoppers and thence distributed to the vats, care being taken to avoid packing. The solution of cyanide is then passed into the vats, percolating upwards. Usually sufficient is run on to form a 2 or 3-inch layer on top, the strength of the solution varying from 5 lbs. to 10 lbs. of cyanide per ton of solution. As this drains through, naturally at first and aided by a vacuum pump towards the end if necessary, a further supply of weak solution is added on top, varying in amount according to the ore under treatment, the final wash being water only. The solutions are passed through zinc towers in the usual way. An extraction of from 90 to 95 per cent of the bullion value of the ores is, in some cases, obtained in this way, notably at the Waihi.

The second process is carried out at the Crown mine. Here the ore is clean quartz with very little mineral, but a considerable portion of the gold is so fine that it is not discernible in the stone, similar in that respect to the Waihi, but also containing free gold in coarser aggregates. After a long trial of dry crushing they treat the ore as follows: It is passed through rock breakers and fed into the mortar boxes as in ordinary wet crushing, but the water used is a dilute solution of potassium cyanide containing about 1 lb. KCA per ton. The pulp is passed into tanks, the slimes and water passing into a settling tank and thence through the zinc boxes back to the battery. The slimes are sucked dry by means of a vacuum pump and then sluiced into the river, the sands being further treated with cyanide solution in the ordinary way and afterwards sluiced out over amalgamated copper plates. With this ore no difficulty is experienced in settling the slimes and a very good extraction results, although the consumption of cyanide is somewhat higher per ton of ore than in the dry crushed ore, yet this is more than counterbalanced by the saving in fuel and has also the advantage of more than doubling the capacity of the mill. The precipitation of the gold from the weak solution, though not very perfect, does not make any great loss, as the same solution is kept in constant circulation and being so weak does not become so contaminated as the stronger solutions. This is the only case that the slimes are treated apart from the bulk of the ore. So successful has this plan been with the Crown ore that the manager says he wishes the ore was all slimes when crushed.

The third process is similar in every respect to that carried out in the Transvaal, the tailings being filled direct into the vats by means of a distributor, almost the whole of the slimes being retained in the vat, the only difference being the vats are only about 4 feet deep. This also gives satisfactory results where applied. W. OAKES KIBBLE, F.I.C., F.C.S.

STATISTICS are presented in a recent number of *Nature* which tend to support the conclusions of Dr. Bruckner that there is a regular cycle, of about thirty-five years, in the course of which the earth experiences a change of weather from a cold and wet period, through a hot and dry period, back to a cold and wet period again. According to these statistics, we are now in one of the comparatively dry periods, but early in the twentieth century the condition of things will be reversed, and the wet years will outnumber the dry ones.

A NEW German exciting liquid for electric batteries—calcium—consists of oxychloride of calcium dissolved in a solution of sal ammoniac. This is cheap, a good conductor of electricity and does not crystallize even at zero temperature.

THERE have been shipped to Swansea, Wales, 5400 tons of American steel rails, to be used in the building of a road near that place.

ton ladle is run by a motor in the rear. All the carriages over the tracks are operated by electric motors. All motors are specially built to stand a temperature of 150°. They are equipped to reverse at varying speed. From each controller is run a hand rope to the floor, so that each molder has control of the speed and can vary it from 1 to 50 feet per minute on the hoist. Each hoisting motor has an electric brake. By electric power the red-hot car wheels are lifted from their molds and taken to the annealing pits. The system enables the men to work rapidly and at less cost than before. The tumbling barrels and pressure blowers are also run by motors.

MUCH of the land surface of the globe is still unexplored; the ocean is almost unknown; our collections contain thousands of new species waiting to be described; the life histories of many of our commonest species remain to be investigated, or have only recently been discovered. Take, for instance, the common eel. Until quite recently its life history was absolutely unknown. Aristotle pointed out that eels were neither male nor female and that their eggs were unknown. This was believed to be true until a few years ago. No one had ever seen the egg of an eel, or a young eel less than five centimeters in length. Thanks mainly to the researches of Grassi, it is now known that the parent eels go down to the sea and breed in the depths of the ocean, in water not less than 3000 feet below the surface. There they adopt a marriage dress of silver and their eyes considerably enlarge, so as to make the most of the dim light in the ocean's depths. In the same regions several small species of fishes have been regarded as a special family known as leptocephali. These also were never known to breed. It now appears that they are the larvae of eels, that known as leptocephalus brevirostris being the young of our common fresh water eel. When it gets to the length of about an inch it changes into one of the tiny eels known as elvers, which swarm in thousands up our rivers. Thus the habits of the eel reverse those of the salmon.

AN INTERESTING announcement is that of the assured progress of tapping the Nile river at its higher level above the cataracts, conducting the water to vertical shafts, down which it will fall to drive turbines, then using the power so generated to run dynamos, from which electricity in the form of alternating or continuous current will be transmitted to points near or remote. The water, after passing through the turbines, will be restored to the river at a lower level or else used to irrigate the land. There will be no waste of material, as in burning coal, and no smoke. Electricity will be applied, not only in pumping for the irrigation, but in driving machinery for preparing the raw products of the soil, spinning cotton, weaving silk and various other industries.

THE ordinary method of making white lead occupies months, but by electrolysis it is claimed that the finest quality of white lead can be produced in a few hours, and at an extremely low cost. The new method consists in the action of electrolytically generated nitric action upon lead, in which there are four reactions. This first consists in the electrolytic preparation of nitric acid and hydro-oxygen. In the second, the action of the nitric acid on the lead forms lead nitrate; the reaction of lead nitrate and sodium hydro-oxygen forms lead hydro-oxygen, while the combination of lead hydro-oxygen and sodium bi-carbonate forms lead carbonate, or white lead.

THE bright colors obtained in case hardening come only on bright and clean steel or iron. The secret lies in plunging the metal into the bath of water without letting the air strike it; then in cleaning the piece in hot water and drying it in sawdust, oiling it afterwards to keep it from oxidizing.

The Gas Engine.

In a recent paper read before the North British Association of Gas Managers, W. C. Peebles thus spoke of the gas engine:

"There can be no doubt that a great deal has yet to be done to improve the action of the gas engine. The main direction in which a change must be looked for is, I think, in the cycle. But this would seem almost impossible without introducing complicated mechanism. At present—at least with the smaller sizes—the successful competition of the gas engine with the steam engine is chiefly due to the convenience and economy with which the gas engine can be operated, especially for intermittent work. With engines above 40 or 50 H. P., using producer gas, the cost of working, as compared with steam, is very greatly in favor of the gas engine, as has been proved time after time. We shall find, therefore, that the large gas engines will not stop at 400 or 500 H. P., but increase gradually year by year, until they compete in power with the largest steam engines made.

"What the gas engine has done for the benefit of small masters it is impossible to estimate. Many hundreds of these employers were driven out of existence by the introduction of the steam engine. But they are gradually springing up again; and, by the aid of the gas engine, they are able to secure a respectable share of trade. That the gas engine will rank in the near future as one of the chief sources of power there can be no doubt; and I would add, in closing, that as gas managers are chiefly concerned in the manufacture of the working fluid, they should do all in their power—by giving a plentiful supply, at a good pressure, and, if possible, at a reduced rate—to help forward this excellent motor to a greater extent of usefulness."

Recently Declared Mining Dividends.

Yellow Aster, California, \$10,000; payable immediately.
 Republic, Washington, 3 cents per share, \$30,000; payable Oct. 10.
 Parrot, Montana, 3 cents per share, \$6900; payable immediately.
 Modoc, Colorado, 2 cents per share, \$10,000; Sept. 17.
 Gold Coin, Colorado, 1 cent per share, \$10,000; payable Sept. 26.
 Homestake, South Dakota, 25 cents per share for August and an extra of 25 cents per share for September payable Sept. 26; total, \$62,500.
 Napa Con. Q. M. Co., California, 10 cents per share and 10 cents extra, \$20,000; payable Oct. 1.
 Etta Con. Q. M. Co., California, 10 cents per share, \$10,000; payable Oct. 1.
 New Idria Q. M. Co., California, 10 cents per share and 10 cents extra, \$20,000; payable Oct. 1.
 Horn Silver, Utah, \$25,000; payable Sept. 26.

Recent California Mining Incorporations.

Golden Trout M. Co., Oakland; capital stock, \$100,000, subscribed \$69,900; J. R. Watson Jr., E. G. Perkins, C. L. Sturm, T. J. McClelland, C. E. Swezy.
 Strable Co-operative Slate Co., San Francisco, to operate at Kelsey, El Dorado Co.; capital stock \$500,000, subscribed \$12,505; J. F. Wetzell, J. A. Kinghorn-Jones, E. S. Tibbey, J. Strable, M. Hornfeldt.
 McKinley Spartan Con. G. M. & M. Co., Stockton; capital stock \$50,000; subscribed \$42,975; P. Miller, J. W. Empfield, W. B. Schuyler, J. W. V. Meseroll, E. L. Rehm.
 American Eagle M. & D. Co., San Francisco; capital stock \$150,000; subscribed \$410; L. S. Harvey, C. F. Bills, A. Rudolph, V. H. Robinson, R. Towart.

Commercial Paragraphs.

THE Colorado Iron Works Co. of Denver, Colo., has arranged with Mgr. Bartlett of the American Zinc-Lead Co. of Canyon City, Colo., to build his new concentrator at their works on royalty under his patents.

A. MIDDLEBROOK, the Denver manager of the Jeanesville Iron Works Co. of Jeanesville, Pa., writes that they are building for the Yellow Aster M. & M. Co., southern California, a compound mine pump for high duty discharge pipe five miles long, carrying water pressure of 500 pounds to the square inch, and that their shops are very busy on mine pumps of large sizes.

Coast Industrial Notes.

—Central Pacific R. R. Co. stock has advanced in New York from 17 to 23½, a share.
 —From The Dalles, Oregon, were shipped last week twenty carloads of wool to Boston, Mass.
 —The Southern Pacific has cut the salmon rate out of Portland to New Orleans to 85 cents a hundred.
 —The San Diego, Cal., Flume Co. is daily furnishing 1,000,000 gallons of water from its thirty-seven wells.
 —The railroad to Globe, Arizona, will be in operation Nov. 10. The Old Dominion will start its smelters to day.
 —A lumbering business is to be established at Hood River, Oregon, and a large mill will be built at the mouth of the river.
 —In Santiago canyon, twelve miles from Santa Ana, Cal., lignite coal is being mined and meets with ready sale at \$4.50 per ton.
 —The Great Northern Railroad has awarded a contract for 2,000,000 feet of lumber to James Bell of Everett, Wash., to be delivered in sixty days.
 —About one-half of the \$100,000 asked for deep drainage and mining on the Comstock, Nevada, lode, has been pledged by the Comstock mining companies.
 —Pendleton, Oregon, wants to negotiate for the sale of \$70,000 worth of water bonds and \$60,000 of outstanding city warrants at a rate not exceeding 5 per cent.
 —Quicksilver receipts at San Francisco in August were 2149 flasks, against 1879 flasks for the same month last year. The foreign exports were 375 flasks this year, against 294 in 1897.
 —Near Biggs, Cal., 550 acres of hemp this year yielded the growers from \$120 to \$200 per acre. A mill of large capacity has been built and is crushing and baling the product for market.
 —Near Butte, Mont., on the 1000-foot level of the Original mine, a cave-in killed D. Poletto; six floors were crushed in. About twenty-five men were working near Poletto, but escaped injury.
 —When the Sunset Telephone and Telegraph Company completes its long-distance line joining in a general system the States of California, Oregon, Washington and Idaho, one can talk direct from San Diego, Cal., to Boise City, Idaho, a distance of 1943 miles.
 —The Bellingham Bay, Wash., Improvement Company have decided to pursue the same method in the reconstruction of their big mill that was pursued when it was first built, viz.: erecting a small mill to cut the lumber that goes into the big one.
 —The steamer Charles Nelson plies between San Francisco and Seattle in opposition to the Pacific Coast Steamship Co. The Cleveland and Lakme will follow the Nelson. Passenger rates on the new line have been cut to \$12 first class and \$7 steerage. Freight rates have also been reduced.
 —Contracts for material and supplies for the system of wharves, docks and elevators now under construction by the Great Northern Ry. Co., at Seattle, Wash., and aggregating in value upwards of \$100,000, were let this week. A lumber contract for 5,000,000 feet has been let to three mills on Puget sound.
 —The Louisiana purchase made America a steamboat nation; the acquisition of Texas and California made America a railway and telegraph nation, and incidentally, the events of 1898 must bring America to the front in the only line in which she is backward and feeble, i. e., marine shipping, to the great profit of the west half of America.
 —The Francisco & North Pacific R. R. Co., which operates the lines to Ukiah, Cal., has leased its entire road, plant and rolling stock for twenty years to the California Northwestern Ry. Co. The consideration is the full net revenue of the road. The California Northwestern is a new railway incorporation, to build a connecting line from the S. F. & N. P. C. through Mendocino county, Cal.

—The Japan-American Commercial Journal, a paper published in Tokyo, states that two items of commercial intelligence have of late greatly impressed the Japanese. One is that American iron manufacturers are able to undersell the English market, and the other that the contract for the building and equipment of the new electric railways of London has been given to Americans as the leaders of the world in the new industry.

—The Oregon Short Line from Salt Lake City, Utah, to the Nevada State boundary will be built by A. W. McCune of Salt Lake and W. L. Hoge of Anaconda. The new road, financed by the Oregon Short Line, will be known as the Utah & Pacific. The Union Pacific graded the roadway nearly the entire distance ten years ago. The Oregon Short Line will furnish rails and equipment, in payment for which it will take the new company's bonds.

—The annual report of the Northern Pacific Railway Company, successors to the old Northern Pacific Railroad Company, shows gross earnings of \$23,697,718 and a net revenue of \$12,584,348. The remarkable thing seems to be that the operating expenses should fall below 50 per cent of the gross earnings. The additions and improvements charged up to income and reductions in values of property and taxes are set down at \$1,494,500, leaving a clean net revenue of \$11,977,035.

—A man returned from an extensive trip through Mexico says: "The greatest cry I heard was 'lack of workmen.' Railroad contractors and farmers are worrying about the scarcity of labor, largely due to the opening up of so many enterprises and the great amount of work being done on the haciendas. Especially will you find that thousands of

men are being sent to the isthmus of Tehuantepec. The great plantations there need men and they take them from the rest of the country."

—Several salmon, averaging twenty-eight pounds in weight, have recently been caught in the Sacramento river, Cal. From the fact that the adipose fin had been removed from each they were identified as fish liberated from the hatcheries on the Clackamas river in Oregon in 1897. This discovery is thought to refute the theories of Profs. Jordan and Gilbert, who have maintained that salmon remain from three to four years in the sea before reaching their majority and then return to the parent water to spawn.

—The Centennial Mill Co., Seattle, Wash., has a contract with the Russo-Chinese bank to supply 25,000 barrels of flour to be shipped to Vladivostok, Siberia. The Russo-Chinese bank, during August this year, bought \$300,000 worth of commodities. Most of the supplies for the construction crews of the new trans-Siberian railway are bought on this coast. Vladivostok has a permanent population of 30,000 or 40,000, besides 50,000 to 75,000 Russian soldiers, who rely upon the United States for nearly all their provisions.

—On the 17th inst. the Bakersfield & Los Angeles Ry. Co. of Cal. incorporated in San Francisco. The incorporators are Claus Spreckels, J. D. Spreckels, A. B. Spreckels, Robt. Watt, A. H. Payson. I. W. Hellman is treasurer. The capital stock is \$5,000,000. The railway to be built is 200 miles in length, from Bakersfield, over the Tejon Pass to Los Angeles. The new move is of significance, as at the latter city through Eastern connection will be made with the Santa Fe. The S. F. & S. J. Valley road thus becomes a transcontinental proposition, with a San Francisco bay terminus at Point Richmond.

—The Pacific Borax and Redwood Chemical Company, Ltd., otherwise the English Borax Syndicate, has filed a trust deed of all its properties on the Pacific coast to cover a loan of \$1,250,000, which has been made by the Indian and General Investment Trust, Ltd., of London, for the purchase or construction, through F. M. Smith, of a large borax plant at Constant Hook, N. J., whither is to be removed most of the large plant which the Pacific Coast Borax Company has been operating in Alameda. Extensive deposits of borax at Antofagasta, Chile, are also to be purchased. The deed recites that the works control borax mines or factories in San Francisco, San Bernardino, Inyo and Alameda counties, this State, and Esmeralda county, Nevada, and Curry county, Oregon.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING SEPTEMBER 13, 1898.

610,790.—AIR COMPRESSOR—D. Beckers, San Pedro, Cal.
 610,755.—TRAP—E. Carpenter, Fisherman's Bay, Cal.
 610,599.—STAMP BATTERY—J. Champion, Enterprise, Cal.
 610,881.—WIRE STRETCHER—S. A. D. Clark, Pasadena, Cal.
 610,802.—ROLLER CRUSHER—W. J. Dyer, S. F.
 610,807.—CIGAR BOX—J. R. Grinsfelder, Spokane, Wash.
 610,810.—MARBLE CUTTER—Hawley & Clot, S. F.
 610,547.—LIFE BOAT—F. N. Lyons, Mendocino, Cal.
 610,764.—CONCENTRATOR—J. Malt, Los Angeles, Cal.
 610,554.—STEAM GENERATOR—J. McCartney, Oakland, Cal.
 610,661.—GATE—J. Ozenberger, Middletown, Cal.
 610,571.—JOURNAL BOX—V. Wigelius, Scotia, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Books Received.

"Inspection of the Materials and Workmanship Employed in Construction," a reference book for the use of inspectors, superintendents and others engaged in the construction of public and private works, containing a collection of memoranda pertaining to the duty of inspectors, quality and defects of materials; requisites for good construction, methods of slighting work, etc.; by A. T. Byrne; 540 pages 12mo.; published and sold by John Wiley & Sons, New York, or will be sent postpaid from this office on receipt of price, \$3.

Catalogues, Etc.

"Modern Methods" from the Link Belt Machinery Co., Chicago, is about the most elaborate thing of the kind received this month; 300 pp. quarto, illustrating modern economical methods of handling numerous classes of raw and manufactured products, waste, etc., of interest to every one who wants to transfer or handle material of any kind on a large scale, the illustrations giving graphic portrayal of what the machinery does in a variety of instances. It is more interesting than a magazine. Any one wanting to see presented in a clear, practical way the latest devices in economical handling of all kinds of material should send for a copy of "Modern Methods" to the Link Belt Machinery Co., 39th St. and Stewart Ave., Chicago, Ill.

Obituary.

SUPT. JOHN DANIELS, the foremost mining man in the Lake Superior district, died at the Osceola mine, at Houghton, Mich., on the 13th.

Personal.

COL. GEO. H. MENDELL is in Astoria, Or.
 W. A. NEVILLS is again at the Rawhide mine.
 HERBERT LANG is at Ivanpah, San Bernardino Co., Cal.
 J. EDNY, Supt. Unity mine, Shingle Springs, Cal., is in San Francisco.
 C. DOBLER, Supt. Brown Bear mine, Deadwood, Cal., is in San Francisco.
 C. E. ARENTS of Alameda, Cal., is assayer at the Everett, Wash., smelter.
 L. T. WRIGHT, Gen. Mgr. Mountain Copper Co., Keswick, Cal., is in San Francisco.
 B. F. HARTLEY, Supt. Montauk mine, Newcastle, Cal., has returned from San Francisco.
 R. D. CHUTE has returned to the Rappahannock mine, Rawhide, Cal., from San Francisco.
 R. E. HANLEY, Supt. Niagara mine, French Gulch, Cal., has returned from San Francisco.
 JAS. CRONAN has returned to Hackberry, Ariz., to take charge of his mining property there.
 E. C. VOORHEIS, Gen. Mgr. Lincoln mine, Sutter Creek, Cal., has returned from San Francisco.
 W. B. MURDOCK returned to the city Tuesday from an extended trip in Nevada and Sierra, Cal.
 J. J. MACDONALD of the Gold & Silver Extraction Co. of America, Denver, Colo., is in San Francisco.
 R. L. DUNN has returned to San Francisco from a mining exploration tour through southeastern Alaska.
 J. J. CRAWFORD of San Francisco has returned from a visit to the Gwin mine, Mokelumne Hill, Cal.
 N. W. MOUNTAIN, Placerville, Cal., owner of the Independence mine, El Dorado, Cal., is in San Francisco.
 PROF. A. G. BELL, inventor of the Bell telephone, sailed from San Francisco on the last steamer for Japan.
 JNO. M. WRIGHT, attorney for the Kennedy M. & M. Co., has returned to San Francisco from San Andreas, Cal.
 T. J. PARSONS, San Francisco, Vice-Pres. Cal. State Miners' Association, is visiting his mine near Alleghany, Cal.
 C. B. WINGATE, managing owner Chloride-Balley mine, Dedrick, Cal., has returned from the mine to San Francisco.
 J. L. COLES, Gen. Mgr. and part owner Montauk mine, Newcastle, Cal., is spending a few weeks at San Diego, Cal.
 D. FRICOT has returned to Grass Valley, Cal., from a trip of inspection to his mining properties at Fricot City, Cal.
 L. R. POUNDSTONE, Supt. Oro Fino mine, Shingle Springs, Cal., is in San Francisco on his return from Pennsylvania.
 S. W. CHEYNEY, San Francisco, is inspecting the Mammoth Garfield mine, of which he is Gen. Mgr., at Whitehouse, Cal.
 On the 11th inst., at Jackson, Cal., Rossiter W. Raymond of New York occupied the M. E. pulpit and preached an able sermon.
 G. FLETCHER of Grass Valley, Cal., managing owner Reddick gravel mine, Nevada City, Cal., has returned from San Francisco.
 F. COREHILL, Supt. Dead Horse mine, Summerville, Cal., has returned from Hawthorne, Nevada, where he was recently married.
 RD. ROWLANDS of Placerville, Cal., is in San Francisco en route to examine mining properties for Eastern capitalists in Arizona.
 A. W. HAWLEY, a mine owner of Grass Valley, Cal., has returned from an inspection trip at the Oro Fino mine, Grant's Pass, Oregon.
 MR. SCHAW, of the firm of Schaw, Ingram, Batchelor & Co., of Sacramento, Cal., returns next week from a business trip to London, Eng.
 F. W. BRADLEY, San Francisco, Mgr. Bunker Hill and Sullivan mines at Wardner, Idaho, is in Seattle, Wash., on his way to the mines.
 W. H. STORMS, Supt. Agnes mine, Sonora, Cal., who was the associate expert in the Argonaut-Kennedy investigation, is in San Francisco.
 J. MELTON, Placerville, Cal., managing owner Brown Bear mine, Deadwood, Cal., and owner Gentle Annie mine, Placerville, Cal., is in San Francisco.
 M. MIERSON, owner Mierson Cons. Mines, Placerville, Cal., was in San Francisco attending the annual meeting of the California Bankers' Association.
 WM. VAN SLOOTEN and E. W. MORGAN of New York have returned to San Francisco from an examination of mining properties in El Dorado county, Cal.
 A. M. McDONALD, Supt. Kanaka mine, Groveland, Cal., has been nominated for the Assembly and has resigned as Supt. of the mine. He is succeeded by H. M. Stanley.
 EVERETT SCHWARTZ, the newly elected director of the Wilmerding School of Mechanical Arts at San Francisco, is at present principal of the Manual Training School at Waltham, Mass.
 DR. DAVID STARR JORDAN, Pres. Stanford, Cal., University, negatives any suggestion as to his acceptance of the presidency of the State University at Berkeley, Cal., which will be vacant March 23rd, '99.
 C. E. UREN of Grass Valley, Cal., is making an underground survey of the Pine Hill G. M. Co.'s property near Placerville, Cal. Mr. Uren has under consideration an offer from the Gold Hills Co. for the position of consulting engineer at Bulawayo, South Africa.

Is Darwinism True?

W. S. PROSSER.

NUMBER V.

The story of the horse, from the size of a fox or perhaps a kitten, to one of strength to bear warriors to battle; from five toes to that hoof incomparable for traveling the hard highways in man's service, gaining teeth, shape, speed, spirit, docility, so exactly fit for human needs, furnishes proofs, hardly to be equaled, that a firm and intelligent hand has guided and assisted all these changes to a destined end, and that chance was not the creator.

The weakness of the old creation theory, and that which made the opportunity for Darwin, was the assumption that each species must have been created *de novo* and independently, which involved many re-creations of those parts not new, and, hence, much unnecessary exertion of creative energy. Darwin jumped to the other extreme by trying to account for things by imaginary processes—miscalled natural—which explanation fails radically, because no process of nature can account for what is outside of nature, to wit: the introduction of new ideas and inventions; and also because the means and methods of evolutionary changes are totally unknown, and to call them "natural" explains no more than if they were dubbed "x-y-z" processes.

The truth lies in the middle. Later species descended from earlier, by natural generation, in so far as the same parts and organs were continued; but the new parts, or new arrangements, were invented and built by an intelligent outside power. (The name of that power is an entirely different affair.) And this introduction of new ideas could just as well have been gradual, as instantaneous. Better, as being in accord with natural processes everywhere. This view is strengthened by the history of all living species and their ancestors.

From the earliest to the latest forms there is a steady and continuous change along lines which must be fixed, because they are never overpast, clearly indicating a controlling mind, working to a predetermined end. Variation by chance, even if possible, as it is not, would ramble back and forth, now here now there, ending nowhere. A ship runs from port to port only if it has a helm and a hand on the helm.

If all animal forms were derived by natural generation and chance variation, there could be no assurance of a unity of design throughout, nor of an unbroken series of forms from least to greatest. Whereas, if lineally derived under an actively controlling mind, such unity and unbroken series would be practical certainties, as we have seen them actual facts. It has been urged by a high authority that nothing could be substituted equal to the idea of common descent as a working theory. The present theory, as it contemplates ancestry, though controlled, ought to have the same value for working purposes, and, if it be true, ought to be of higher value.

A theory of some kind seems necessary to give system and enthusiasm to scientific work. The theory of natural selection of Darwin and Wallace was so superior to the lame former explanations, and so ably supported, that biologists were carried off their feet, and believed that all was explained. Afterwards doubt crept in. Some anatomists, especially American, found what they considered proof that "variation was determinate"—according to a fixed plan—which contradicts any variety by chance. Both cannot be true. Chance is like the explosion of a shell, in which the fragments are hurled in every direction; the farther they travel the more apart they become, and the less resemble a system. Determinate variation flows steadily within its limits, like a river in its banks, to a fixed and destined end. It would seem almost certain that chance variation, if possible at all, as it is not, working for ages, would present to us now a heterogeneous collection of freaks, without order or intelligible system, far remote from the nice

series we see, from the microbe to the mammoth. There are thousands of possible variations. What disadvantage in the struggle for food would a grass-eating animal with two heads have? or a horse with extra tail on each side to keep off the flies? or a deer with wings to assist his running, or with extra ears and eyes to warn of danger? These fancies may seem grotesque, but they, or others far more extravagant, must have resulted if chance ruled evolution.

(To be Continued.)

Platinum in the Ural Mountains, Russia.

In Russia platinum working is free from all taxation; and as the government monopoly of refining, which was kept up for a time, has been abandoned, the product is mostly placed on the London and Paris markets, and there controlled by one or two individuals.

In working the alluvial gold deposits, two methods are followed. In the first, the plant and apparatus are provided by the ground owner, who hires labor and directs the operations either personally or by deputy; while in the second, a system of tribute is followed, the ground being let to free laborers or starateli, who provide everything necessary for working and deliver the product at a fixed rate to the proprietor. This price may vary, according to the difficulty of working, from \$9 to \$10.50 per ounce; but in all cases the prime cost in the proprietary workings is higher than in those of the free laborers, who are able to handle, with a profit, material with but from eight to ten grains of gold per ton. Platinum sands are considered poor when containing less than forty-five grains of the metal per ton and rich when above 180 grains. The lowest profitable limit seems to be about thirty-nine grains. The platinum workings of Avorinski are at present the most important of that class. The deposits, from 13 to 16 feet thick, lie upon a conglomerate of serpentine, and are covered by nearly 80 feet of barren material; they extend for about 1½ miles, with a breadth varying from 70 to 250 feet. At Avorinski the average yield is about eighty-seven grains of platinum minerals per ton; but in places it goes up to twenty, thirty or even fifty times as much. The working is entirely subterranean, but open, small pits 70 to 80 feet apart being sunk to the deposit; and the material, drawn to the surface by windlasses, is washed in the ordinary Siberian frame at the mouth of the pit. About 400 hands are employed, the work going on night and day. The crude platinum contains about 1 part in 4000 of gold, which is separated by amalgamation and washing with water in large capsules. The final product contains 90 per cent of platinum. Besides the platinum found from Gora Blagodat, not far from the Isa river, to Nijni Tagilsk, a distance of over fifty miles, it occurs also near Miask, more than 100 miles farther south. But here only about 1200 ounces are obtained annually, while the yield of the entire Urals is about 55,000 ounces. The platinum district of Isa river and its tributaries is worked by the Government and by a number of private owners jointly with the Government. The platinum is whiter than that of any other district, whereas that from the Demidoff estate in the Martian range, farther south, has always a rusty appearance.

THE more accessible portions of the globe having been explored, geographers are now correcting their imperfect records. Text books and the latest maps represent the Arctic coast of Siberia as a flat, water-soaked tundra, but this, Dr. K. Hikish has just pointed out to the Russian Geographical society, is decidedly wrong. Only in the region of the Obi has the Arctic low, flat shores. East of the Yenesei to Bering strait, as early explorers knew, the coasts are high, and in the east of the Kolyma even hilly, and there are only deltas at the mouths of the Olenek, the Lena, the Yana and the Indighirka.

Electric Smelting.

It appears that the Americans are likely to lead us once more in the matter of electric smelting. Europe generally does the research work, but America is usually the first to adapt the discoveries which are made to the practical business of life. At Niagara some improved furnaces are now being laid down. These are large cast-iron drums, and resemble in appearance the spool upon which cables are wound. On the outside peripheries iron plates can be clamped, and these serve to keep in the ores which are to be reduced. The drum is mounted on a shaft, and can be slowly rotated by suitable gear. The electrodes are carbons fixed side by side, their points touching an imaginary line drawn horizontally through the axis of the furnace. The heat due to the resistance of the ore is, of course, developed between these two points, and, as the ore is reduced, the resultant metal lowers the resistance of the furnace, and the amperemeter rises. When this occurs the furnace is slowly rotated, and by this movement the metal is drawn down away from the electrodes and fresh ore is also brought between them to be acted upon in like manner. The reduced ore cools within the furnace, and can be extracted cold at the other side of the drum after moving the clamped plates. The adjustment of the furnace is to be automatic, a small motor controlled by an ammeter rotating the drum and keeping the current constant. This furnace is the outcome of elaborate experiments, and, judging from the results which the author of the paper describes, we should expect great things from it.—London Electrical Review.

The Fatal Blue Point in Working Iron or Steel.

One of the technical niceties required to be observed in boiler work for United States naval use is the prohibition of blue working without subsequent annealing. The fact is interesting, as explanatory of this rule, that what is known as a critical temperature in the working of both iron and steel is at the so-called blue heat, this being from 450° to 600° F., and it is here that iron and steel are much more brittle when cold or at redness. On iron, however, this heat does not seem to leave any bad effect, though, if the piece be worked in such a range of temperature, it will retain the brittleness after cooling and show a great loss of ductility as measured by the bending test, and the poorer the iron the more susceptible it is to the blue heat. The danger to steel at this fatal blue is more pronounced than in iron, but it exists to a greater or less extent in all iron of whatever grade, is also more noticeable in a descending than in an ascending heat and is especially marked in work having sharp corners, which has been worked at the blue heat.—Blacksmith and Wheelwright.

IN glancing over the mining field of this country it is perfectly apparent that those regions which have had the most assistance from capital of late years are the greatest producers. Take, for instance, Colorado and Montana, which head the list in the matter of bullion production. They are both very prosperous States from a mining point of view, or would be if silver commanded a fair price, and they are the two regions which have been best backed up by capital. Butte had the advantage of having very good men to give it a start, and very good mines, too, for that matter. But none of the mines were developed to any great degree until capital took hold of them. It takes money to make money in mining as in other things. Colorado, being comparatively near the Eastern centers of capital, had had great assistance, and its mines are doing wonderfully well. Arizona, New Mexico, Oregon, Nevada, Idaho, Washington and even California have not for a long time enjoyed the advent of any large amount of capital for investment in mines. They have had to get along as best they could. Of course, in time all

this will be remedied. Mining is now considered more of a legitimate business than formerly, when all mining investments were considered speculations. "Stock board" mining is in decadence in these days. People are going into mining for the mines themselves, and it is a good thing to do, for there is plenty of room for investments of this kind.—Clancy, Mont., Miner.

PROFESSOR TILDEN, in his address at the Royal Institution on "Recent Experiments on Certain Chemical Experiments in Relation to Heat," said:—If we try to think what is going on in the interior of a mass of solid when it is heated, the work done is expended not only in setting the atoms into that kind of vibration which corresponds to a rise in temperature, but partly in separating the molecules or physical units from one another, and partly in doing internal work of some kind, the nature of which is not known. Metals dissolved in metals are generally monatomic. It is, moreover, remarkable that although in respect of specific heat each element is a solid seems to be independent of the rest with which it is associated, when the separate atoms like mercury, some in groups of atoms, and these groups, as the temperature is raised, are simplified with very varying degrees of readiness. Sulphur vapor, for example, diminishes in density from 7.9 at 468 deg. to 4.7 at 606 deg., and iodine from density 8.8 at 253 deg. to 5.6 at 1570 deg., while with mercury there is no corresponding change. But although these groups are taken as the chemical molecules, the physical unit in the solid is certainly the atom, whether united by combination or mere admixture.

THE plan of traveling by tunnel to the center of Mont Blanc, and then taking an elevator for a vertical ascent of a mile and a half to the summit, is an amazing one even in these days of great works. A French engineer, M. Paul Issartier, proposes a tunnel 18,864 feet long, to terminate at 7500 feet above sea level, after a rise of 600 feet in its length, and from this a vertical shaft, 10 x 13 feet in size, to the summit, 8200 feet above. The excavating would be done from below. A strong, two-storied steel chamber would be raised on steel racks at the corners of the shaft, the upper floor carrying the compressed air drills and the lower one being provided with rock-crushing apparatus, and the rock blasted out would be caught on steel gratings, pulverized, passed to the bottom of the shaft in a 12-inch tube, and then washed away in a stream from centrifugal pumps. Before making a blast the chamber would be rolled to the other side of the shaft.

THE recent announcement of the discovery of new gases in the atmosphere has elicited considerable discussion. Prof. Berthelot calls attention in the *Comptes Rendus* to the fact that the green line of krypton almost exactly coincides with the green line of the aurora spectrum, and suggests that the element should, therefore, be called eosium. Dr. Arthur Schuster in *Nature* shows the spectrum of metargon to resemble closely that of carbon plus that of cyanogen. In replying, Prof. Ramsay recognizes the great similarity, but produces evidence which seems to render it very improbable that any form of carbon could be present, as the metargon spectrum remains the same in spite of every effort to remove any possible carbon present either as an element or a compound.

THE element calcium is generally described in text books as a yellow metal. This color is evidently due to impurities, as M. Moissan has recently obtained pure calcium in the form of brilliant white hexagonal crystals. The crystals were obtained by dissolving the metal in liquid sodium in a low red heat and removing the sodium by means of the cautious use of absolute alcohol. Calcium can also be obtained by the electrolysis of fused calcium iodide. Each of these methods yields a metal over 99 per cent pure.

Mining Summary.

ALASKA.

The Alaska *Miner* says that at Sunrise City, Cook Inlet, on California creek there are ten men working, doing fairly well. On Cow creek Williamson & Co. are putting in hydraulic machinery. They have ten men at work and the ground averages 50 cents to the cubic yard. Beedy Bros. have sold their Bear creek hydraulic plant and mine to Mr. Sleeper of New York for \$15,000. O. Riley, the discoverer of Bear creek placers, takes out all the way from \$10 upwards a day to the man and employs three men. On Six Mile creek there are thirty-five men working. W. T. Wybel of Bakersfield, Cal., has a hydraulic plant partly on the ground and the remainder will be taken in on the snow this winter. The Colorado Con. Co. have ten claims on an ancient channel which, it is said, averages 55 cents to the cubic yard. On Canyon creek junction of East Fork three men are said to average on one of the claims \$25 a day to the man, pumping and shovelling into the sluice boxes. The Polly Co. at the mouth of Mills and Canyon creeks have eighteen men at work shovelling in. There are about 600 men working in the district altogether. One sale by South & White on Lynx creek of \$50,000 is reported. This is a hydraulic proposition and employs eighteen men. There are several placer claims being operated near Juneau. On McGinnis creek States & McCully have acquired 320 acres of placer ground.

The steam schooner Excelsior, arrived from Copper river, brings 200 prospectors who failed to find gold. They report that the gunboat Wheeling will bring down 150 destitute men from Copper river.

ARIZONA.

(Special Correspondence.)—The Copper King Co. has bought the Barrett & Fetts property, and have ore at Solomon Springs to haul up to the Barrett Smelter.

Bisbee, Sept. 15th.
The Nyack Mining Co.'s copper mines near the Grand Canyon of the Colorado are turning out ore carrying 60 per cent copper with an average of about 18 per cent. The railroad from Williams to the mines will be started next month and is expected to be completed by December. A smelter for treatment of the ores has been erected at Williams.

Three carloads of machinery arrived at Thomas last week for the Spenszuma Co. The smelter will have a capacity of 500 tons per day. The copper properties of Twin Buttes are producing good ore as development proceeds. At Silver Bell the smelter continues to produce its daily quota of copper. Mgr. Wores of the Tucson sampling works says that the mining interests tributary to Tucson were never more promising than now, and that the chlorides are increasing steadily, and shipments to the sampler are satisfactory in quality and quantity. Mining in the Pima district is experiencing increased activity as the cool weather sets in. The Helmet Peak mines are being prospected by a tunnel. The ore is high grade silver with a good percentage of gold. The owners of the Little Jessie mine in Chapparral gulch, Yavapai county, will erect a 200-ton cyanide plant. The Temple Bar M. Co., operating on the Colorado river sand bars in Mohave county, has bought the interests of Redman & Co. for \$15,000. The Old Boot mine, in Silver Bell district, Pima county, is turning out three tons of copper bullion daily and employs thirty-five men.

The old Red Cloud mine, in Silver district, Yuma county, made a shipment of ore that yielded good returns. This property has lain idle for years until recently. T. Creighton, of Los Angeles, is pleased with his mines near Springfield in Yavapai county and will erect a mill upon them. Jones & Co., of the Little Jessie mine near Prescott will erect a 200-ton cyanide plant. Work has been started again on the Planet Saturn properties in Yavapai county. Development work to the extent of 2000 feet will be pushed to open out the mine and determine its value, when machinery will be erected to work the ore. In the Copper King camp in the Dragon mountains, Cochise county, the company is sinking three wells in the canyon and also has a dam. A mill is being erected on the mines of the Ardath Co. near Wickenburg. The Swindler mine in Big Bug district, Yavapai county, is being developed by E. B. Gage of the Congress mine under option.

To the Boston News Bureau one closely identified with Arizona copper properties says: There are four large copper-producing properties about which very little is heard, for the reason that they are either close corporations or owned by individuals. The first of these is the United Verde mine, owned by W. A. Clark of Montana, for which he paid \$23,000 and has recently refused \$30,000,000 from the Rothschilds. This property is creating \$10,000 a day net profit. The second and third properties are the Copper Queen at Bisbee and the Detroit Copper Co. at Clifton, owned by Messrs. Phelps, Dodge & Co.; and the fourth is the Arizona Copper Co., the control of which is owned in Scotland. Both the Copper Queen and Detroit companies are giving Messrs. Phelps, Dodge & Co. a profit of \$500,000 yearly and the Arizona Copper Co. is paying 12 per cent upon its capitalization, which amounts to several millions. The Arizona copper mines are preparing to double their production. The Copper Queen and the Detroit companies doubled their capacity last year and are now erecting sufficient machinery to again double their capacity. The Arizona Copper Co. is erecting a 300-ton concentrator and has given out contracts for two 150-ton furnaces which will be in running shape before the close of this year and this will double the Arizona Co.'s capacity. Present capacity of the Detroit Co. is twenty-five tons per day and of the Arizona Co. thirty-five tons a day. The stock of the Arizona Co. could have been purchased in London within the last four years

at 75 cents per share, to-day the stock is selling at \$50 a share. This company is working ore running as low as 3 per cent at a profit by concentrating and leaching. There are several other large producers in Arizona of which we hear but little. Arizona copper commands the same price in most instances as Lake copper. The ore does not have to go through a roasting process, however, for the ore is mostly all concentrating and free milling, and in view of this, low grade ore can be worked at a good profit, but it is not all low grade ore. The United Verde ore contains \$15 to \$18 in gold, and twenty to thirty ounces of silver to ton and runs 15 per cent copper.

J. Kasser effected the sale of the Marshall group of copper claims near Globe to the Live Oak Copper M. & S. Co. of New York for \$12,000 cash, in addition to \$1000 paid when the property was bonded. They have put twenty men to work. J. Kasser will be Supt.—J. W. Haas has sold his interest in the turquoise mines near Mineral Park, receiving \$5000 cash payment, balance to be paid in a few months. The purchaser is from New York City, whether he has gone with specimens.

The Azurite Copper and Gold Co. near Tucson has an abundance of water for the 30-ton water jacket. During the last thirty days they have been developing the carbonate body of ore and discovered that this is a blanket averaging from 6 to 17 feet in thickness, running under the surface from 5 to 50 feet. They can measure a body of ore from exposures made to run a 30-ton smelter for more than twenty years, and the deepest workings will not exceed 60 feet. All this body of carbonates, so far as developed, is confined to two of the eight mines of the Azurites. They also have a large body of ore uncovered on the Little Mammoth, the vein on the surface being over 50 feet wide. The grade seems good and carries gold. On the 300-foot level the breast of the drift is all in ore and of good value. The water question settled, the future of the Azurite is assured.

Enterprise: An English company has bonded the King of Arizona mine in Yuma county for \$2,000,000 and will at once sink to 500 feet. They are down 300 feet, and if the quality holds out to the 500-foot level the sale will be made. H. J. De Lamar has bonded the Maguire mining claim at Railroad canyon for \$30,000. Maguire Bros. have been running a dry wash machine on the claim and made money.

CALIFORNIA.

Amador.

The first clean-up of rock from the Oneida mine, at Jackson, averaged low; but this is accounted for, as the run was from a low grade boulder vein. The second run is being made of rock from the 1600 level, and is estimated to go \$25 a ton.

Dispatch: At the Anita, Jackson, the shaft is down 770 feet, the greenstone continuing hard. An average of 10 feet a month is made. At the Kennedy Supt. Parks is putting up a boiler and engine to run the mill, there not being sufficient water to keep all the stamps dropping. At the Lincoln mine, Sutter Creek, the shaft has reached a depth of 300 feet, and the work of retimbering and straightening is being well and carefully done under the supervision of E. C. Voorbies. One hundred and five feet was made last month, and the average is from 25 to 30 feet a week. In straightening the shaft a good deal of ore lying along the footwall has been taken out and will be hauled to the Zeila mill at Jackson. There are about 400 tons out now. The Argonaut and Kennedy companies, through their attorneys, have agreed upon a basis of damages to be paid by the latter for ores abstracted from the claim of the former. The issue unsettled between the companies is the claim of extralateral rights with divergent end lines of the Argonaut. M. Co.'s patented claim, disputed by the Kennedy M. & M. Co., on which the attorneys of the two companies will make their legal fight.

Republican: The crosscut from the shaft of the Balliol mine is in 135 feet and good rock has been found. This mine will be worked on a larger scale when water is plentiful. About 150 tons of ore from the Potasuba mine were recently milled at the Zeila and yielded \$3825, besides \$200 worth of sulphurets. This is equal to \$27 per ton. San Francisco capitalists are developing the Douglas mine in the Volcano district. The new shaft is down about 217 feet, and the old Sorocco shaft has been partly cleaned out. The total expenditure so far amounts to over \$20,000.

Record: The last twenty stamps at the Mahoney mill, Sutter Creek, closed down last week and not a stamp out of eighty is dropping at either the Mahoney or Wildman mines. One hundred and twenty-five men are laid off at both mines. Early rains are looked for for work to be resumed. A 10-stamp mill is being erected at the Allison mine in Plymouth district. The Bay State mine near Plymouth, which has been bonded by Stockton people, has begun unwatering the property.

Butte.

H. Francis of San Francisco has bought the Buchanan mine at Yankee Hill. This is an old time drift property on which work has recently been resumed, which under the new ownership is to be pushed by running a tunnel to tap the channel.

Sixty men are repairing the flumes on the big Cherokee ditch, extending from the Banner mine near Oroville to some distance above the Dogtown ridge. The work will be rushed. The English company which owns the Banner mine, near Oroville, will expend \$200,000 in deepening the shaft 1000 feet more. The shaft is now down 1300 feet, and has a 3-foot perpendicular ledge in slate, which runs from 7 to 8 inches in ore. Supt. Geo. Evans expects that the new shaft will develop the gold ledge to its full width.

Calaveras.

The Golden Gate quartz mine, near San An-

dreas, has been bonded to W. H. Clary & Son for \$7000, a partial payment advanced. Work at the Fellowcraft and San Andreas mines is progressing. It is intended to haul the ore from the San Andreas to the Fellowcraft and also to pipe water from the Ford mine to the Fellowcraft, where a reservoir will be built; and this, with water from the shaft, will supply five stamps. After a time a dynamo will be put in to run the mill and also to run trolley cars from the San Andreas to the Fellowcraft. The contract specifies that, within one year, a mill of twenty stamps shall be erected.

El Dorado.

(Special Correspondence.)—R. S. Raw has bonded the Gentle Zephyr and two other claims near Volcanoville, and is organizing a company for the continuance of development work. So far as the work has gone, it gives encouragement to the prospectors.

The Boulder M. Co., near Shingle Springs, is increasing the present 10-stamp capacity to twenty stamps and putting in an air compressor. The latter will be run by steam and the mill by waterpower.

Work at the Poverty mine near Placerville progresses. The new tunnel at 160 feet cuts the ledge at a depth of 600 feet. The ledge, so far as cut, is 6 feet, and the ore plates \$9 a ton. It carries about 8 per cent sulphurets that run over \$150 a ton. The 15-stamp mill will be finished in six weeks, and so soon as water can be obtained will begin crushing ore. This property is owned by J. Melton, who also owns the Gentle Annie mine near Placerville and the Eagle King mine at Grizzly Flat, both of which are working. Kelsey, Sept. 19th, '98.

Inyo.

H. C. Ratcliffe of Ballarat is at Los Angeles to transfer his one-half interest in a group of mines in the Panamint mountains to a company of Eastern and Los Angeles people for \$30,000 cash.

Kern.

There is considerable dry washing going on in the Stringer district. It is known that some are making wages, and some are getting \$5 and \$6 per day.

Randsburg *Miner*: The low price of hauling and milling ore is having its effect. The Wedge people will ship one car as an experiment, and, if satisfactory, will send in 1000 tons. The railroad people have put in a new chute for loading, and everything is convenient. The Eureka mill crushed four tons of ore from the La Crosse mine in the Stringer district which went better than \$150 per ton, the result of two men's work for one month. They are now working on twenty tons from the Napoleon, which will go above \$100 per ton. The cyanide plant at the Eureka mill is handling eight tons per day. This, with what the mill accumulates, will keep them busy for ninety days.

Los Angeles *Review*: Most of the mines in the Stringer district, which shut down during the hot weather, have resumed work. The cyanide plant at the Eureka mill, Randsburg, is in steady operation, and the results of the treatment are exceeding the expectations of the owners. The Eureka mill started on Little Butte ore, and will give it both a milling and cyanide test. The ore is from the 520-foot level and runs from \$17 to \$19 per ton, a little more than half of which is base. The Little Butte shaft is down 530 feet, and has a ledge of \$18 ore, whose width has not yet been ascertained. The Yellow Aster Co. shipped 1400 tons of ore to the Barstow Reduction Works during August, the ore going \$30 per ton. Dupuy & Swarthout of the Ophir mine, Johannesburg, have had two carloads of ore milled at the Barstow Reduction Works, cleaning up \$37.50 per ton.

Mariposa.

Near Coulterville on the 16th a premature explosion in the Mary Harrison mine killed G. H. Warne and J. Skewes, miners, and E. Felice, carman.

Mono.

Chronicle: M. Ryan of Bridgeport has sold his mines—the Arnot and Par Value—to an Eastern company, which is in possession and working them. There is an 18-inch ledge of good ore, the company having taken out ore which gave them a gold brick before they purchased.

Nevada.

(Special Correspondence.)—Supt. Shockley of the Phoenix mine at Nevada City started the new 10-stamp mill on a trial run and is well satisfied with its work. He expects soon to begin a steady run, as the ore is accumulating. This is another of the old time properties worked to only a few hundred feet depth and abandoned. It was known as the Sneath & Clay. The present company, composed of Cincinnati, Ohio, capitalists, unwatered the mine, did some development work and have been rewarded in finding a ledge of medium, average and fair grade. Nevada City, Sept. 20th, '98.

At the Gaston Ridge twenty stamps are running with good results. A 150 H. P. air compressor has been ordered and will be put in this fall.

H. W. Cole of Maybert is meeting with success in the development of his quartz claim, the McKinley. The tunnel is in 60 feet and shows a large ledge in a contact vein.

Good ore has been found in the 200 level of the Old Home mine near Blue Tent. The ledge is 12 inches thick.

A good ledge about a foot thick has been struck in the Maud S. mine near Nevada City. The property is being worked by Dower, Osborne & Co.

Placer.

At the Pioneer mine the dam is finished. Poles for wiring from the power house to the mill, a distance of 4000 feet, are set and the wire strung.

The new 30-foot vein at the Pioneer mine

runs \$6 per ton. The machinery for the electric plant is on the ground and the dam is completed.

F. Taylor uses nineteen pack mules between Towle and the Pioneer mine at Damascus to carry out sulphurets.

Plumas.

Bulletin: At Butte Valley A. N. Cameron is understood to be producing \$10 to the pick.

The Dunn Bros. are reported to be getting, with a 2-stamp mill, from \$300 to \$500 per week. V. B. Allen is putting a 10-stamp mill on his Bushman quartz mine, near Quincy. There has been considerable development done on the property.

Sacramento.

The Blue Ravine M. Co. is making extensive improvements on its mining property near Folsom. A hoist, steam pump and boiler are being placed. Work on the new shaft is progressing. Eastern capital is interested in the enterprise.

San Diego.

(Special Correspondence.)—A contract has been let for supplying 300 cords of wood for use of mine and mill in prosecuting further work on the Cincinnati Belle mine at Banner. Work is being prosecuted at the Helvetia mine and mill near Julian, the property being on the market for sale.

It is expected an increase of the working force at the Owens mine at Julian will be an event of the near future.

A few men are at work, of a preparatory nature, on the tailings of the Stonewall property, it being the announced intention to put in an extensive plant for their treatment and the employment of quite a force of men.

The Mountain View property, between Stonewall and Julian, and the Laguna Mining Co.'s property in the Laguna mountains, both good prospects, are dying for the want of activity or enterprise on the part of the companies who own them.

Mining matters are extremely dull in San Diego county.

Julian, Cal., Sept. 18th, '98.

Receiver Pauly of the Golden Cross mines at Hedges reports the output of bullion for August as \$43,000, of which \$23,000 was paid toward the indebtedness of the company. This makes \$190,000 paid off the past year.

At Venus Camp, Picacho district, H. W. Blaisdel has put in a mill and is crushing 100 tons of rock per day, and is also operating a cyanide plant of that capacity. Water is pumped from the Colorado river to the mines. There are seventy men on the payroll. The mines are well opened and large bodies of low-grade ore developed.

Shasta.

(Special Correspondence.)—The Distelhorst Bros., who have made a success of their dredging operations in the Sacramento river near Redding, are still operating, and with better success than at any previous time in their work. They completed a large windjam this season, and are operating with a large undershot wheel placed in the strong current of the river's channel, by which a hydraulic elevator is operated in the side channel; the dredger, lodged in the main channel, operates the scoop in the dry channel, and the output of gold is taken in paying quantities; in fact, the season has been profitable to a gratifying extent.

A second dredge is operating in the Sacramento river, built this season as a prospecting venture by a company from Michigan, known as the Mackinaw M. Co. They operate with a centrifugal pump and shovel, and work both upon the banks and in the channel. They raise on an average two yards a minute. Whilst their work and machinery have both been experimental, they have met with encouraging results. The same company is also doing development work in quartz properties in three different portions of the county—at Muletown, at Copper City and at Shasta. At Copper City they are opening five claims. The ledge as yet is small, but the ore mills \$38.12 a ton, exclusive of sulphurets. Their tunnel is 130 feet long and cuts the property at good depth. At Muletown they have five men working in a shaft. The work this company is doing is on a line of businesslike methods and thorough mining.

In the various directions that one may travel in Shasta county he sees prospectors at work, and the county has not shown such progress in the mining field in probably fifteen years as it shows at present.

In a portion of the Old Diggings or Buckeye, where for ten years mining received little attention, ledges are being uncovered of a paying grade of ore.

The National Con. Co., at Rich Gulch, is pushing to depth on an ore body of fair grade, from 3 to 5 feet wide, that carries a large percentage of good sulphurets, of which regular shipments are made to the Selby Smelting Works. The National has introduced electric power, and the entire plant shows good management in both mine and mill.

In the Whitehouse and also in the Kennet sections prospectors are laboring with encouraging results.

I am informed that the Mammoth, owned by S. W. Cheyney of Philadelphia, will put in a power plant to drive the tunnel, as the rock is very hard and hand work makes slow progress. From this property there is a bucket tramway across the Sacramento river to the railway, by which the ore is carried nearly a mile for shipment to Keswick.

In the French Gulch section, down to the Tower House country, old properties are being reopened and new ones being prospected.

About Whiskeytown, with a credited record of a heavy gold output in the long ago, where surface diggings produced quick results, work has begun, but not in the superficial way of olden times. Men now are working to depth, and with a knowledge of mining.

On Clear creek down to Shasta, for a radius of ten miles, more shafts and tunnels are seen

in which men are at work in a day's journey than one would hardly believe if he didn't see them.

The Iler Bros. have a group of nine claims, in which they have run one tunnel 900 feet, that runs 300 feet on a ledge of 4 to 10 feet wide, and at a depth of 400 feet they have another tunnel on ore. The ores in this property are partly base and some free milling.

The Hardscrabble hydraulic mine at Igo, which has not been operated since the Sawyer decision went into effect, is talked of as a possibility of being reopened soon. The property comprises 1700 acres; it belongs to the Dry Creek Fluming & Tunnel Co. of San Francisco. I am told that negotiations for its purchase are pending with Boston capitalists.

One cannot view the encouraging opportunities of mining in California, as he drives over those localities, without coming to the conclusion that companies making investments in Klondike could fare as well or better nearer home, under more favorable circumstances, with smaller investments and with comparatively equally good results.

Redding, Sept. 18th, '98.

The Anderson News says that the Marina Mariscano G. M. Co. will soon start up the Sunny Hill mine near Oro and ship the ore to the smelting works. This was one of the rich mines of Shasta county. It has been idle nearly five years.

Free Press: The 10-stamp mill at the National mine on Rich Gulch is using steam for motive power. The entire plant was formerly operated by electric power, but owing to the drouth the plant was unable to furnish sufficient water power, and now only the pump is operated by electricity. Water for steam purposes and for the batteries is pumped from the mine.

Sierra.

(Special Correspondence).—The Oriental mine near Alleghany City, owned by C. Heintzen, has been secured by Hill of Colorado under bond for a year. The price has not been made public. The mine has been idle nearly eighteen years. It was famous as a pocket producer, and it will be operated on this basis. The property was secured by M. W. Mather, Supt. of the Plumbago mine, which is also of a pocket nature. Mr. Mather will also have an interest in the Oriental. Both he and Mr. Hill have returned from San Francisco, where they bought machinery to be put at once upon the mine, which will be opened thoroughly and as rapidly as can be done. They pay cash as they buy.

Speaking of the Plumbago, I can say that for nearly a year work was carried on at a loss, but Mather, with business-like tenacity, having made a careful and thorough study of the geological structure and mine formation in the Plumbago, persevered, and within the last few months he came upon an ore shoot 80 feet long, from which he has taken over \$1000 a foot. His predilection in mine work is to delve in the pocket formations. With this idea in view, he bought the Hope mine last spring, near Alleghany, and now becomes interested with his son-in-law, Hill, in the Oriental. The 10-stamp mill on the Plumbago is in operation and the new power plant soon will be. This latter is being put on the banks of the middle Yuba, one mile from the mine and mill.

The Plumbago is owned by the Crosses G. M. Co., a New York corporation, and the Hope mine likewise.

Forest, Sept. 17th, '98.

It is locally reported that a strike of good ore has been made in the Buttes mine, at Sierra City.

Enterprise: The deal between the New York people and G. M. Pinney, owner of the Mountain mine of Sierra City, having fallen through, Mr. Pinney concluded to open the mine himself and a force has been put to work.

Siskiyou.

The Diestelhorst-Barton Dredger Co., operating on the Klamath river, has discovered a bar lying out of water that gives good prospects in gold. The ground cannot be worked until the rains have swollen the river so the dredger can be floated. The gravel deposit will then be worked by the usual method.

The Minnetta B. mine, at Nolton, is being put in ship-shape for winter. A new elevator will be put in at the Grider mine. This is the only mine on the Klamath river where piping is being carried on at present. The Eastlick and Wright hydraulic mines at Oro Fino are being fitted up for winter and putting in a new elevator. The Hollister Co., working the old Spencer mine on Humburg, now called the Golden Star mine, found a 2-foot ledge where the old company stopped work. This find has induced the company to pay the second installment and extend the tunnel 500 feet.

Journal: At the Greenhorn blue gravel mine at Yreka water is holding out and the mine is worked with success. The Chinese company working on Greenhorn continues operations by gaining a supply of water from bedrock. Frye & Macauley are putting up a quartz mill on Cherry creek; and, when completed, will crush quartz from Hunter's Cherry Hill mine. They have also bought the Ironsides quartz mine, which they intend developing. Jones & Daniels are getting out quartz from their mines in Quartz valley, all of which are paying well. Morrison, Carlock & Co. are putting up hoisting works at their mine in Quartz valley and employing a large force. The miners in the dry gulches and high bench diggings are making preparations to work their claims this winter.

Trinity.

The Cinnabar last week shipped 100 flasks of quicksilver. G. L. Bailey of Dedrick sold the Stanley-Helene group of mines owned by him to A. G. Hubbard of Redlands. Men have been put to work and the mine will be further developed and a milling plant erected.

The Golden Jubilee M. Co., near Trinity

Center, has its mill completed and has several hundred tons of good ore on the dumps, awaiting water. At Bragdon Moore & Saunders have uncovered a paying ledge in the vicinity of Trinity river, where they were fixing to work the bedrock for river gold. They have quit sluicing and are busy with their mortar. The rock lies between decomposed quartz and black slate. The ledge is 10 feet thick.

Tuolumne.

(Special Correspondence).—The Star mine, at Star P. O., is having its 10-stamp mill increased to double its present capacity. Steam power will be introduced. This property is among the productive mines of the East belt, on which for over fifteen years there is a line of producing properties.

The Bonanza mine, at Sonora, is building a steam hoist.

The Republican mine, near Jacksonville, records a strike of good ore. The shaft is about 150 feet, and in ore almost the entire distance. The vein is large. A steam hoist is being built. The property is operated by a San Francisco corporation.

From the Tuolumne river on the Mariposa side to the Stanislaus river on the Calaveras side, a distance of fifteen miles, there is an almost continuous line of productive properties. It is believed that this is the only instance of its kind in California.

Though the water famine has materially interfered with the gold output of this county this year, work has nevertheless been actively continued in all the properties unable to run the mills.

P. Geo. Gow has bought for the Jumper M. Co. the Golden Rule mine at Stent. This, though operated by the Scotch investors, will be worked separately from their other holdings in this county. The property had been worked in the early 60's and again in the 70's to a depth of 300 feet, and is said to have produced \$48,500. The mine was reopened in later years and much development work done. It has an adit level 525 feet long, and the main drift is about 1000 feet in length. It has a 10-stamp water power mill.

The Jumper Co. will add twenty stamps to its present milling capacity. The work has already begun.

Jacksonville, Sept. 19th, '98.

Though lack of water has compelled many of the mines to suspend milling operations, considerable development is being done where enough water can be obtained to run hoists. At the Norwegian group, in Jackass gulch, the chimney is being extended in depth with good results. The distance reached is 355 feet, 165 feet below where the horse was struck and work for the time suspended. The ore taken out will mill \$20 to the ton. The company recently received a patent to forty-five acres covering the apex of the hill.

Yuba.

The Postlethwaite dredger, operating in the Yuba river near Smartsville, will, it is locally stated, be operated by electricity, getting its power from the Yuba County Electric Co.

COLORADO.

BOULDER COUNTY.

(Special Correspondence).—At present Boulder mining operators are dealing largely in processes and new stamp mills. The new pyritic smelter of fifty tons daily capacity is nearing completion. The management has offered to purchase the entire output of the Dew Drop mine, Ward, for its smelter. Much interest is being taken in the success of the smelter and many mines will send their ore to it for treatment.

H. P. Walker has almost completed his chlorination mill of fifty tons daily capacity to treat the mineral from the Amalgam mine, Sugar Loaf. Water is pumped over the mountain 1000 feet from Boulder creek to supply the mill.

The Woody M. & M. Co. has built a pipe line one and one-half miles long from James creek over the mountain to the new mill at Jamestown. Preparations are being made to build the mill (chlorination) as rapidly as possible.

The Springdale 20-stamp mill is doing good work on the Standard ore. This mill started up three weeks ago.

The Delano mill and Kekionga mine, reported sold to an English syndicate a fortnight ago, have not started up under the new management. It is not definitely known when the property will be started. The mine is in good ore.

An air compressor costing \$8500 and two 80 H. P. boilers have been put in place at the mouth of the Adit tunnel, Ward.

Mgr. F. W. Davis is in Pittsburg, Pa., to meet the directors of the Ward Rose M. & M. Co. to make arrangements for placing machine drills to cut the Rose and Chief veins, which are in fine ore.

M. Cumberford, Supt. of the Dickens group of mines, Magnolia, is putting in air drills to push his tunnel 2000 feet under Magnolia mountain from Boulder creek. This will give a depth of about 1100 feet and pass through mineralized sections of undeveloped country.

J. Teagarden is taking out high-grade ore from the Wood M. & M. Co.'s claim and makes handsome monthly returns to the company. He has a well-equipped mill for treating his product, but is testing the ore by the several processes now in operation in this county and Denver.

The new Culbertson mill in Boulder is owned by members of the Colorado & Northwestern Railroad Co., and gets a large percentage of the ore mined here for treatment. The new railroad has given an impetus to mining in this section because of cheap transportation to the several mills and freight to the mountain towns.

Our county is looking prosperous and miners are doing well. WM. M. RULE.

Denver, Sept. 16th, '98.

The Worth mine lessees at Eldora shipped sixteen tons of ore that ran \$114.40 in gold,

seventeen tons ran \$67, sixteen tons concentrates that yielded \$115.80 and 140 ounces of amalgam worth \$7 per ounce. The Boulder mine, in the Caribou district, is shipping twenty tons of ore daily. The Eagle Bird mine, in the Caribou district, is taking out ore that runs \$280 in gold per ton. In the Hobson claim the vein carries 2 feet of high-grade smelting ore. Chunks of steel galena weighing 500 pounds, mixed with different forms of copper, are taken out, while other pieces show considerable polybasite and cerargyrite.

CHAFFEE COUNTY.

The new smelter, near Buenavista, is running to its full capacity of 150 tons a day on ore from Chalk Creek and Silver Creek districts. The principal shipping properties are the Mercur and Wood Tick, belonging to Missouri Pacific railroad people. The output is about forty tons a day of ore running from \$20 up. The Calumet mine, near Hecla, has started with fifty men. Fifteen cars of ore a day will be shipped.

CLEAR CREEK COUNTY.

The yearly output of the Dunderberg mine, at Silver Plume, is about \$80,000. The mine furnishes employment for nearly 100 men.

DOLORES COUNTY.

W. E. Hawley has secured a five years' lease on the dumps of the various properties of the Enterprise M. Co., near Rico. He will erect a mill shortly to cost \$10,000. The value of the ore is estimated at a high figure, as before the advent of the railroad in 1891 no ore could be shipped from the camp of less value than \$100 per ton.

EL PASO COUNTY.

Denver Mining Record: The ore bins at the Victor mine are filled and it is impossible to get cars sufficient to handle more than half the output of which the mine is capable. The ore is sent out in three grades. The low grade runs from \$20 to \$25 a ton, the second from \$50 to \$100, the high grade \$200 to \$250. The shaft will be put to a depth of 1000 feet, where a station will be cut, a pumping plant installed, and the vein tapped. In the Elkton each of the five levels is being driven, and every one is in ore. A production of 100 tons per day is maintained of ore averaging \$40. The net profit exceeds \$60,000 a month. The Modoc continues its large output. Five carloads of ore were sent to a local mill last week, and two carloads of high grade to the smelter. The lowest grade taken from the mine is five-ounce ore, and the general average of all the grades is placed at eight ounces. The Lafayette mine in August output 200 tons, ranging from one to sixty ounces in value.

Post: The gold output of Cripple Creek from 1891 to September 1, 1898, is \$47,182,797; the output from January 1, 1898, to September 1, 1898, is \$9,932,797; dividends paid since 1891 amount to \$6,432,144.94, of which \$1,825,525.50 have been paid in the current year. The dividends paid do not include profits distributed by private parties and mine owners. The average monthly dividends for the eight months of 1898 are \$214,578.

GILPIN COUNTY.

E. Steffen sold his one-third interest in the Star and four other claims near Central City for \$25,000 cash.

An enterprising miner at Black Hawk is making money shipping slag from the yards of the old mills at that place. Last week he shipped five carloads to Argo from the grounds of the B. & C. smelter. The Nicholls property on Maryland mountain will begin a steady output of ore as soon as the plant improvements are completed.

GUNNISON COUNTY.

The Maid of Athens mine near Pitkin daily ships a fifteen-ton car of ore.

LA PLATA COUNTY.

La Plata Mountains: (Special Correspondence).—The La Plata mountain region, while geographically a part of the San Juan country, possesses distinctive characteristics which separate it from the mountains of San Juan, San Miguel, Dolores and Ouray counties. The La Platas are almost an isolated region, perhaps twenty miles square, being cut off from the Silverton ranges by several ramifying affluents of the Animas river. In a similar manner are they separated from the Rico mountains to the northward by interlying hills and small streams. The peaks and ranges of the La Platas rise to an altitude of from 11,000 to 13,000 feet. From their heights is obtained a splendid view of the towering peaks of Mt. Wilson, near Ophir; Mt. Sneffels, near Ouray; Needles, near Silverton; and others near Telluride. Turning to the south-west is visible that grand panorama of the Mancos and Montezuma valleys, skirted by the vermilion-hued cliffs, where the unknown cliff dwellers dwelt.

The La Platas, as a group, are distinctly bisected by a rather deep, narrow valley, down which the little La Plata river flows toward the Mancos. At various points on both sides of this valley deep side gulches cut into the mountains, in most cases ending in an amphitheater-like basin near the mountain crests. These gulches contain the initial points for most of the exploiting for mineral, for along their sides are exposed the indications which lead to the discovery of precious lodes.

The important distinguishing feature of the La Platas is the character of their ores. When found in fissures, as in most cases, they consist of a tellurium-quartz with considerable free gold. When found in blanket contact veins, as in other cases, they consist of a gold-bearing pyrite, with considerable silver. The ores from the regular leads resemble the tellurium-sylvanite ores of Lake City and Cripple Creek. The rich tellurium ores are found in chutes and stringers. Where, as in some cases, the ledge between walls is 20 feet wide, the very rich ore is in narrow streaks; but the vein filling is more or less mineralized. Some of the best development in the La

Platas is found on the Columbus, located in a semi-circular basin, at the head of one of those side gulches above mentioned, at an altitude of about 11,000 feet. The property belongs to New York parties, comprising the Columbus M. Co. It is under the local management of S. R. Thompson, formerly on the Homestake at Deadwood, South Dakota. From a 200-foot shaft a crosscut goes to the vein. The main vein ranges from 2 to 20 feet wide, carrying streaks of tellurium ore. The product shipped, comprising about 160 tons per month, runs from 1½ to 5, 6 and 10 ounces gold per ton.

The Bessie G., on the opposite side of the range, is being worked by F. L. Freeman, who has thereon a three years' lease. This property was opened about sixteen years ago and is reputed to have produced about \$50,000. It is being worked through three tunnels, which go in on the vein, one above the other, and which are respectively 180, 200 and 180 feet in length, with upraises connecting the three. Between these levels much stoping has been done. The ores are a tellurium and free-gold quartz, some streaks of which are said to run about \$500 to the ton. It also yields some high-grade silver ore.

On the Valley King and Small Hopes are quite extensive developments, including a 200-foot shaft and 800 feet of drifts and crosscuts. The result is ore of the same character as is described above. This property is equipped with a bromine-treatment mill, which is not operating.

The Little Jane is being developed into a producing property by Pueblo parties.

The La Platas are reached by stage from Hesperus, a station on the Rio Grande Southern Railway, twenty miles above Durango.

WASCOOT.

La Plata, Colo., Sept. 16th, '98.

OURAY COUNTY.

At the Silver Queen on Bear creek a discovery has been made of a lead property which mill runs \$50 in silver and 40 per cent lead. Two carloads of ore have been shipped.

PARK COUNTY.

The Morning Star on Mt. Bross, worked under lease, has shipped several cars of high grade ore.

PITKIN COUNTY.

The mill of the Aspen Concentrating Co. is running night and day and giving satisfaction in the saving of values. Ore running from five to seven ounces in silver is being concentrated, and the value raised from \$35 to \$40 per ton. Two carloads of concentrates were sent to the smelters last week. The mines around Aspen are keeping up a monthly output of 12,000 tons, which is shipped to the different smelters of the State. A larger number of men is kept on the payrolls than since the slump in silver. The ores are high grade silver.

SAGUACHE COUNTY.

The Commodore at Creede is shipping 250 tons a day. The mine has recently been lighted with electricity.

SAN JUAN COUNTY.

In the Silver Wing mine at Silverton the tunnel is in 2000 feet and has a 15-foot body of ore that will average \$15 per ton in gold. They are taking out enough to keep their twenty stamps dropping. They will keep the concentrates until spring.

At Silverton the Tom Moore mine is shipping three carloads of ore a week; the Blizard is shipping two, the Great Eastern three, the Dick Bland two and the Hamlet one carload. Livingston & Donovan are working the old Cape Hatteras, which has been developed by 300 feet of tunnels and drifts. They are taking out good shipping ore. Considerable ore is being taken from the Occidental. The stuff is being piled on the dump to await the construction of a mill.

SAN MIGUEL COUNTY.

(Special Correspondence).—The Suffolk mill at Ophir, Colo., leased to Thomas & Real, handles an average of about fifty tons of ore per day, most of which comes from the Suffolk group of mines, which are worked by lessees. These ores are partially free milling, a part of the saving being in the concentrates.

In Turkey Creek basin, 2000 feet above the railroad at Ophir, the San Juan G. M. Co. are completing a new mill on their Bessie mine, which has large ore reserves in sight. These ores are free milling quartz, with some sulphurets. The mill equipment consists of crushers, rolls, Huntington's and a large roaster, all to be run by electric power. By means of the roaster it is designed to desulphurize the ore. To facilitate the work a crosscut tunnel is being driven, through which the ore will be conveyed in cars from the mine to the mill. Adjacent to the Basin is the Gold King group, worked through a tunnel that cuts through the mountain to the Ophir side. The latter operates a mill.

Sept. 17th, '98.

WASCOOT.

The Meldrum tunnel, piercing the San Juan range between Telluride and Silverton, is in 1000 feet on each side of the range. When completed it will be about four and one-quarter miles long, and its greatest depth will be 3426 feet. It is 12x12 in size and will cost \$2,000,000. It is expected to take out enough ore to pay expenses. It will furnish transportation for 100 mines and save over a 100-mile haul between the different cities now connected by 120 miles of rail.

SUMMIT COUNTY.

From the Kokomo district the Wilfley mine is shipping six carloads of \$75 concentrates per week. The White Quail is shipping four carloads of high-grade ore weekly.

IDAHO.

At Wallace the tunnel on the Cincinnati group is in 600 feet. The Granite M. Co. began dropping five stamps on ore last week and will start the other five as soon as there is water enough for power. C. Cunningham has taken a bond on the Gettysburg group at

Mullan has six men working.—At Saltese the Eclipse M. & M. Co. owns 25 claims. On the Kearsage 3 feet of ore runs 25 per cent lead and 140 ounces in silver. Four carloads of it have been shipped. On the Shakespeare 5½ feet of ore have been cut, running twenty-five ounces in silver, \$3 to \$5 in gold and a little copper. The headquarters of the company are in Spokane, and it is said to be their intention to put in pumps and hoists as soon as possible, and put on twenty-five men before the end of the month.

F. R. Reed has a second placer mining enterprise under way on the Boise river. The company will be known as the Josephine Placer M. Co., with F. R. Reed Pres. and Gen. Mgr., and W. R. Lindsay Supt. The property is sixty-two miles from Boise, embracing 540 acres of the high bars, which have been demonstrated to be valuable. The ditches are completed and the pipe and six giants will be put in place this fall. If the weather keeps open, a run will be made this season, but everything will be in readiness for mining in spring.—The Lucky Boy Co. will soon put up three 2-stamp mills. A force is at work laying the pipe line.

At Mullan work will begin on a new mill for the Hunter and on further development work in the mine upon the return of M. Curran, for several years Supt. of the Hunter, who has gone East. The company has agreed to either build a mill and open the mine, or give Mr. Curran a long-time lease on terms which would justify him to build.—Two boilers, weighing 20,000 pounds each, were taken to Moose Creek for the dredge boat built there.

Near Murray the Granite M. Co. has started its mill, but owing to a scarcity of water only one battery of five stamps is operated.—H. M. Glidden has bonded the Hobson's Choice claim at Buffalo Hump for \$33,333. This is one of the first locations in the camp. The ledge is large and crops for nearly 1000 feet. It is a contact vein between granite and schist. Glidden will at once put a force to work.

The Lucky Boy of Custer shipped gold bars amounting to \$3650, the result of a few days' run.

Statesman: The Friday mine at Pearl, owned by J. C. Hill and bonded to B. F. Parish six weeks ago, has proven so satisfactory that the bond was taken up. There is on the dump about 100 tons of ore waiting sorting for shipment.—The Checkmate mine has the shaft sunk over 100 feet. The mine is working three eight-hour shifts, crosscutting for the ledge at the 100-foot level.—McDougal & Pollock are working on the King mine, and so soon as the contemplated concentrating works are in operation it will be a producer.—Soderberg & Co. of the Challenge mine are driving a crosscut to tap the ledge at 250 feet. They cut a ledge that mills \$80 a ton.—B. Hall is milling ore from the Nellie Fraction that runs \$100 per ton free gold.—R. H. Robb has opened a body of coal that is 5 feet thick. There has also been a large body of lignite opened up by a 140-foot drift near Pearl. Nearly all the families and hotels in Pearl are burning this coal.

Lewiston Tribune: J. G. Richey recently bought the Big Bar placer mine on Salmon river and the ditches, flumes and water rights of the defunct Big Bar M. Co., and has organized the Salmon River G. M. Co., composed of Denver, Colo., capitalists. The company will immediately construct a ditch and pumping plant. The Big Bar has puzzled mining men for thirty years. It consists of a deposit of gold-bearing granite 67 feet deep, overlying a pay streak 7 feet thick that carries nearly \$2 to the yard. The engineering difficulties have been to strip the pay streak of this deposit. The mine will be in full operation before winter.

MONTANA.

The Big Seven mine at Neihart employs forty men and takes out five tons of high grade ore daily. The main tunnel is in 1750 feet and forging ahead. It has cut through an ore body 850 feet long, one 100 feet long and is entering into a third. The ore is high grade sulphuret of silver and carries some gold.—The mill at the Montana mine near Twin Bridges started this week. The Montana mine has had a varied experience since its discovery fifteen years ago. Good ore has been found at different times and the mill has dropped stamps, but without returning hardly expenses. The group consists of four claims and is owned by Eastern capitalists, who until two years ago did no work except the representing. About that time twelve men were put to work, and considerable ore run through the mill, but only a small per cent saved, which it is understood, with the improved machinery put in, has been remedied.—Stevens & Co. at Barker are shipping two cars a week. They are also running a tunnel on the Equator.—J. Kitto has added a table to the North Home mill at Townsend and is running through 300 tons of ore from the Bob Lee.—Easterley & Sons of the Hard Cash are taking ore from a 14-inch streak which goes \$120 to the ton.—Eight hundred tons of second-class ore have been shipped from the Moulton at Barker by the smelter company since it commenced leasing the second-class ore of the mine. The new 1100-foot tunnel is completed.

Interviewed as to the truth of the reported closing down of the Anaconda mine, Marcus Daly, in an interview with the Butte Inter-Mountain, says the report is not even worth a denial. That paper says: Never for fifteen years have the Anaconda properties been in such splendid shape as they are now, and never was the prospect of continued operation brighter. While copper commands a good price, as it does now, all the copper companies believe in working to their full capacity. The operations of all the companies are characterized by remarkable activity, and there is no thought of restricting the product while the market continuously demands more of the red metal at constantly increasing prices. The

Butte mines output this year will approximate \$35,000,000, of which amount three-fourths is kept in the State to pay for labor and supplies. Not one of them has yet reached a depth of 2000 feet.

NEVADA.

At Candelaria a special meeting of the stockholders of the Holmes M. Co. has been called for November 23d to vote upon a proposition to create a bonded indebtedness of \$175,000.

J. Diem and associates of Park City, Utah, are developing a property near Tuscarora. They have opened three veins and the ore runs \$30 a ton. They have a 10-stamp mill running.

About 340 tons of ore from the Bounce mine, at Douglas, were milled and yielded \$19.10 per ton. This is the result of thirty days' work by five men in the mine. They are down 350 feet and the ore is good grade.

Operations at the iron mines near Lovelock continue. About sixty men are employed doing assessment work. The surveyors have finished their work for patent.

THE COMSTOCK.

Last Saturday there was a special meeting of the general committee on drainage and deep mining, composed of two directors from each of the twenty-four Comstock companies. At that meeting the report of the committee (published herein in the issue of the 17th) was endorsed and a pumping association formed, composed of the presidents of the several mining companies who engage in the project. The members of this association are to work without compensation; the endeavor will be to pump out all the water in the workings below the level of the Suto tunnel; that each level, after being unwatered, be thoroughly prospected; that all necessary machinery and power be secured by the association. It was determined that the boards of directors of the various companies aid in every way in their power to carry out the plan, an important feature being a proposed pro rata agreement to pay what all the above costs, the money to be raised by assessments, company stocks that won't or can't stand the assessments to be virtually pledged to pay their share later on. It is not desired or intended that this last should result in the stronger companies standing all the expense and the weaker companies sharing in the benefit; the central idea is mutual co-operation—a small preliminary assessment all round providing enough money to at least make a start, relying upon the strength developed in the stock market by the favorable developments on the lode to insure a satisfactory basis for further assessments as the work progresses and more money is needed. It is argued that the public will stand assessments for deep mining when they would not contribute anything with a prospect of having money applied to salaries, milling, etc.

The pumping association's officers are C. Hirschfeld, Pres.; A. Waterman, Sec'y; G. McM. Ross, Supt. It is estimated that the first expenditure necessary will be about \$100,000 to put in the requisite pumping plant and operate it for sufficient time to permit of the uncovering of good ore long known to exist. It is figured that were the Con. Cal. & Va. to contribute a pro rata of 15%; the Hale & Norcross, Potosi, Savage, Chollar, Sierra Nevada, Gould & Curry, Best & Belcher, Union Con., Mexican and Ophir each 7½%; Belcher, Crown Point and Yellow Jacket 5%; Caledonia, Alta and Confidence 1½%; Con. Imperial, Justice, Con. New York, Bullion, Utah Con., Alpha Con., Challenge Con., Overman, Exchequer, Seg. Belcher, Mides Con. and Kentuck Con. 1%, sufficient would thus be secured to begin on the basis proposed, with a small reserve fund. Several of the companies have already formally agreed to furnish the quota indicated above, and it is probable the financial preliminaries will be so far advanced this week as to justify the association in taking further steps to hasten the beginning of the work.

During the month the thirty-two Comstock companies have reduced or will reduce their capital and the rate of par value of their shares of stock. The Overman and Yellow Jacket reduced by reincorporation. This week the Ophir and Best & Belcher reduced to \$3 per share; the Savage, Con. Cal. & Va. and Union Con. to \$2.50; the Alpha, Utah Con. and Bullion to \$1 each; the Occidental, Sierra Nevada, Gould & Curry, Mexican, Chollar and Potosi to \$3 each; to-day Justice and Kentuck will reduce to \$2 and \$1, respectively; and next week Crown Point, Confidence, Caledonia, Challenge and Belcher will reduce to \$3; Julia, Exchequer, Silver Hill, Con. Imperial, Con. New York and Lady Washington to \$1; and Alta to \$2 per share.

NEW MEXICO.

The sulphur mines in Guadalupe county are being rapidly developed, and one, of which A. A. Chateau is Mgr., is putting in a furnace capable of reducing 100 tons of ore daily.—The Hematite mill, at Red River, has been sold to Longdorf & Co. and will start up without delay.—The Insurgent, a new silver ore producer near Hillsboro, has a vein 15 inches wide and assays fifty to sixty ounces a ton.

A big strike is reported at the Philadelphia mine at Hanover of an ore body 7 feet wide, averaging 26 per cent copper and 26 per cent iron.—One hundred and twenty sacks of ore shipped by the Opportunity mine, Hillsboro district, netted \$840; while a shipment of first and second class ores netted over \$1000.—The Wicks mine in Sierra county has sunk a new shaft 90 feet below the 300-foot level. The ore assays \$58 and \$76 in gold.

OREGON.

(Special Correspondence).—Indications here favor rich gold mines in the immediate vicinity, judging from the amount of development work being done. Scarcely a day passes but there are from one to three parties of pack animals loaded with provisions for the different mining claims. New hoists are being put

in place, dry wood is scarce, covering for buildings is being inquired for, and rope tramways are being constructed. The 20 stamp mill is running full capacity and there are no idle men in town. About forty jacks came in last evening to pack ore from the higher altitudes. Mining men looking for investments might be satisfied if they saw the different mines with their values in sight.

JAMES RUSTLER.

Cornucopia, Or., Sept. 15th, '98.

The past thirty days La Bellevue mine shipped upwards of 30,000 pounds of concentrates from Baker City.—The Climax in the Cracker Creek district, owned by Grayson & Bishop, makes a good showing at a depth of 700 feet. The ledges are from 5 to 12 feet in width. The ore runs from \$10 upwards.

The Red Boy has been equipped with a 20-stamp mill at a cost of \$40,000. A large amount is on the dump.—The Eureka & Excelsior mine has been put on a producing basis, and employs 120 men. The mine has produced to date \$1,400,000 of bullion.—Among the new properties developed near Sumpter is the Golconda mine, they are erecting a new plant at a cost of \$50,000. Seventy-five men are employed.

The Forest Queen placer mine, near Grants Pass, was bought last week by G. W. Seeley of Aramona, Cal., and M. J. Seeley of San Francisco. There are three ditches and a reservoir, 1400 feet of flume and 1000 feet of pipe on the property; the new owners will begin work immediately.—Boneau & Mohr bought the Free and Easy mine in Josephine county for \$10,000 and will commence work on it on a large scale.—The dredger at Tolo has begun operations and works well.

Fifty men are at work at the Keady mine, near Baker City, owned by Bement Bros., of Indiana. A 2000-foot tramway is completed from which the quartz will be hauled to the mill, three-quarters of a mile.—Two concentrators are being put in at the Eureka Co.'s mine on Soldier creek, Josephine county, formerly known as the Denver city. It has produced considerable bullion.—The Browning-Hannum mine, near Grants Pass, at a depth of several hundred feet has a vein 3 feet wide of good grade ore.—Stalker & Davis, near Brownstown, made a strike in a locality that had been mined as far back as 1852 and has been mined over and over since. In June, Stalker & Davis landed in Brownstown, and struck their shovels in the hills above the old town where they exposed a high channel never before touched and in a few days took out twenty-eight ounces of channel gold.

Journal: E. B. Jennings of Table Rock has sold a three-fourths interest in his quicksilver mines to Folger & Molander. The conveyance embraces 260 acres. The ledge has been developed by a 100-foot tunnel and a 75-foot shaft, and it is said to be 100 feet in width. The purchasers are said to represent English capitalists, and it is their purpose to at once develop the property on an extensive scale.—The thirteen-mile ditch which has been under construction on Grave creek for the John C. Lewis Co. has been finished. The two ditches together are about twenty-eight miles in length.—Work on the Greenback mine near Leland under the new management is being vigorously pushed. The men who have the mine under bond are E. Smith of Denver, W. J. Carton of Bland, N. M., and W. H. Brevort of New York. F. T. Sutherland is in charge of the work. The old tunnel is being pushed by night and day shifts; the men are working 170 feet under the surface. A 5-stamp mill and other machinery have been ordered.

UTAH.

At Provo E. J. Raddatz sold to C. H. Griffin & Co. several claims for \$10,000.—The Bingham Bulletin says that the past week 100 tons of galena were raised at the Spanish mine.—The last shipment from the Daisy mine at Mercur, the result of two weeks' run, amounted to 154 pounds and yielded \$38.15 per pound, a total of \$5875.

The Crescent of Park City will put its ores on to the market in crude form, and as soon as the concentrating ores upon which the McGregor mill is operating have been cleaned up, that plant will either be suspended or put upon custom ores. It is thought that better results can be obtained from the output by shipping to the smelter furnace than by reducing them to the form of concentrates. The ore shows an average of 26 per cent lead, sixteen ounces silver and a fractional amount in gold.—The Eureka Hill last week shipped from Tintic district silver and gold of over \$100,000 in value. It has suspended operation of forty stamps and has but sixty in operation. This will reduce the output of the mine to 120 tons a day.—The Undine of Silver City made a shipment of high-grade ore last week. The company has begun sinking to the 350 level, from which they will crosscut to the vein. On the level above are 33 inches of ore, of which a foot shows seventy-four ounces silver, 28 per cent lead, 6 per cent copper and \$4 in gold with 44 per cent in iron.

Work on the Rover mine at Mercur has been resumed under an option by G. A. Holmes.

An ore discovery of value is reported in the 350-foot level in the Sunbeam at Silver City.

The Centennial-Eureka at Tintic has closed arrangements with the Eureka-Hill Co. to make a mill run upon the ores from the former company's property, to decide the question of their adaptability to a mill. The Centennial has thousands of tons of a class of ore such as that which the Eureka-Hill has been profitably milling, on its dump. Should it be demonstrated that the ores of the Centennial-Eureka may be handled as successfully as have those of the Eureka-Hill, a plant of equal magnitude is likely to be built.—S. Newhouse, Pres. of the Highland Boy mine at Bingham, with his associates, has secured an option on 200 acres of ground at Mercur, on which they will at once begin development work.

The Comstock M. Co. at Park City has

made a strike of ore that assays 18 per cent copper, \$17 in gold and twenty-four ounces in silver. Of this quality of ore they have 2 feet. They will sink another 100 feet, then crosscut the vein. The point at which the strike was made is 2000 feet from the surface. The taking out of ore will begin at once.—At Park City a larger number of miners are employed than at any time since the closing of the Ontario and Daly.—A shipment of ore from the Darlington mine at Alta yielded 24 per cent in copper and twenty ounces silver, with a fraction in gold. The streak from which this is derived varies from a few inches to many, but goes through a vein all the time. The Darlington is worked under a lease by J. Matteson & Co.—The camp of Alta is said to be improving, and that twice as much work is being done as at any time since the old days of the Emma and Flagstaff.

Shipments from Tintic for last week were 110 cars of ore, six of concentrates and fourteen bars of bullion.

WASHINGTON.

(Special Correspondence).—Mgr. Brackett began work on the mine at Twisp on the 1st inst.; is now in the face of the vein in the middle tunnel. He expects by Jan. 1st, '99, to begin taking out ore. He then proposes to put in a smelter. Okonogan county and Stevens are now attracting considerable attention and some capital.

Twisp, Sept. 15th.

At Chelan Falls a large body of free milling quartz has been found. It has been developed by a trench 270 feet long, which has cut 21 feet of quartz. Sixteen assays have been made; the highest gave \$19.61 in gold and 11 ounces silver, and the lowest was 20 cents in gold and 8 ounces silver. The average of the sixteen tests made was \$9.97 gold and \$17 silver.

At Colville the Great Northern mine on Douglas mountain has cut a ledge of fair grade ore at a depth of 125 feet.

P. Clark has bonded the Davis group of two silver-lead claims in Davis camp on the south half of the Colville reservation and has put twelve men to work. The ore is silver-lead carbonates and galena. The vein is said to be large. The ore assays 374 ounces silver and 10 per cent lead. The development work started is the first in the camp.

WYOMING.

The Black Buttes Coal M. Co. will make improvements at its mine at Black Buttes station. It is proposed to put on a steam hoist, improved tippie and dump to increase the capacity. It is also proposed to go deeper and make the output 1000 tons of coal per day. They have four veins, making an aggregate of 23 feet of coal.

FOREIGN.

BRITISH COLUMBIA.

T. Charles, representing American capital, has bonded the Walker mine, near Clinton, for \$100,000. Work will start shortly.—The Le Roi at Rossland shipped last week nineteen cars of ore, averaging 23½ tons to the car, or 450 tons. There are 261 men at work, and they are operating twenty-six machines, primarily engaged in opening the property.—The Monument group of silver-copper claims, near Nelson, have been bonded to H. E. Croasdale for \$90,000, payable \$1000 October 31st, the balance at the end of a year.

The Rawhide claim in Greenwood camp has been bonded to P. Larson of the Coeur d'Alenes for \$40,000.—J. P. Graves has bought a quarter interest in the Phoenix for \$5000 cash.

At New Denver, 18 inches of ore has been struck in the Bosom. Twenty-two men are employed.—On the Miocene mine at Horseshoe, rich gravel was struck at the 400-foot level, but they have not yet reached the bottom of the channel.—The ore shipments from Kaslo for August were 1718 tons.

The Sunshine M. Co., Trout Lake district, received from the Selby Smelting & Lead Co. checks for \$12,321.95, for 123 tons 310 pounds of Silver Cup ore. A further shipment of 56 tons has gone forward. This makes 650 tons shipped the last few months, all the ore being high grade.—The Moyle group, East Kootenay, has been bonded to Vancouver men for \$125,000, with \$5000 paid.—The Hall Mines Co., East Kootenay, is reported to have made a copper strike on the Big Three claim. The company has this property under bond. On the Lone Star and Equator the same company has let a contract for another tunnel.—The product of the Rossland mines last week was 3874 tons. The greatest record made in the camp was for the week ending July 30th, when the output was 3050 tons.

The North Star Co., East Kootenay, will sink a shaft 300 feet; an order has been placed for hoisting machinery.

MEXICO.

The Felipe group of mines near Monterey, owned by J. A. Robertson, have been sold to a New York corporation for \$500,000 gold.

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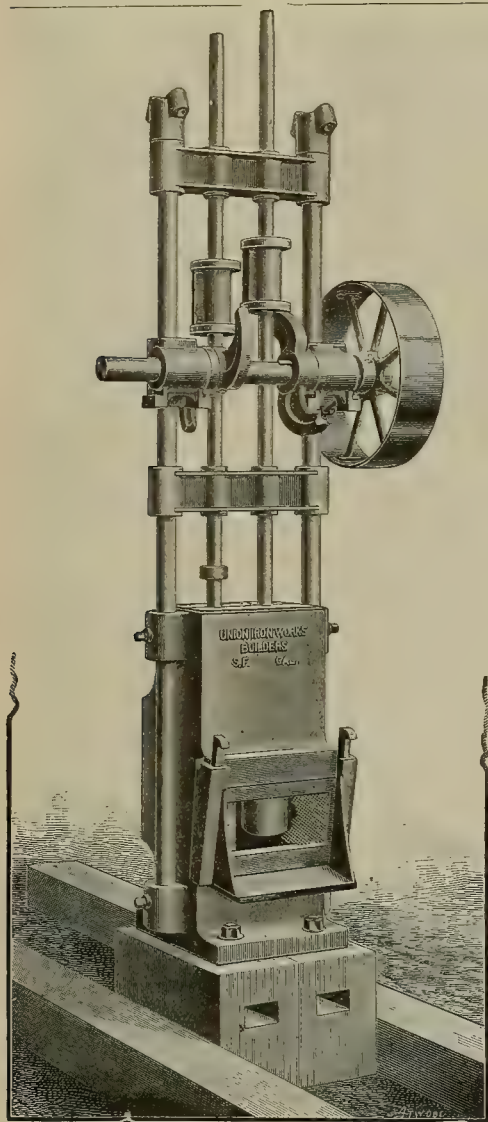
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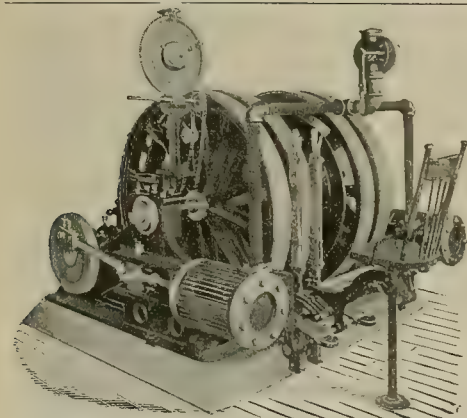
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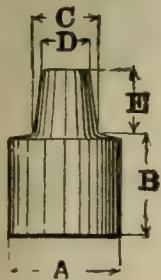
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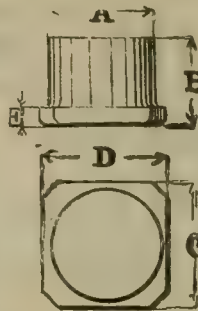
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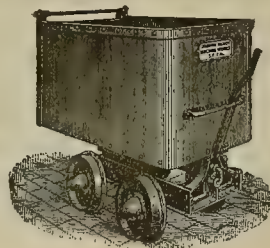
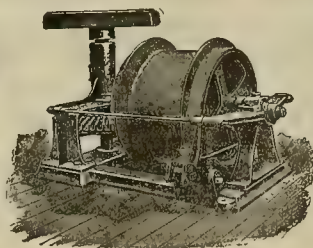
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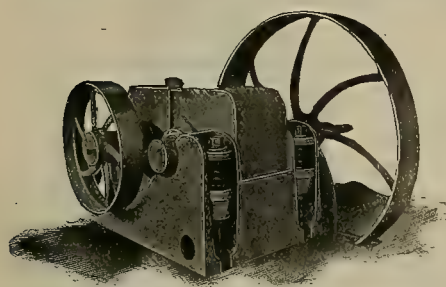
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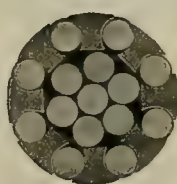
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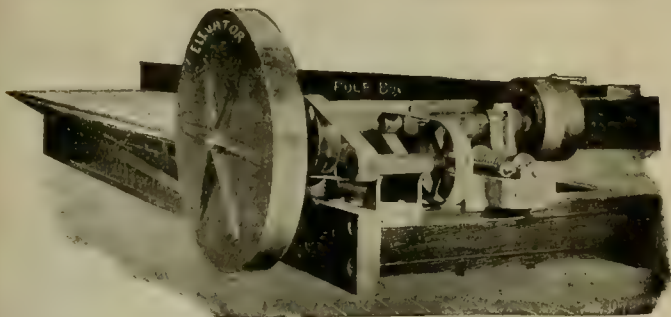
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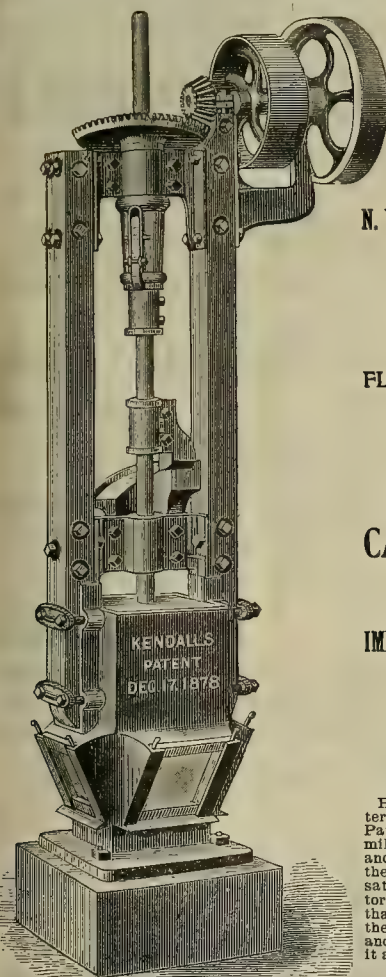
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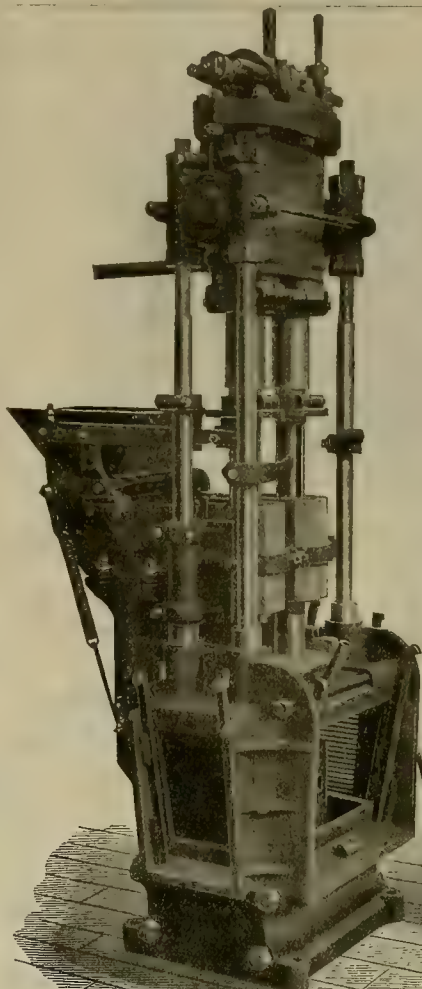
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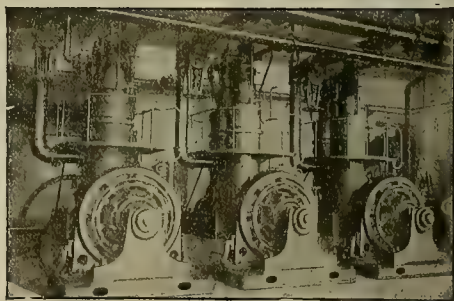
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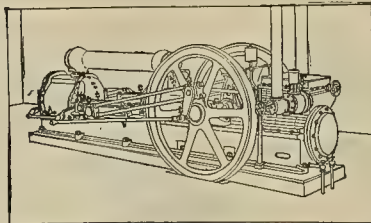
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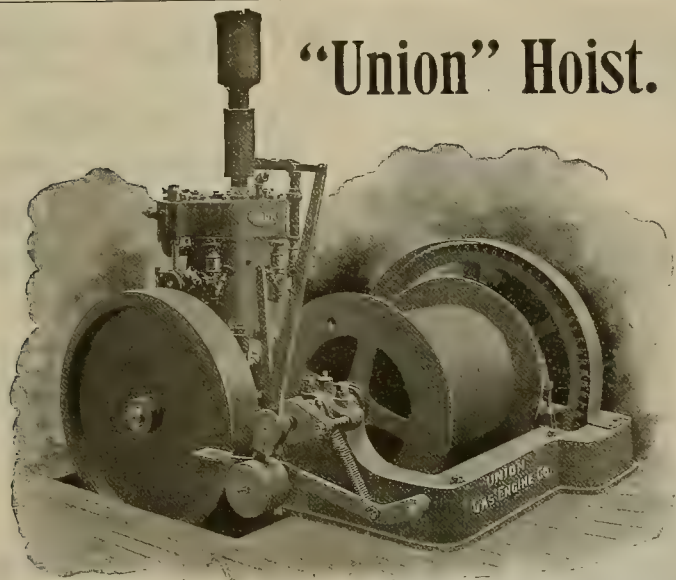
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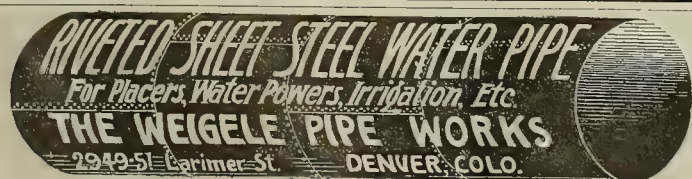
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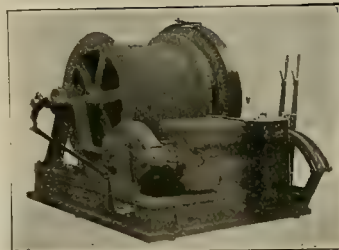
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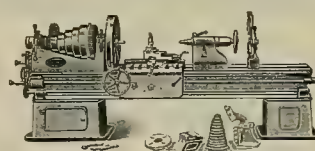
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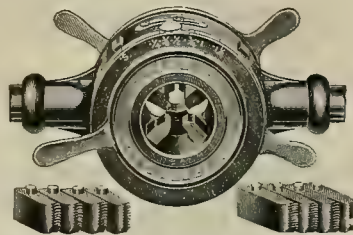


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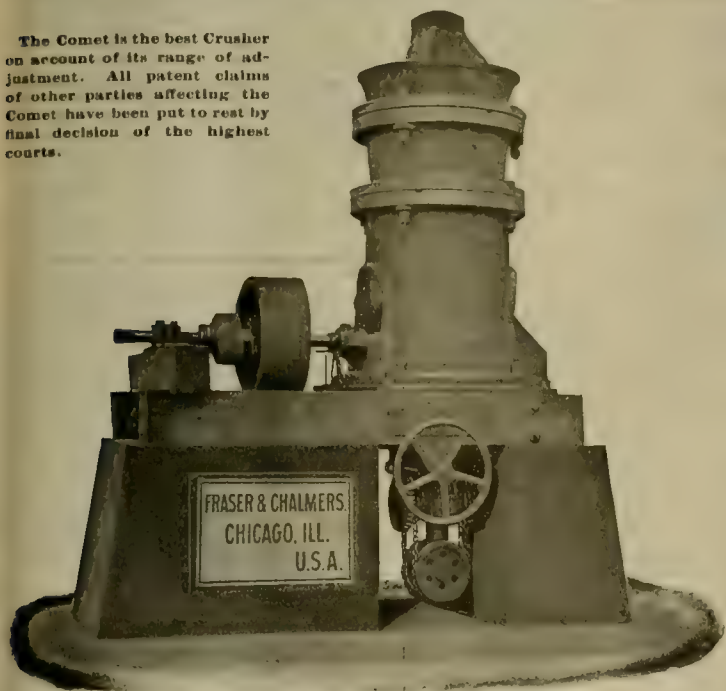
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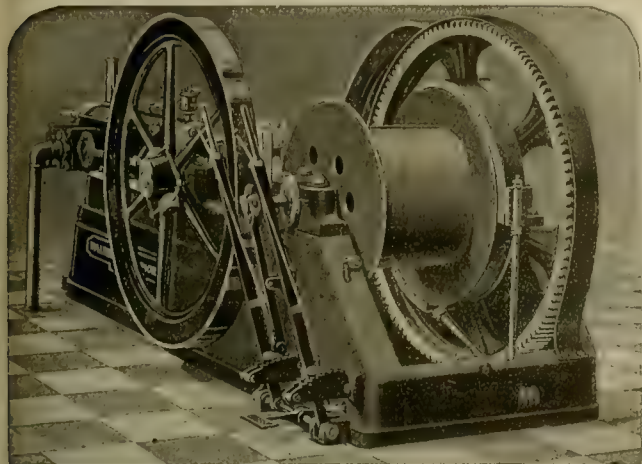
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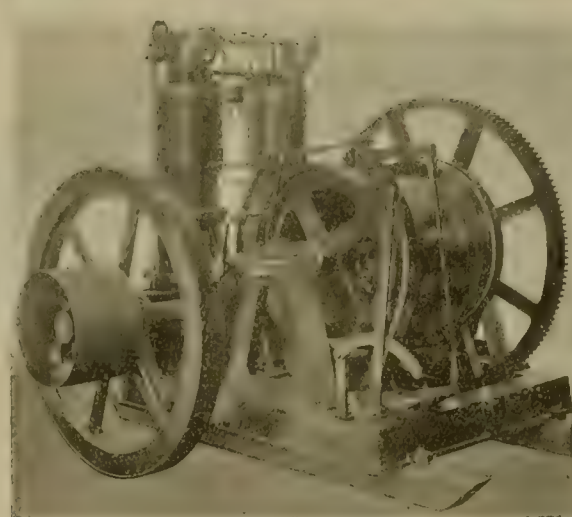
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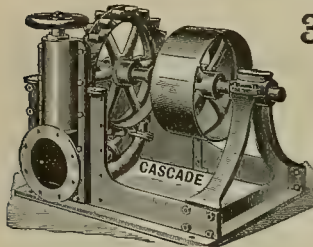
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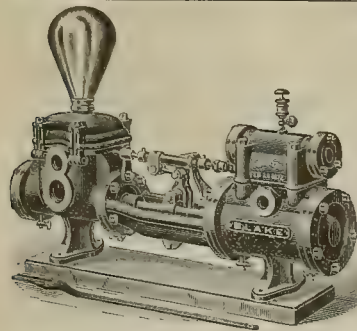
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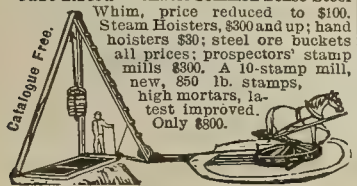
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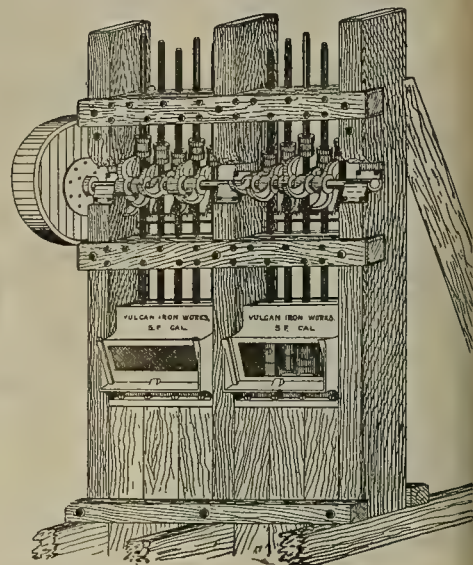
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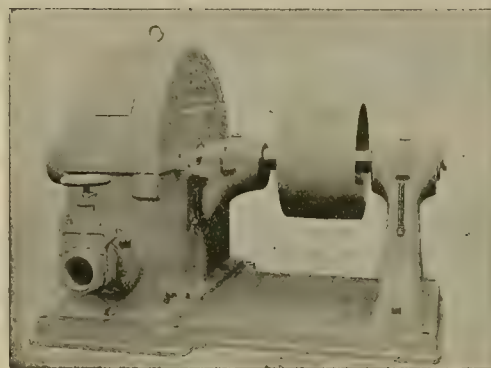
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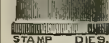
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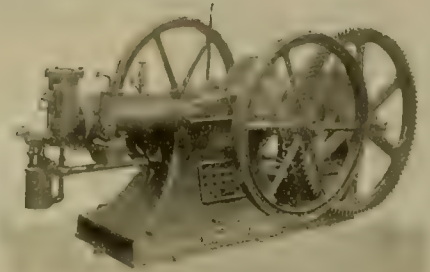
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The Markets.

SILVER.—San Francisco, Sept. 22, 1898. London, 28½d; New York, 61; San Francisco, 61½; Mexican Dollars, 46½@46¾. Bradstreet's says East Indian demands are apparently responsible for the steadiness of silver quotations in London this week. It is also stated that forward sales for American account there have been on a reduced scale. New York exchange, sight, 17½.

COPPER.—New York reports Lake, \$12.25 @12.37½.

LEAD.—New York reports "easier, unchanged," \$4 bid and \$4.05 asked. The firm fixing the settling price for miners and smelters quotes lead \$3.85. Local, pipe, 6@6¼c; sheet, 6½@7c; pig, 5½c; bar, 6c.

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—Unchanged, 5½@5½.

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carload lots, 9c; less than one ton, 11c. Black

blasting powder in carload lots, minimum car

728 kegs, \$1.50 per keg; less car lots, \$2 per

keg.

FUSE.—Triple tape, \$5.10 per 1000 feet;

double tape, \$4.35; single tape, \$3.45; Hemp,

\$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8;

Lion, \$9.

COAL.—San Francisco coast, yard prices:

Wellington.....\$3 00 Coos Bay.....\$5 00

Seattle.....6 00 Southfield.....7 50

Cargo lots, Eastern and foreign:

Wallsend.....\$ 7 50 Cumberland.....\$10 00

Brymbo.....7 50 Cannel.....9 50

Pennsylvania, hd., 14 50 Welsh Anthracite, 12 50

Scotch.....8 00 Rock Springs.....7 60

COKE.—Foreign, \$13; domestic, \$12 per

ton.

OILS.—California Castor, pure, cs., \$1.12

per gal.; bbl., \$1.07; pure No. 2, cs., 85c; bbl.,

80c; Baker's AA Castor Oil, in case lots of 200

gals. and upward, \$1.11; less than 200 gals.,

\$1.20; in bbls., 4c per gal. less than case;

Baker's Crystal, \$1.50; China Nut, 52c; Lin-

seed, strictly pure, boiled, bbl., 43c; cs., 48c;

raw, bbl., 41c; cs., 46c; lots of 5 bbls., 1c less;

Lucol, boiled, bbl., 38c; cs., 43c; raw, bbl.,

36c; cs., 41c; lots of 5 bbls., 1c less. Kero-

sene—Pearl, cs., per gal., 17c; Astral, 17c;

Star, 17c; Ecocene, 19c; Extra Star, 21c;

Elaine, 22c; Water White, bulk, in tanks,

11½c; Mineral Seal, iron bbls., 21c; wooden

bbls., 23½c; cs., 26c; Mineral Sperm, 27c;

Deodorized Stove Gasoline, bulk, 12½c; do.,

cs., 18c; 86 deg. Gasoline, bulk, 20c; do., cs.,

25c; 68 deg. Naphtha or Benzine, deodorized,

in bulk, per gal., 11½c; do., in cs., 16½c;

Lard Oil, Extra Winter Strained, bbl., 56c;

cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatsfoot

Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs.,

60c; Sperm, crude, 60c; Natural White, 65c;

Bleached do., 70c; Whale Oil, Natural White,

40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific

Rubber Mixed Paints, white and house colors,

\$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium,

jobbing, 30 @ 31c per lb.; carloads, 29c;

sulphuric acid, 2½c per lb. for 60%;

soda ash, \$1.60 per 100 lbs. 58%; hyposul-

phite of soda, 2½c per lb.; blue vitriol, 4½c

per lb.; borax, refined, 5@6c per lb.; chlorate

of potash, 9½@10c; roll sulphur, 2½c; blue

vitriol, 4c; alum, \$1.90@2.00; flour sulphur,

French, 2¼@2½c; California refined, 1½@

1¾c; nitric acid, 12½@16c; caustic soda, 60%,

2½@2¾c; 70%, 2¾@3¼c; 77%, 3¼@3¾c; Cal.

s. soda, bbls., 65c; sks., 60c @ 100 lbs; chloride

of lime, spot, 2.10@2.25c; to arrive, 2.10@—c;

salt-peter, refined, 9c; chlorate of potash, 9½@

10c; caustic potash, 8@9c.

CORDAGE.—The Tubbs Cordage Co. of

San Francisco quote invoices of 10,000 pounds

as follows: Manila Rope, 10½c; Sisal Rope,

9½c; Duplex Rope, 8½c.

CANDLES.—Electric Light Candles—6s,

16 oz., 7½c; 6s, 14 oz., 6½c; 6s, 12 oz., 5½c; 6s,

10 oz., 4½c; Granite (Mining) Candles—6s, 16

oz., 8½c; 6s, 14 oz., 7½c; 6s, 12 oz., 7½c; 6s,

10 oz., 6½c. Paraffine Wax Candles—1s, 2s,

4s, 6, 12s, white, 8c; colored, 9c.

NAILS.—List per keg: No. 20 to 60d, wire,

\$2.35; cut, \$2.25; 10 to 20d, wire, \$2.40; cut,

\$2.30; 8d, wire, \$2.45; cut, \$2.35; 6 and 7d,

wire, \$2.55; cut, \$2.30; 4 and 5d, wire, \$2.65;

cut, \$2.40; 3d, wire, \$2.80; cut, \$2.55; 2d,

wire, \$3.05; cut, \$2.95. In carload lots, 10c

per keg less.

LUMBER.—Retail: Pine, ordinary sizes,

\$17@18.50; redwood, No. 1, \$18@20; No. 2,

\$16@18.

The following has been adopted by the lum-

ber manufacturers of the Pacific coast:

Reference to "sale sizes" is to standard

sizes of rough (from which "worked" sizes

are made), noted in list of same in export

schedule of prices.

All sale sizes 1½ inches and less in thick-

ness, and 12 inches and less in width, tongued

and grooved and surfaced on one side, when

"worked," will be ½ inch less in thickness

and 5/8 inch less in face width.

All sale sizes 1½ inches and less in thick-

ness, and 12 inches and less in width, square

edged, and surfaced on one side, and two

edges, when "worked," will be ½ inch less

in thickness and ½ inch less in width.

All above sale sizes, whether tongued and

grooved, or square edged, or surfaced on two

sides, when "worked," will be 3-16 inch less

in thickness.

All sale sizes over 1½ inches and up to and

including 6 inches in thickness, and 12 inches

and less in width, when "worked," will be

½ inch less in thickness for each side sur-

face; widths 6 inches and less will be ½ inch

less, and widths over 6 inches and up to and

including 12 inches, ¼ inch less for each edge

dressed.

All sale sizes over 6 inches in thickness, and

over 12 inches in width, when "worked,"

will be for the largest worked size possible.

Above references being solely to green lum-

ber, the worked sizes of partially or wholly

seasoned lumber will be proportionately less,

as may be determined by the shrinkage

thereof.

Internal Revenue Commissioner Scott has

made the following rulings as to the opera-

tions of the war-tax bill: A dealer in real

estate, making short and long time to answer

on promissory notes and general securities for

himself and others and real estate loans for

loaning companies, and who also buys promi-

sory notes for himself and clients, al-

though he does not make loans for himself

and others, and afterwards sell the securi-

ties, is liable to the special tax as a

broker. Merchants or others who have

a place of business "where credits are

opened by the deposit or collection of money

or currency, subject to be paid or remitted

upon draft, check or order, or where money is

advanced or loaned, or promissory notes are

received for sale," are subject to the special

tax as brokers.

San Francisco Stock Board Sales.

SAN FRANCISCO, Sept. 22, 1898.

2:30 A. M. SESSION.

100 Andes.....09c 100 Ophir.....50c

700 Bullion.....03c 200 Union Con.....25c

100 Con. Cal. & Va.....70c 300 Yellow Jacket.....21c

2:30 P. M. SESSION.

500 Ophir.....55c 500 Chollar.....20c

300 Best & Belcher.....30c 200 Alta.....08c

500 C. Cal. & Va.....73c 500 Andes.....11c

1000 Savage.....15c

WANTED.

Partner in Extensive Placer and Quartz

Mines. Free wood and water. JAMES ARTHUR,

Cornucopia, Union Co., Oregon.

Mine and Mill Superintendent

Will be open for an engagement Oct. 1, '98.

Highest References Furnished.

Can also do Mine Surveying, Mapping and As-

saying. Competent to take full charge of a gold

or silver property anywhere.

As to terms, qualifications, etc., address F. G.,

Mining and Scientific Press Office, San Francisco.

Mine Wanted.

Man of experience will develop gold mine for ¼

interest, or will bond whole property and develop.

Must have ore chute IN SIGHT. State exact con-

ditions. Correspondence with owners only. Ad-

dress P. O. Box 887, Los Angeles, Cal.

WANTED.

METALLURGIST and PRACTICAL

SMELTER

Will be open for engagement October 1st as

Superintendent of Copper or Lead

Smelting Works.

Thoroughly competent in analyzing, assaying,

and handling men. Speaks Spanish. Excellent

references. Address SMELTER, care Mining and

Scientific Press.

COPPER MINES WANTED

— ALSO —

A Good Dividend = Paying

Gold Mine.

Address "MINING ENGINEER," P. O. Box No. 1,

ROSLINDALE, MASS.

Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.

For Sale.---A Bargain.

35 H. P. HERCULES GASOLINE HOIST.

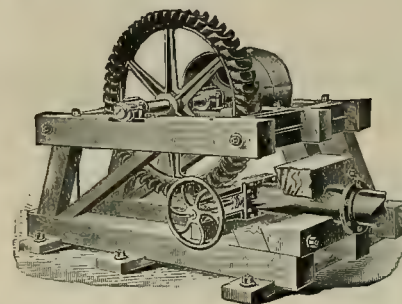
New and first-class in every particu-
lar; geared to 700 feet per minute; all
latest improvements; made in sections
weighing not over 1000 pounds each.

Outfit built to order; has never been
used; price very low; builders will give
full guarantee.

Address MINER.

P. O. Box 2684, S. F.

KNIGHTS' WATER WHEEL.



The accompanying cut shows the general ar-
rangement of Knight's Standard Water Wheel,
of which there are hundreds in use in different
States of the Union.

These Wheels are made from 2 feet to 6 feet in
diameter, from 10 to 1000-horse power, and
adapted to all heads and purposes.

Wheels inclosed in iron cases, from 6 to 24
inches.

Wheels for electrical power can be furnished
with or without Governors. Highest regula-
tion guaranteed.

Address all communications to
KNIGHT & CO., Sutter Creek, Cal., or,
RISDON IRON WORKS, Agents, San Fran-
cisco, Cal.

For full particulars, send for descriptive catalogue.

H. P. DICKINSON.

W. H. KINNON.

J. F. CRITCHETT.

Denver Ore-Testing Works,

CHEMISTS ASSAYERS *ENGINEERS.*

521-525 Seventeenth St., DENVER, COLO.

WORKING TESTS by Amalgamation, Concentration, Chlorination and Cyanide.

ORES CRUSHED AND SAMPLED. ♦ MILL RUNS.

Prices on Application.

AMERICAN ENGINEERING WORKS.

204 DEARBORN ST.,
CHICAGO, ILL.

MANUFACTURERS OF

ANACONDA

SELF OILING AXLES

FOR
MINE CARS



WHEELS AND AXLES COMPLETE. FURNISH
ED TO MINING COMPANIES. OR
BUILDERS OF MINE CARS.

WEST COAST OF MEXICO.

WÖHLER, BARTNING Suc's, Mazatlan (Sinaloa), Mex.

Bankers

Assessment Notices.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 22nd day of August, 1898, an assessment (No. 4) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 916 Market street, Room 57, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 31st day of October, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 31st day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors.
GEO. W. FLEISSNER, Secretary.
Office—No. 916 Market street, Room 57, San Francisco, California.

EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Forest Hill, Placer County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of September, 1898, an assessment (No. 13) of one-half cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, Nos. 1209-11 Claus Spreckels building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of October, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 1st day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors.
J. J. CRAWFORD, Secretary.
Office—Nos. 1209-11 Claus Spreckels building, San Francisco, California.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, near Winchester, Riverside County, California.
Notice is hereby given that at a meeting of the Board of Directors, held on the 16th day of May, 1898, an assessment (No. 1) of 1 1/4 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 7, fifth floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of July, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors.
R. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment is postponed to July 9th, 1898, and the day of sale to MONDAY, August 8th, 1898.
R. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to August 8th, 1898, and the day of sale to MONDAY, September 5th, 1898.
R. L. CHENEY, Secretary.
Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to September 3rd, 1898, and the day of sale to MONDAY, October 3rd, 1898.
R. L. CHENEY, Secretary.
Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.

By order of the Board of Directors of the Leon Gold Mining Co., the day of delinquency of the above assessment has been postponed to October 1st, 1898, and the day of sale to TUESDAY, November 1st, 1898.
R. L. CHENEY, Secretary.
Office—Room 508, Safe Deposit building, Cor. California and Montgomery streets, San Francisco, Cal.

Notice of Stockholders' Meeting.

A meeting of the Stockholders' of the Eureka Consolidated Drift Mining Company will be held in the company's office, No. 1209 Claus Spreckels building, San Francisco, at 1 o'clock P. M. on WEDNESDAY, September 28, 1898, for the purpose of considering the extension of the options on the treasury stock, expiring October 1, 1898.
J. J. CRAWFORD, Secretary.

W. & P. PLASTIC SLATE.

A Preservative Coating.
For Flumes and Damp and Tropical Sun Exposed Woodwork. Cheap, durable, unequalled.

PACIFIC REFINING & ROOFING CO.
113 New Montgomery St., S. F.
Correspondence solicited.

QUICKSILVER!

—FOR SALE BY—
The Eureka Company,
OF SAN FRANCISCO.
Room 1, 426 CALIFORNIA STREET,
SAN FRANCISCO.

BARGAINS IN DYNAMOS, ENGINES, ETC.

DIRECT CURRENT DYNAMOS of 55, 150, 270, 350, 700, 725, 800, 810, 900, 1075, 1350, 1610 and 2500-light capacity. ALTERNATING CURRENT DYNAMOS of 750, 900, 1300 and 2000-light capacities. ARC DYNAMOS—20, 24, 30, 40, 50 and 60-light, both 1200 and 2000-candle power. ENGINES—12, 50, 75, 85, 100, 115, 125, 150, 175 and 200 H. P. BOILERS—50, 100, 250, 375 and 500 H. P. HEATERS—150, 1000 and 2000 H. P. STEAM PUMPS—All sizes.

DELINQUENT SALE NOTICE.

WEST SANTA ROSALIA GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, State of Sonora, Mexico.

Notice.—There are delinquent upon the following described stock on account of assessment (No. 1) levied on the 3rd day of August, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|--------------------------------|-----------|-------------|---------|
| J. W. Pew, Trustee..... | 3 | 2,000 | \$80 00 |
| D. E. Alexander..... | 11 | 500 | 15 00 |
| Chas. F. Gardner..... | 12 | 2,500 | 75 00 |
| J. W. Pew, Trustee..... | 17 | 870 | 20 10 |
| L. H. Eckhardt, Trustee..... | 24 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 29 | 2,500 | 75 00 |
| J. W. Pew, Trustee..... | 32 | 100 | 3 00 |
| J. W. Pew, Trustee..... | 33 | 100 | 3 00 |
| J. W. Pew, Trustee..... | 34 | 300 | 9 00 |
| J. W. Pew, Trustee..... | 35 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 38 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 39 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 40 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 41 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 42 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 43 | 5,000 | 150 00 |
| J. W. Pew, Trustee..... | 44 | 10,000 | 300 00 |
| J. W. Pew, Trustee..... | 45 | 50 | 1 50 |
| J. W. Pew, Trustee..... | 46 | 450 | 13 50 |
| D. E. Alexander..... | 49 | 165 | 4 95 |
| Chas. F. Gardner..... | 50 | 165 | 4 95 |
| A. C. Shaw, Trustee..... | 53 | 15 | 45 |
| A. C. Shaw, Trustee..... | 54 | 35 | 1 05 |
| A. C. Shaw, Trustee..... | 55 | 50 | 1 50 |
| A. C. Shaw, Trustee..... | 56 | 100 | 3 00 |
| A. C. Shaw, Trustee..... | 57 | 100 | 3 00 |
| A. C. Shaw, Trustee..... | 58 | 100 | 3 00 |
| A. C. Shaw, Trustee..... | 59 | 100 | 3 00 |
| A. C. Shaw, Trustee..... | 60 | 100 | 3 00 |
| A. C. Shaw, Trustee..... | 61 | 100 | 3 00 |
| Jas. McNab..... | 70 | 1,000 | 30 00 |
| Jas. McNab..... | 71 | 1,000 | 30 00 |
| J. W. Pew, Trustee..... | 101 | 500 | 15 00 |
| J. W. Pew, Trustee..... | 121 | 14,975 | 449 25 |
| Chas. F. Gardner, Trustee..... | 122 | 500 | 15 00 |
| Chas. F. Gardner..... | 123 | 5,000 | 150 00 |
| Chas. F. Gardner..... | 124 | 11,500 | 345 00 |

And in accordance with law, and an order from the Board of Directors, made on the 3d day of August, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, No. 310 Pine street, Rooms 15 and 17, San Francisco, California, on MONDAY, the 26th day of September, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. W. PEW, Secretary.
Office—No. 310 Pine street, Rooms 15 and 17, San Francisco, California.

DELINQUENT SALE NOTICE.

BOULDER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, El Dorado County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 27th day of July, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|------------------------|-----------|-------------|---------|
| Mrs. Marie Malson..... | 18 | 1,000 | \$50 00 |

And in accordance with law, and an order from the Board of Directors, made on the 27th day of July, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Secretary, room 163, Crocker building, San Francisco, California, on MONDAY, the 26th day of September, 1898, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

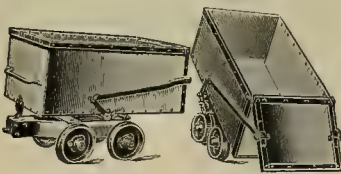
J. M. WILLMANS, Secretary.
Office—Room 163, Crocker building, San Francisco, California.

THE F. M. Davis Iron Works Co.,

723 to 743 Larimer St., Cor. 8th St.,
DENVER, COLO.

THE DAVIS AUTOMATIC ORE CAR.

Patented Jan. 7, 1896.



SIMPLE. DURABLE. EFFICIENT.

| | | |
|---------------------------------|-----------------|------|
| No. 2.—44 in. x 24 in. x 20 in. | Weight 425 lbs. | \$30 |
| No. 3.—48 in. x 24 in. x 20 in. | Weight 525 lbs. | \$35 |
| No. 4.—48 in. x 24 in. x 20 in. | Weight 600 lbs. | \$40 |
| No. 5.—48 in. x 24 in. x 24 in. | Weight 700 lbs. | \$45 |

THE BEST ORE CAR IN THE FIELD.

Skeleton Mining Report.

NEEDED BY EVERY MINING MAN.

FIFTY CENTS POSTPAID.

Mining and Scientific Press, 330 Market St., S. F.

.Lunkenheimer's. Double Disc Gate Valves



Are perfectly constructed, compact, durable and made of gun metal (U. S. Government standard). They outlast and outwear all other makes. Made in two weights from 1/4" to 3" screw and 3/8" to 3" flange ends for 175 and 350 lbs. working pressures. Satisfaction guaranteed. Specify "Lunkenheimer" make. None genuine unless name is cast in body. Supplied by dealers. Catalogue of up-to-date brass and iron specialties free for the asking.

THE LUNKENHEIMER CO., Cincinnati, Ohio, U. S. A.,
SOLE MANUFACTURERS,
26 Cortlandt St., NEW YORK. + BRANCHES: + 35 Great Dover St., LONDON, S. E.

WEBER GASOLINE MINE AND MILL PUMPS.

ALL SIZES.

For All Duties.
Economy & Efficiency
Guaranteed.

Address, stating capacity and conditions,
**WEBER GAS AND
GASOLINE ENGINE CO.**

430 S. W. Boulevard,

Kansas City, Mo.



FARIES TUBE CLEANER.

SELF EXPANDING.
SELF CONTRACTING.

It is Provided with a Ram that Makes the Work of Cleaning Easy.



FOR FIRE TUBE BOILERS.

FOR WATER TUBE BOILERS.

IT NEVER GETS STUCK.

IT NEVER WEARS OUT.

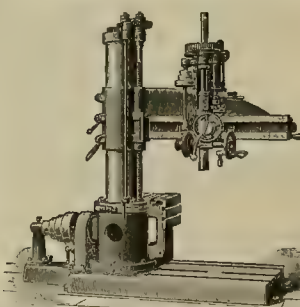
IT NEVER SLIPS OVER THE DIRT.

IT PROFITS PROPRIETORS. ENGINEERS LIKE IT.

We Guarantee Satisfaction.

GLOBE IRON WORKS, Agents, & Stockton, Cal.

— SEND FOR CIRCULAR. —



RADIAL DRILLING and TAPPING MACHINES.

To tap on a Radial Drill is not a success unless done with our PATENT TAPPING ATTACHMENT, which is placed directly on the Drill spindle, and which is entirely automatic, no friction clutches or reverse belts. A guaranteed saving of from 50 to 75 per cent.

BICKFORD DRILL & TOOL CO.

CINCINNATI, OHIO, U. S. A.

HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal.

THE BUCYRUS COMPANY,

DESIGNERS AND BUILDERS OF

DREDGES, STEAM SHOVELS, EXCAVATING MACHINERY,
WRECKING CARS, LOCOMOTIVE CRANES, PILE DRIVERS,
CENTRIFUGAL PUMPS, WITH SIMPLE, COMPOUND OR TRIPLE
EXPANSION ENGINES,

MACHINERY FOR PLACER MINING.
SOUTH MILWAUKEE, WISCONSIN.

TUBBS CORDAGE CO.

(A CORPORATION.)

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Duplex Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc. Extra sizes and lengths made to order on short notice
611 and 613 Front St., San Francisco, Cal.

M. CRAWFEE,

Manufacturer of the Celebrated

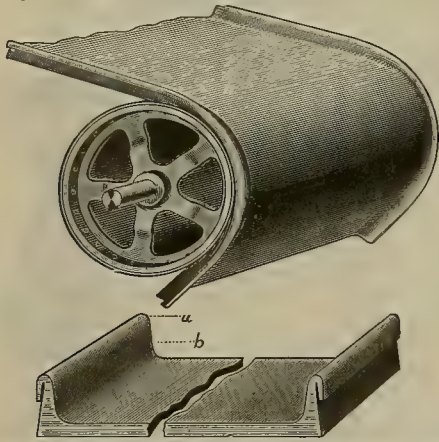
Smelter Broom,

1554 BLAKE ST. DENVER, COLO.

CHICAGO EDISON COMPANY,

139 Adams Street,
CHICAGO, ILL.

THE BROWNELL "PATENT LIP" FLANGE FRUE VANNER BELTS.



It has taken years of ceaseless testing and experimenting to produce the superior belt which we now offer, with elastic flanges and pliable body reinforced with specially woven duck. Every belt is manufactured by experienced workmen, and carefully tested on machines especially built for that purpose; consequently we are to-day manufacturing the best belts that mechanical ingenuity, combined with honesty of construction, can possibly produce.

MR. JAS. S. BROWNELL, 132 Market St., San Francisco, Cal.—DEAR SIR: Replying to your favor of the 18th inst., will say that in the two mills operated by this company we have nineteen of your Patent Lip flange concentrator belts in use; some of them have been in constant use for the past two years and have given entire satisfaction. I know of no better flange for a side shake machine. Yours truly, JOHN ROSS JR., Superintendent.

MR. J. S. BROWNELL, San Francisco, Cal.—DEAR SIR: For some years we have used three different styles of belts on our Frue vanner at the Mexican mill, and for smooth working and endurance the Brownell Patent Lip flange belt has proved its superiority over all others, and I unhesitatingly recommend it to all who are using Frue machines. Yours truly, EUGENE MAY, Foreman.

For any information regarding Frue Vanner or Belts, call on or address

JAS. S. BROWNELL, Western Agent FRUE VANNING MACHINE CO.
(Successor to Adams & Carter.) 132 MARKET STREET, ROOM 15, SAN FRANCISCO.



RISDON IRON WORKS, SAN FRANCISCO, CALIFORNIA.

Cable: "Risdon's." Code: A. B. C. & Leibers.

— MANUFACTURERS OF —

Gold Dredging Machinery

And COMPLETE EQUIPMENT for Placer Mines
OUR SPECIALTY.

We build GOLD DREDGES COMPLETE IN RUNNING ORDER to handle 2500 cubic yards per day at a cost of 3 cents per cubic yard. We excavate 50 feet below water, 20 feet above water and handle boulders up to one ton weight.

Send for Dredging Catalogues Nos. 15 and 16.

WE ALSO BUILD

All kinds of Mining, Milling, Concentrating, Pumping,
Air Compressing, Hydraulic, Water Wheel
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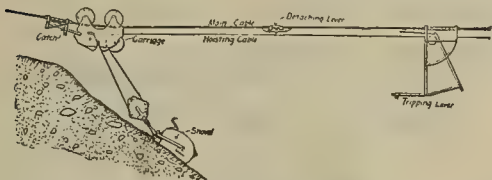
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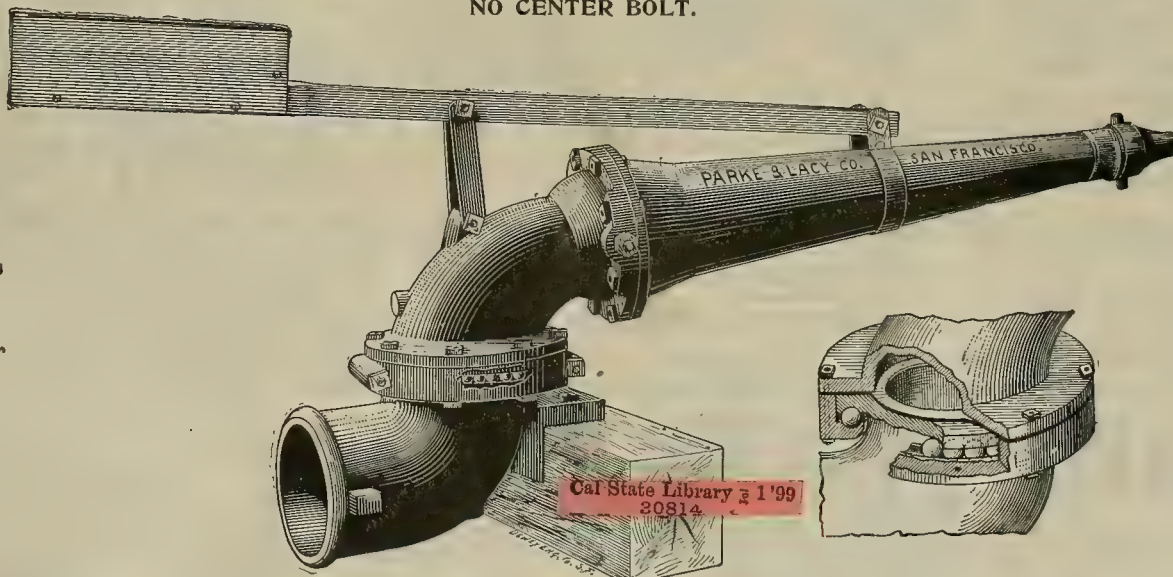
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“Technical Terms.”

To those who think that there are “too many technical terms” in mining and scientific articles herein, it might be interesting to note instances wherein “technical terms” are really in evidence. The constant aim in this journal is to have as few “technical terms” as possible without marring the sense or value of technical articles. In this regard it is in order to note the list of papers read at the fifth annual meeting of the American Mathematical Society at Boston, Mass., on Aug. 19th and 20th. Following is a partial list: “On the ruled surfaces generated by the plane movements whose centrodes are congruent conics tangent at homologous points;” “A second locus connected with a system of coaxial circles;” “On the Hessian of the cubic curve;” “Asymptotic lines on cubic scrolls;” “Relative motion considered as disturbed absolute motion;” “On the development of the perturbative function in terms of the mean anomalies;” “Note on the differential invariants of a system of $m+1$ points by projective transformation;” “Note on the extension of the Poincare-Goursat proof of a theorem of Weierstrass’s;” “Supplementary note on a single-valued function with a natural boundary, whose inverse is also single-valued;” “The theorems of oscillation of Sturm and Klein;” “Space concepts in



CABIN ON TWENTY-EIGHT, DOMINION CREEK, BELOW UPPER DISCOVERY, KLONDIKE. (See page 328.)



DUMPS AT JUNCTION OF EL DORADO AND BONANZA.—BENCH CLAIMS ABOVE AT RIGHT HAND. (See page 328.)

dian lead miner, for under our existing tariff laws it pays him better to ship the ore across the border than to smelt it at home. American miners would rather be pleased than otherwise to have the Canadian Government put on the proposed lead ore export tax. Another Canadian proposition is to put a very high duty on imported manufactures of lead. However this might work after a while, it is evident that for a time Canadian users of imported lead products would be heavily taxed thereby with no corresponding benefit. Probably the ultimate solution of the problem from a Canadian point of view will be to promote therein the manufacture of lead products, and thus, in time, tend to become as independent as this country is in nearly every way of Europe.

ON this page are presented views from photographs taken for the MINING AND SCIENTIFIC PRESS by Col. Wilkins, in company with Alf. Tregidgo, a well-known California miner, on the occasion of Mr. Tregidgo’s recent visit to that region. On page 328 appears an article on the Klondike, written by Mr. T. for this paper, which, by reason of his prominence in the mining world, is of more than ordinary interest. He has just returned from a year’s sojourn in the Klondike, and this is his first published utterance.

mathematics;” “The subgroups of the generalized modular group;” “Non-euclidean cubics;” “On the simple isomorphisms of a Hamiltonian group to itself;” “Construction of a linear homogeneous group in m variables.” Nothing in engineering or mining can compare with the “scientific jargon” of the foregoing, and yet, doubtless, the authors of the above-named articles could not well dispense with what to many seem obscure and pedantic terms. A “technical term” that may have no meaning to one conveys exact information and expression to another, and is usually unavoidable in an article treating on any special department of science. A “technical term” is usually synonymous with an exact term, a word specially or exclusively pertaining to some particular trade, profession or pursuit, and one that could not be replaced by any other. Every business has its “technical terms,” though probably few instances can be found where the language is as severely technical as in the instance cited above.

BRITISH COLUMBIA and Canada in general object to the present U. S. tariff on lead in ore of $1\frac{1}{2}$ cents per lb., and on pig lead of $2\frac{1}{2}$ cents per lb. Some Canadian papers claim that the remedy is to put an export duty on lead ore. That would probably be objected to by the Cana-



CLAIM TWENTY-EIGHT BELOW UPPER DISCOVERY ON DOMINION—SHOWS BREAKING UP OF THE ICE AT JUNCTION OF CARIBOO CREEK, KLONDIKE. (See page 328.)

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RECENTLY was noticed an ambitious California electrical project of the newly organized Standard Electric Co., which proposes to furnish San Francisco and intermediate points with light and power from electrical energy generated by its Calaveras Co. water power. The company now announces that it will apply for such a franchise covering the city of Stockton and will continue its line to San Francisco. The scheme is a commendable one, though so far as San Francisco is concerned it is probable that San Francisco bay will present obstacles in the way of successful transmission that will be ordinarily regarded as insuperable.

ENGLISH scientific publications have notices of an application of wireless telegraphy at a recent regatta, when Marconi is reported to have demonstrated the adaptability of his system to the transmission of press intelligence from a steam launch in motion. The yachting expert on deck dictated his account of the races while these were in progress, and pages of manuscript thus dictated descended below deck to Marconi, who sat in a cabin working his transmitter, whence the ether waves carried the news with a minimum loss of time to a fixed receiving station on shore. Arrived at this point, the news was forwarded to the press offices by telephone. It is stated that one edition of the London *Evening Mail* contained two columns of news dispatched entirely by wireless telegraphy. This notable event is concerned to be the germ of an important development of wireless telegraphy.

In the U. S. Geological Survey report for 1897, E. W. Parker says in his paper on the production of sulphur and pyrites, that, compared with the domestic consumption of sulphur, the production of this country continues to be of small proportions. In '96 was produced in this country 5260 tons, valued at \$87,200, being the largest annual production recorded. The increased output of that year is ascribed to the operations of the Frasch process in Louisiana, which consists in melting the sulphur by superheated water and pumping or forcing into the surface. The principles of the air-lift pump have recently been applied to this enterprise. The works in Louisiana, which produced about 80 per cent in 1896 of the total product, were shut down the greater part of 1897. The substitution of iron pyrites for sulphur in the manufacture of sulphuric acid continues to increase. The report says that iron pyrites is found in nearly every one of the United States, but it has not been mined on a commercial scale in more than six.

Former Cost of Comstock Mining.

As illustrating the present decreased cost of mining, compared with that of former years, it is interesting to note the prices paid on the Comstock, Nev., lode for labor and supplies in early days. One mine—the Hale & Norcross—is typical of the entire lode. During the year ending March 1, 1867, there was a product of 29,404 tons ore. The managerial expenses were \$9,331.25, the hoisting and engine department \$70,199.25, prospecting and dead work \$39,769.23, extracting ore \$101,167.94, improvements \$19,376.30, "relative expenses" \$27,321.21. The entire cost of production was \$266,679.18. It is worthy of note that the 15,639 tons of ore treated during the first six months of the year under consideration in the history of the mine specified, assayed \$1,288,132.79, and produced \$816,977.62, the loss, according to the assays, being \$471,155.17; that is, the 15,639 tons assayed \$465,190.14 in gold and \$822,942.65 in silver, and produced \$397,157.99 in gold and \$419,819.63 in silver—a tremendous waste.

In those days the cost of supplies was necessarily great. Compared with present prices it seems exorbitant. In the details of expenses in the hoisting department occur a myriad of such items as the following:

| | |
|--------------------------|----------|
| 2665 lbs. tallow..... | \$396 78 |
| 36 lbs. sulphur..... | 18 00 |
| 133 lbs. white lead..... | 35 35 |
| 320 gals. kerosene..... | 396 75 |
| 61 lbs. borax..... | 27 30 |
| 1828 lbs. car iron..... | 237 50 |
| 2046 lbs. coal..... | 132 11 |
| 7500 ft. lumber..... | 210 00 |

In the engine department among the items are:

| | |
|------------------------|-------------|
| 1916½ cords wood..... | \$26,770 16 |
| 93 gals. lard oil..... | 295 15 |
| 1 gal. varnish..... | 8 00 |

In the "prospecting" department:

| | |
|------------------------|------------|
| 268 boxes candles..... | \$1,474 00 |
| 8 kegs powder..... | 49 00 |
| 875 ft. fuse..... | 25 50 |
| 280 lbs. steel..... | 80 00 |

The labor was at the same general rate as at present, being the one item that has remained unchanged through the years. In the summary of prospecting is the item:

| | |
|----------------------------|----------|
| Miners, 3204 days..... | \$12,816 |
| Carpenters, 281 days..... | 1,405 |
| Carmen, 981 days..... | 3,924 |
| Blacksmiths, 285 days..... | 1,710 |

The average cost of ore reduction for the year was \$14.26 per ton. The cost of materials at the Gould & Curry mill for that year is given below, with the quantity and average price:

| Articles— | Quantity. | Cost. | Av. price |
|---------------------------------|-----------|---------------|---------------|
| Wood, cords..... | 11,442 | \$168,830 | \$14 72 |
| Lumber, feet..... | 172,857 | 3,725 | (per M) 42 40 |
| Shingles..... | 21,500 | 185 | 8 60 |
| Charcoal, bushels..... | 5,848 | 1,659 | 28 |
| Iron, pounds..... | 12,639 | 1,698 | 13½ |
| Gas pipe, pounds..... | 451 | 258 | 57½ |
| Castings, pounds..... | 395,099 | 33,880 | 8½ |
| Rivets, nuts, etc, pounds..... | 1,253 | 175 | 20 |
| Steel, pounds..... | 178 | 315 | 25 |
| Copper, pounds..... | 262 | 142 | 80 |
| Babbit metal, pounds..... | 3,832 | 120 | 46 |
| Nails, pounds..... | 172 | 417 | 11 |
| Zinc, pounds..... | 35 | 42 | 25 |
| Turpentine, gallons..... | 25 | 72 | 3 00 |
| Belting, pounds..... | 2,882 | 2,192 | 1 00 |
| Packing, pounds..... | 494 | 497 | 1 00 |
| Rope, pounds..... | 393 | 96 | 25 |
| Hose, pounds..... | 136 | 97 | 20 |
| Sulphate of copper, pounds..... | 87,353 | 17,588 | 20 |
| Salt, pounds..... | 345,668 | 10,943 | 3 |
| Lard oil, gallons..... | 1,360 | 2,487 | 1 64 |
| Kerosene oil, gallons..... | 965 | 1,615 | 2 47 |
| Linseed oil, gallons..... | 49 | 35,013 | 51 89 |
| Quicksilver, flasks..... | 675 | 214 | 23 |
| Cut bolts, pounds..... | 743 | 633 | 1 to 75 |
| Screws, pounds..... | 2,980 | 819 | 27½ |
| Candles, pounds..... | 71 | 67 | 20 |
| Axes and handles..... | 42 | 30 | 50 |
| Picks..... | 239 | 231 | 1 39 |
| Shovels..... | 487 | 2,087 | 4 28 |
| Feed, sacks..... | 196 | 1,120 | 5 71 |
| Hay, bales..... | 116 | 58 | 50 |
| Axle grease..... | 280 | 280 | 1 00 |
| Copper rivets, pounds..... | 10,863 | 1,361 | 12½ |
| Tallow, pounds..... | 15 | 60 | 4 00 |
| Alcohol, gallons..... | 189 | 147 | 77 |
| Brooms..... | 126 | 46 | 32 |
| Sledge handles..... | 157 | 77 | 50 |
| Lamp chimneys..... | 531 | 174 | 32 |
| Hoes..... | 76 | 71 | 1 00 |
| White and red lead..... | 1,241 | 242 | 20 |
| Blankets..... | 43 | 347 | 8 00 |
| Leather..... | 575 | 246 | 42½ |
| Stone coal..... | 9,751 | 714 (per ton) | 150 00 |

And yet, despite all, the business even at such apparently ruinous figures, and carried on under such a wasteful system, showed a profit. For the year indicated the assessments were \$1,232,380, the dividends \$1,794,400.

So far as the stock market was concerned few knew and fewer cared what anything around the mines cost. To the street it mattered little that coal cost \$150 per ton or skilled labor \$6 per day. And the strangest part of it all was that though the system was lavish and the methods destructive, yet it was the speculative element that furnished the opportunity for the first example of deep metal mining on this continent. In those old Comstock days there was no cautious sinking from level to level, as the

ore found paid for the work of going down another 100 feet. It was bold, daring development made possible by unlimited funds furnished by the speculative public, not with that intent but with that result.

THE Union Iron Works of San Francisco will build one of the three new battleships ordered by the U. S. Government. The recent war has modified many of the former governmental plans regarding construction, draft, armament, etc., of American battleships. It is probable that the three for which contracts have been awarded will be protected by the new Krupp armor. Experiments with this at the naval proving station at Indian Head have demonstrated its superiority in toughness and resisting qualities to the plates treated by the Harvey process. Experts in ordnance matters are satisfied that the Krupp armor is superior to the Harvey. A 6-inch Krupp plate has shown remarkable results when attacked by a 6-inch rifle. Three shots fired at this plate did little damage, none but the last penetrating it entirely. At that test it was proved that a 6-inch plate of the Krupp type was equal to an 8-inch such as is now supplied to the navy. The greater strength of the new armor will permit more protection being given the new battleships of the Indiana and Kearsarge class at points where plates now taper to 5 inches or less at the bow and stern. It is probable that the fine battleship Wisconsin, now nearing completion at the Union Iron Works, would be built on different lines had not her construction begun before the war. She has a coaling capacity of 1200 tons and will be able to steam sixteen knots an hour; but the experience gained in the late war can hardly be utilized in her case. It will be different with the next one built here—the Ohio. She will be so constructed that, in case she is needed as badly as the Oregon was at Santiago, she will not have to rely much upon the inefficiency of her antagonist. In the new vessel increased speed and coaling capacity will be required, three of the essentials being the ability to carry 2000 tons of coal, to attain a speed of eighteen knots, and run 10,000 knots at the rate of ten knots an hour.

ANSWERING an "apex," "side line," "extralateral" question: assuming that the side lines run on each side of the course of the vein or lode, distant not more than 300 feet from the middle of such vein and parallel, the outside portions lying between vertical planes drawn downwards through the end lines, the inquiry is to be answered in the affirmative—that is, a quartz locator can follow the dip of his ledge, vein or lode outside of his end lines, where the adjacent ground is owned by other parties, the top or apex of his ledge lying inside of such surface lines extending downward vertically. This is the law as followed by the United States Supreme Court in general; but only in general, for there are several decisions in special cases on this subject; more especially that one by Justice Field in the case of King vs. the Amy and Silversmith Mining Company in Montana, where the holder of the Amy claim was refused the right to follow the vein into the Consolidated claim by reason of confusion between the end lines and side lines. In the Amy claim the lines marked as side lines crossed the course of the strike of the vein and did not run parallel to it, being therefore interpreted by the United States Supreme Court as constituting end lines. The most recent and in every way the most lucid interpretation of this matter appeared in the issue of July 2, '98. In the case of the Del Monte vs. the Last Chance the United States Supreme Court decided that if the apex of a vein crosses one end line and one side line of a lode mining claim as located thereon, the locator of such vein can follow it upon its dip beyond the vertical side line of his location. If inquirers will refer to the issue named they will find this entire matter clearly and exhaustively discussed and decided by the highest tribunal on earth.

A CRIPPLE CREEK, COLO., PAPER has an unusual notice, even for a State that issues non-assessable stock. The Boston & Cripple Creek G. M. Co. gives its stockholders notice to pay a 10-cent-per-share assessment, with the alternative of having their interests "confiscated." It often amounts to the same thing, but public announcement of the intent to "confiscate" delinquent stock is unusual.

Concentrates.

BROKERAGE in Dawson is on a 10% commission basis. Interest is 10% per month.

THE Denver, Colo., *Mining Record* says that Cripple Creek's average of smelting ore is \$72.30.

A ROUND tank, 20 inches inside diameter, to hold 100 gallons should be 73.294 inches in length.

In Mercur, Utah, gold is produced from the mine cheaper than silver can be there so produced.

THE Leadville, Colo., *Democrat* estimates the mineral output of that district since 1878 at \$253,290,078.77.

It is locally estimated that the gold output of Boulder county, Colo., will be \$300,000 more than a year ago.

In the Leadville, Colo., district there are seventy active mines, producing gold, silver, copper, lead, iron and zinc.

THE Kilton reduction works at Boulder, Colo., are handling 100 per cent more ore than at any period in their history.

CHAS. POULOT, having searched for uranium and platinum in Oregon and Washington, says his search has been fruitless.

THE American G. M. Co. is operating machines at Sheep Creek, Alaska, by air conveyed 13,000 feet from the compressor.

DURING September the names of 246 new subscribers were received at this office. Of these, 131 were from the State of Colorado.

C. J. STRATTON, Mgr. Belle of Granite mine, Granite, Colo., while in a drift last week, was killed by the falling of a large slab of rock.

In a drilling contest at Rossland, B. C., Sept. 19th, for the championship of the province, M. McNicol in fifteen minutes drilled 37 inches.

In the stock market it is different from salvation. In the latter one is saved by faith; but in the former you are often saved by want of it.

THE United Verde mine at Jerome, Ariz., at 300 feet depth is said to have 96 feet of solid ore and at 500 feet the ore body is reported 450 feet wide.

THE Sonora, Cal., *Democrat* says that when the autumn rains furnish a water supply twenty newly developed mines will begin crushing ore in Tuolumne county.

THE Copper Queen mine at Bisbee, Ariz., which when at a depth of 200 feet was about to be sold for debt, has at 800 feet ore enough in sight, it is said, to run fifty years.

THE mining assessment increase in El Paso county, Colo., in which Cripple Creek is located, for '98 over '97, is \$613,000 and the increase in money and credits is \$200,000.

In the deepest iron mines of Sweden the natural ventilation is notable. The temperature rises to ten degrees Centigrade, and generally varies between six and nine degrees.

In a petition to the Minister of Mines for British Columbia, the Miners' Union at Rossland unanimously adopted a resolution asking that a School of Mines be established in that city.

THE *Miner* says that of the \$2,000,000 paid for the Center Star mine at Rossland, B. C., O. Durant received \$788,035.60, and about an equal amount went to A. H. Tarbet of Butte, Montana.

In the Bell mine at Butte, Mont., last week, J. Mourn, attempting to jump from the deck of the cage while in motion, at the 1000 level, was caught between the wall plate and cage and killed.

NEXT Saturday the United States Civil Service Commission will hold an examination at Port Townsend, Wash., for the position of assayer in the customs house in that city, at a salary of \$5 per day.

THE United States Government is reported arranging for a shipment of 10,000,000 ozs. silver bullion from Philadelphia to San Francisco, by special-guarded fast freight train, for coinage for Oriental use.

ALPHONSE FRELTY, Pres. of the American Society of Civil Engineers, says "on the engineer depends the safety of the capital invested by those who repose their confidence in him, and on the soundness of his designs also depends human life."

THE output for July of pig iron in Germany, including Luxembourg, was 620,554 tons, an increase over June of 25,339 tons, and an increase over July, 1897, of 50,826 tons. From January to August, current year, the total was 4,219,325 tons, an increase of 307,752 tons.

THE total gold output of the South African Republic for July, '98, was 382,007 ounces; of this the Witwatersrand contributed 359,344 ounces and the outside districts 22,663 ounces. The August gold yield of the Transvaal, S. A., was 398,285 ounces; of this the Rand furnished 376,911 ounces.

It is believed that if the U. S. Government builds the contemplated restraining dam in the narrows near Smartsville, Cal., upon plans necessary as based on the supposed forthcoming report of the Government Engineers, it will be the largest and most substantially built water barrier in the world.

ALL that Colorado wants to know is what is wanted in the metal line, and straightway it is supplied. Till silver slumped, the Centennial State led the list as a silver producer; this year it is in the van of the gold output, and now has some idea of crowding Michigan or Arizona for first or second place as a copper producer.

SINCE Aug. 2nd there has arrived at San Francisco from Australia gold to the amount of \$28,712,729. The greater part of it was in English sovereigns and was recoined into American money in the San Francisco mint. During the same time gold to the amount of \$16,875,000 has been received at New York from Europe.

THE coinage of gold by the United States mints in 1897 was \$64,044,885—nearly 50 per cent more than the average annual coinage since 1870. Since the discovery of America the total value of the gold produced to 1898 (estimating 1897 at \$240,000,000) was \$9,023,320,600. Of this amount \$6,065,097,600 has been produced since 1850.

POSTMASTERS at money order offices are now authorized to issue money orders payable at their own offices. This practice has not heretofore been allowed and the new departure is for the accommodation of people who, not having an account with a bank, desire to follow this economical and absolutely safe method in payment of bills, etc.

DURING the week about 300 miners and prospectors have returned dustless and despondent from the Klondike. A few have money, the vast majority glad to get back anyhow. It is there as everywhere in all gold regions: some secure thousands, others starve to death; the great majority returning

curse the country. So far that region has cost more than it has yielded.

FILES can be resharpened by immersion for a short time in dilute acid. They must be first cleaned. A solution of sulphate of copper will remove iron filings from a file without affecting the file itself. Zinc filings can be dissolved out with dilute sulphuric acid, and copper filings with dilute nitric acid. Any grease must be removed from the file first. This is best done with a dilute caustic alkali.

UNDER date of Sept. 23rd, a letter from Tampa, Florida, from a former Arizona subscriber, inclosing \$3 for renewal, says: "Uncle Sam's call for packers reached us in the mountains and ninety-five of us were hurried to Florida. Some of us are still here. I have lost fifteen pounds in weight; no longer a mine superintendent, just a member of 'pack train No. —'; nothing here but sand, heat and moisture."

In all mining countries where isolated veins are worked a large number of them have been abandoned and taken up again: abandoned because water, accidents, increased depth or barren streaks rendered their working burdensome, and, afterwards, taken up again, when they have, by the aid of capital, been proved to be productive mines. The same mines have been declared to be rich or exhausted for these reasons at different times. Exhausted, always when the owners were discouraged or "broke," and rich after further development had demonstrated their value.

CASES of poisoning by cyanide of potassium are not numerous. It is believed that a ready and effective antidote is furnished by peroxide of hydrogen (H_2O_2). A German paper states that it has been applied successfully to $\frac{2}{3}$ to 3 per cent solution in subcutaneous injections, which were performed every four minutes at different parts of the body. At the same time the stomach was also washed out with a 2 per cent H_2O_2 solution. The rationale of the process is that peroxide of hydrogen forms with hydrocyanic acid a substance known as oxamide, which is a harmless compound. The reaction is thus stated: $2HCN + H_2O_2 = 2CONH_2$, which is the formula of oxamide. Peroxide of hydrogen is not expensive, and it would be a wise precautionary measure if a supply were kept on hand at works where cyanide is employed.

WHERE copper matte is smelted by the reverberatory process the slags from the refining-furnaces, generally containing about 40 per cent of copper in the form of suboxide, are returned to the blister-furnace, there at once aiding in the production of metallic copper from the regulus or subsulphide of copper. To regain the copper from the slags of the blister and matte-smelting furnaces, these must be reduced in a cupola or blast-furnace with the aid of iron pyrites, whence will result a secondary matte, and a slag clean enough to be discarded. The following is an example of a smelting-mixture of such material:

| | Pounds. |
|--------------------------|---------|
| Coke..... | 350 |
| Matte-smelting slag..... | 2,500 |
| Blister-slag..... | 300 |
| Pyrites..... | 600 |
| Carbonate of lime..... | 400 |

THE annual meeting of the Comstock Tunnel Co. will be in New York City, Oct. 10th. Contracts with the Con. Cal. & Va., Best & Belcher, Gould & Curry, Savage, Hale & Norcross, Chollar and Potosi Companies give the Tunnel Co. a royalty of 4% upon the coin value of the bullion contained in all ore found upon the Brunswick lode and an additional payment of \$3600 in cash out of the first ore taken from the 650 feet of ground which had been in controversy. The Tunnel Co. also receives 40 cents per ton for transporting ore and waste rock to the mouth of the tunnel. Past due royalties in dispute amounting to \$579,52, arising from ore previously taken from the Brunswick lode, have been paid. The company's announcement says: "The great problem of deep mining is now receiving much attention upon the Comstock lode and at San Francisco. The successful solution of these problems is of the utmost importance."

THE method of making leaded brass is as follows: The copper is melted in a plumbago crucible under a good layer of charcoal, and when hot enough to avoid chilling (no hotter) the spelter is added and then the lead. The mixture is next stirred thoroughly with an iron stirrer, and, if necessary, allowed to get hot enough before pouring to run without forming cold shuts, otherwise a "spilly" bar will result. The determination of this temperature is the most difficult problem of brass-casting, and is the most important point in the operation, for if the metal is allowed to get too hot it will either crack in rolling or become "speuy," that is, full of blow-holes; or often both these faults will be present. On the other hand, if poured too cold the divided metal falling to the bottom of the bar will unite and the metal will become "spilly," that is, covered with splinters or scales when the metal is rolled or drawn, due to the ununited metal being extended. The determination of this temperature is made by the eye, and no other satisfactory method for obtaining it is known.

PRESENT discussion regarding correctness of assaying brings into prominence the sometimes forgotten fact that a good assayer is often charged with failure because his customer is ignorant of the first principles of sampling ore. Sometimes a piece of rock is broken in two, the halves sent to different assayers, widely varying results are obtained, and one of the operators is charged with error, when in fact both are correct, and the results are chargeable to the fact that the metal was unevenly disseminated through the sample. It is well to remember that like results can only be reasonably expected when the sample is finely crushed, thoroughly mixed and carefully divided. The careful miner will treat his sample in this way, grinding as fine as his circumstances will permit, mixing and dividing carefully, and in every case reserving a portion of the sample, so that a check assay can be made, if desired. As the best men are liable to an occasional mistake, no conservative miner will expend any large amount of labor or money upon the result of a single assay, but will base his future work upon the concurring results of two or more reliable assayers.

THERE have been a number of attempts to make a double-acting pump, retaining therewith the advantages of the Cornish. Its use would save space in the shaft, the pipes for a continuous discharge occupying less than one-fourth the area of a single discharge pipe and its rod. Cushier's system of pumps for deep mines consists in having sets of two pumps, each working in concert, one above the other, the suction and discharge pipes being common to both pumps. The pumps are placed at intervals of about 200 feet in the shaft, the power being transmitted directly through the center of the plungers.

The connection with each other and to the motive power is connected by means of a steel-wire cable, encased in wood, preventing it from external wear, as well as from rust. This cable is fastened to, and its length regulated by, shackles. The plunger of the lower pump, in a set, is double in area that of the upper one, so that in working on the upper stroke one-half the water raised fills the chamber of the upper pump, the other half being forced out through the discharge pipe on the down stroke; the upper pump plunger forces out, in its turn, the water in the chamber, thereby causing a continuous delivery.

THE relative merits of chlorination and cyanide in the treatment of gold ores are of constant interest. Each process has strong advocates; each has its peculiar advantages and disadvantages; neither is adapted to the treatment of all kinds of ore. The barrel chlorination plant is simple and of moderate cost; and for ores not containing large percentages of silver or copper, or not having a lime gangue, the process is almost ideal. The precipitated gold is clean, free from other metals, and requires little after-manipulation, regular yields of 92 to 94 per cent of the assay value of the ore treated being not unusual. The disadvantages are that the ore requires a thorough dead roasting before it can be treated economically, and that any silver contained in the ore is lost, or must be recovered by some subsequent treatment. The cyanide process can be worked with fairly successful results on some unroasted ores, and on some ores that are much more complex than those adapted to chlorination. The extraction of gold rarely reaches in actual practice over 85 per cent of the assay value, and, indeed, when worked on a large scale seldom exceeds 80 per cent, unless the ore is subjected to the same previous roasting as is necessary for chlorination. One objection to the cyanide process is the bulk of the precipitates and the necessity for special appliances for their after treatment. The use of zinc shavings as the precipitant requires that the zinc shall be distilled off before the gold can be melted and refined, and loss usually occurs in this after treatment.

RETURNING Klondikers claim that corruption and duplicity characterize the conduct of Canadian officials at Dawson. One man, who had heard of the difficulty of getting valuable properties recorded, and who took every precaution to observe the law, says he went to a new locality and found a good claim, which he properly staked out and left a man in charge, while he went to Dawson to record it. In relating his experience, he said: "I stood in line before the Gold Commissioner's office from 9 o'clock in the morning until late in the afternoon, when my turn came. I answered the usual questions about where the claim was, how much gold I had found and the prospects. The official hesitated, and then told me to call in a couple of days and he would attend to it. I went and I returned, and I was told that the claim had been recorded. I could have shot that man if I had been armed. I had not a cent in the world, and had gone there to see if I could not get enough to support my wife and babies. I had hardships that nearly prostrated me and then made a find only to be beaten out of it by one of the recorders, who used my application for a tip and had one of his friends take up the claim." Others say that a man cannot stake out a claim with any assurance of getting it recorded without he has a "stand-in" with the recorder's office, and even then he is obliged to be perpetually paying blackmail on penalty of losing all he has. One of the recorders, it is claimed, has gold dust to the value of \$90,000, and yet he draws only \$150 a month salary, and is not permitted under the laws to take up a claim. The speakers said there is no question that his \$90,000 is tribute levied upon his unfortunate victims. "You cannot even get your mail from the postoffice in less than two or three days," they said, "unless you pay a mounted policeman \$1, when you will have it in fifteen minutes."

A PONY, Montana, subscriber writes that at a rock-drilling contest there July 4th, Moore & Beebler of Red Bluff, Montana, drilled 32 inches in fifteen minutes; "the rock drilled was the hardest granite, and broke drills for every team but the winners. Fifteen drills were allowed, $\frac{1}{2}$ steel, 8 lb. hammers." He also states that in fifteen minutes "Williams & Lusher of Pony drilled 27 $\frac{1}{2}$ inches; Sincos & Bonham of Pony, 27 inches; Crampton & Conley of Pony, 26 $\frac{1}{2}$ inches; Duncan & Johnson of Pony, 24 $\frac{1}{2}$ inches; McKinnon & Pellete of Sterling, 23 $\frac{1}{2}$ inches." The Pony man asks for details of former similar contests elsewhere: On Feb. 22, 1898, at the Golden Jubilee Mining Fair, San Francisco, the MINING AND SCIENTIFIC PRESS gave a championship gold medal. The contest of three-handed teams, fifteen minutes' continuous work, each team allowed sixteen drills, was won by Page, Kitto and Dingle of the Gerry-mander mine, Tuolumne Co., Cal., 41 $\frac{1}{2}$ inches; the brothers Feeney and Larkin of the Omaha mine, Nevada Co., Cal., second, 36 $\frac{1}{2}$ inches. P. and J. Feeney of the Omaha mine, Nevada Co., Cal., won the two-handed contest, 26 $\frac{1}{2}$ inches; Kitto & Page of the Gerry-mander mine, Tuolumne Co., second, 26 9-16 inches. In the single-hand contest, J. J. Coan of Nevada City won first prize, 18 inches; T. L. Coffey, Nevada City, second, 17 3-16 inches. Subsequently, in a record-breaking, triple-handed drilling, Page, Kitto and Dingle drilled a hole through 43 11-16 inches hard-grain California granite in fifteen minutes, breaking the former world's record of 42 inches. The first similar rock-drilling contest on the Pacific coast was held at the Midwinter Fair, in San Francisco, May 21, 1894. At the Denver contest the previous year the world's best record was made by D. L. Jones, who, single-handed, sank a hole 18 11-16 inches deep in fifteen minutes. Page and Riggin of Butte, Montana, drilled a hole 29 15-16 inches in that time. Hearn and Rinker of Denver, Colo., beat that time in '93, but not officially, they having drilled a hole 31 $\frac{1}{2}$ inches in fifteen minutes. At the Midwinter Fair contest, E. F. Durham of Grass Valley, Cal., took the first prize and the world's championship, drilling a hole 19 31-32 inches, single-handed, in fifteen minutes, through Rocklin granite. T. J. Ahearn of Grass Valley, Cal., drilled 19 9-16 inches. In the double-team contest, Kitto and Harvey of Amador Co., Cal., put a hole down 30 21-32 inches, winning first prize. Feeney and Lynch of Grass Valley drilled 27 5-32 inches, taking second prize. In the three-handed contest, Dingle, Kitto and Harvey of Amador Co. put a hole clear through the 40 inches of Rocklin granite and had about 2 inches in on a second hole when their fifteen minutes was up, they winning first prize. The Feeney brothers and Lynch of Grass Valley, Cal., drilled almost through the 40 inches of granite in the quarter of an hour, taking second prize. In the San Francisco contests of '94 and of Feb., '93, the single-handed drillers used $\frac{1}{4}$ -steel and 4-pound hammers; double and triple teams, $\frac{1}{2}$ -steel and 8-pound hammers.

The Output of Gold From the Klondike.

TO THE EDITOR:—On my arrival at St. Michael, Alaska, Aug. 29, 1897, a representative of one of the established commercial houses there said: "I know of \$1,200,000 worth of 'dust' having been taken out, and what more than that I cannot vouch for." After having been in Dawson a little while, I found that there was about \$400,000 deposited in each of the two companies' safes, viz: Alaska Commercial Co. and North American Transportation & Trading Co., and I calculate the amount in actual circulation very small. This was last October (1897). There were only two stores in town, viz: those owned by the two commercial companies, which were rival concerns, and each covered a block of ground with their stores and warehouses. The remainder of the business part of town was occupied by saloons and dance-houses. Neither of the stores had anything to sell, and what the saloons had to sell there were very few buyers for. Those who had money had it with one or the other of the commercial companies, and were looking for a chance to buy anything in the eating line, and pay any price that was asked for it. Our steamer, the *Bella*, was the last to arrive, and all her provisions, excepting 700 gunnies of flour, a few potatoes in tins and a little bacon, the property of the Alaska Commercial Company, to whom the steamer belonged, had been taken out of our hold by an armed mob at Circle City. Then the crowd on shore, realizing that their last hope for relief had arrived—that the river was rapidly closing, that they would be ice-bound for the next eight or nine months with absolutely no spare food for anyone—became downhearted and desperate. Many who came down the river to Dawson and were fortunate enough to arrive with a year's outfit (having had a pretty rough experience on the way), were anxious to sell what they had, only retaining for their individual selves sufficient quantity of food to last a month or so, until the river was frozen over, so they could return again to Dyea over the ice. They saw an opportunity to sell to advantage, and realized from \$1 to \$2 per pound for any kind of food they cared to dispose of, flour preferred. Such people never even went out of Dawson City, and had no desire to spend what little profit their venture had brought them by paying 50 cents per drink, and took their dust with them over the ice to civilization, so as to have a stake on arriving there. These people never went near the mines and know nothing at all about them. I never saw a mining camp with so little money in circulation as at Dawson upon my arrival there, the beginning of last October. After interviewing several owners, who should know, and ascertaining to the best of my ability the amount produced by them, I do not think the product of the Klondike for 1897 was more than \$2,000,000.

During last winter, after the trail had been broken, from 800 to 1000 men went out of Dawson over the ice. They went every kind of way—in small groups and in large parties—some very scantily provided for the trip and others in good shape; some with money that they had procured by selling their outfits, and the majority with just enough grub to take them to tide water. From these the discouraging reports on the mineral wealth of the Klondike were obtained.

At Dawson, and mining in the surrounding country, I judge were not more than 2500 men. I don't believe the entire population last December from Stewart river to Seventy Mile, in the Yukon mining district, would exceed 5000, counting Indians and all. Of the 2500 men mining, I am sure not 1500 were working on paying gravel, and that number did not average five months' work to the man. I am speaking of actual workers. Of the 1500, I place 1000 as engaged on El Dorado and Bonanza creeks, and 500 elsewhere. I calculate that \$7,000,000 to \$8,000,000 was extracted, five-sixths of this from the two creeks mentioned, in the following rates, two-thirds from El Dorado and one-sixth from Bonanza. Bonanza creek below discovery was a great disappointment, but some claims above discovery were a surprise. Whilst this pay gravel was being extracted from developed mines on El Dorado, Bonanza, Hunker and Bear creeks, and a claim or two on Sulphur and Dominion, the balance of the 2500 men were doing "representing work" on undeveloped claims (as the Canadian law demands continuous work for three months during each year in the Yukon mining district, on each claim, under penalty of forfeiture), with flattering results as far as Dominion, Sulphur and Bear creeks were concerned. As claim after claim would be developed and pay gravel struck, the news would come to Dawson: So and So, on such a claim, struck so much to the pan on bedrock. Sometimes grand results would be reported—four ounces to the pan on some El Dorado claim, or So and So took out \$160 to the pan on bedrock. With such reports the value of the prospective year's output would increase a few millions and be reported to the outside world by some promoter who left Dawson during last winter and came out over the ice with claims for sale. This is how the output of the Klondike has been unneces-

sarily exaggerated. I think eight millions will more than cover the gold output for 1898. Nearly twenty tons of gold dust, extracted by 1500 men in less than five months to the man, is not at all bad, and more creditable to the actual workers when all the uncomfortable conditions under which they work and exist are known and understood. An average yield of over \$1000 to the man per month gold produced for actual labor is pretty hard to equal in any other part of the world at the present time.

The principal creeks being worked and developed at the present time head from the divide between the Klondike and Indian rivers. This divide consists of a series of peaks, or domes, as they are locally termed. The highest of these rises to an elevation of 3400 feet above sea level. This divide starts at the head of Bonanza creek and extends southeasterly for twelve miles to the head of Dominion creek. Emptying into the Klondike river are Bonanza (El Dorado is the right-hand fork of Bonanza), Bear creek, Hunker creek (Gold-bottom is the right-hand fork of Hunker creek), All Gold and Too Much Gold creeks. Emptying into Indian river are Dominion (which is really the left-hand fork of Indian river), Sulphur and Quartz. The last-named is the largest of all the creeks and has many tributaries (locally called "pups") but has been the least prospected of any. Last winter's work, in addition to the gold yield obtained, thoroughly demonstrated the existence of valuable pay channels on Dominion, Sulphur and Bear creeks, and determined that Dawson would be a gold-producing center for many years. The faith of the "old timers" in the Yukon is re-

ritory and Alaska to the Bering sea. The Yukon river runs through it a distance of 2500 miles. Gold has been found on the Klondike, Sixty Mile, Forty Mile, American creek, Birch creek (Circle City diggings), and Manook creek, where \$150,000 was extracted last year (and which is 500 miles northwest from Circle City), and will undoubtedly continue to be found in other creeks for all time, as there is nothing that will develop a country quicker than a gold excitement. Thousands will go there and make failures; hundreds will be successful. But millions and millions of dollars will be produced and be brought forth for the benefit of mankind. The valley of the great Yukon traverses an empire, the gold production of which in time to come will support hundreds of thousands. ALF. TREGIDGO.

Mining at High Altitudes in San Juan Co., Colorado.

TO THE EDITOR:—As a general proposition the ores of San Juan county are sulphides of lead, iron and copper, carrying gold and silver. In the product, as between gold and silver, the greater values are in gold. About 80 per cent of the values are shipped in the form of concentrates. These concentrates run about 35 per cent lead. The bulk of the ores mined in San Juan county are estimated to run between \$10 and \$30 per ton in value. In earlier years many richer leads were found and worked out, so that



IOWA MINE AND MILL, SILVER LAKE BASIN, SAN JUAN CO., COLORADO.

markable. Those who have worked for years under adverse conditions and have succeeded in "striking it rich," and many of whom could leave the frozen North forever and have enough to keep them in affluence for the remainder of their lives, are the largest buyers of "outside" claims as soon as they shall have been proven to contain gold, and for which they invariably pay the price asked; and I believe those who own the best claims would sooner stay by them and work them out than sell for a fair price. Hence, nearly all the best claims that were developed during last winter were purchased by the "lucky ones," who were working paying properties on El Dorado and Bonanza creeks. There were very few mining men in Dawson who were looking for claims to work last winter; claims were developed by men who never saw a mine before, but who had the good fortune to arrive with a year's outfit and the stamina to go to work and develop a claim for an interest. Some of these made fortunes, and others lost their year's work. Developing a claim on the Klondike is not an easy job, and the majority of men, having such an experience to get to Dawson, and finding the conditions there so different to their expectations, get downhearted and disgusted, and are only too ready to sell out what they have and return again to civilization.

It requires a man with good health and a great deal of determination to make a success on the Yukon—one who must make up his mind to rough it, and not be afraid of hard work. The majority of those who go there want something easy, and would rather have some inducement to get the dust from the miner than to be himself a pioneer. Working on the outside for half the year, ten hours a day and the thermometer ranging from 15° to 50° below zero, is easier to talk about than to experience.

There is a great mineral belt traversing from southeast to northwest through the Northwest Ter-

mining in San Juan county now resolves itself to the problem of producing and concentrating a heavy tonnage of low-grade ores at minimum cost. The most extensive producers in the county are putting in such equipment as will enable them to meet these requirements. Several properties near here are now treating ores which run as low as \$8 per ton. Worked on a larger scale, at relatively lower cost, they could treat ores of a grade still lower, and it is possible that as depth is attained the values may not increase. That ores of moderate grade exist in extensive ledges throughout this rugged, mountainous region no one questions. It is a place for the individual or company with large capital to operate on low-grade ores, wherein a small profit per ton on a great tonnage is desired, rather than rich streaks of doubtful continuity.

The difficulties, however, attending the development and operation of a big property in this section are not to be overlooked. The season of pleasant weather is short. In winter the snows are deep, and the mountain sides being steep, the snowslide is a constant source of danger. The mines, as a rule, are near the mountain crests, at high altitudes. For example, the Silver Lake, Iowa and Royal Tiger—all in Silver Lake basin—are 12,300 feet above sea level; the North Star, on King Solomon mountain, is 13,800 feet; the Sunnyside, up Eureka gulch, is at an altitude of 12,800 feet, and the Gold King 12,000 feet. At such heights the effectiveness of labor is doubtless 25 per cent less than at some point below timber line. In winter it requires good heating facilities, which are sometimes very expensive. By reason of the fact that most of the mines are situated beyond the reach of wagon teams the ore must be brought down either on pack animals or by tramway. The Silver Lake has its large mill at the mine and the concentrates are sent by a tramway line

down to large ore bins at the railroad track, three miles distant and 3000 feet lower. The Iowa conveys its crude ore over its two miles of tramway to its mill, 2000 feet lower. The Royal Tiger sends its ores to the Iowa mill. The North Star has its own mill in the Animas valley and uses pack animals to move the ore. The Sunnyside has an 8800-foot tramway from the mine to the mill. The management of this property is erecting a 100-ton mill at Eureka, which will require one one-half miles of additional tramway. The Gold King, on Bonita mountain, drops its ore 1500 feet within a mile and a half by means of a tramway. This property has a 20-stamp mill in operation and ten additional stamps are being put in.

A few years ago, before these excellent wire rope tramways were put up, there was a general closing down of mines of San Juan county at the approach of winter, not to reopen till the groundhog saw his shadow and the Johnny-jump-up blossomed on the sunny side of the mountain the following May. It is different now. None of the mines above mentioned, with their modern equipment, will close down the coming winter. Every place where a workman is required is under cover. In the county generally there will be as many men employed the coming winter as have been the past summer. Several properties are preparing to increase their output.

The Sunnyside ores are a lead sulphide, with some streaks of quartz bearing free gold. In this respect they differ from those of many other mines. The great bodies of ore in this mine run from \$18 to \$25 per ton. The new mill will be equipped with crushers, rolls, amalgam plates and concentrators.

The Gold King ores are a sulphide of iron, with gold values preponderating. The present output is about forty tons per day, though this will be increased.

The Pride of the West, in Cunningham gulch, produces lead and silver. The ores are concentrated to 50 per cent lead and thirty-five ounces silver. Thirty tons per day are milled. This property started up this year after ten years' idleness.

The North Star, which has a record of producing over \$1,000,000 in high-grade silver-lead ore, has been worked twenty-two years. It is now in medium low-grade ore and employs thirty men. Its workings are extensive, the five main levels running clear through the mountain.

Recently new work in Maggie gulch has resulted in some very high-grade ore.

It is estimated the county is shipping about 700 tons of concentrates per day.

Around Ironton and Red Mountain, which in former years was the center of the greatest activity of the San Juan, there is almost a cessation of work. The idle mills and lifeless hoists testify to this. The richer ores were found in chimneys and in most cases these are worked out, though it is possible others will be found. The ores now available are as a rule very low grade, and exist in vast bodies. They are iron and copper sulphides and will hardly bear shipment with present producing facilities and with silver prices as they now stand. I do not wish to give the impression that the Red Mountain district is to be abandoned. The ores are there and the day will come when they will be mined on a large scale and

A Floating Machine Shop.

On page 184 of the issue of Aug. 20, '98, appeared a reference to the floating machine shop Vulcan, a repair ship used by the U. S. navy in the operations of the recent Spanish-American war in Cuban waters. Several requests for further data in connection with that vessel are herein complied with.

Private Atlantic American liners have long had small machine shops on board, but it was not until the early months of '98 that the idea of devoting one vessel to that purpose entirely was put in shape by U. S. naval officials. While no one except the mechanical and steam engineering department of our navy seems to have given much thought to the ques-



U. S. N. MACHINE SHOP SHIP VULCAN.

tion of repairing the machinery of our ships on the water, there was no good reason to doubt the success of such an innovation. The idea was a common-sense one, for our warships are now huge ma-

vessel. The master machinists even claim that, should occasion demand it, they could turn out rapid-fire guns.

The machine shop includes plate-bending rolls, punching and shearing machines capable of working on steel an inch thick; also lathes, planers, drills and milling machines, blowers for forge and ventilating purposes, pipe cutters, forges, grindstones, and, indeed, every kind of a machine that would possibly be needed that is capable of operation on board ship. The vessel contains, besides the workshops which are located on the third deck, a large stock room, blacksmith shop, foundry and machine shop, and two steam cranes with 10-foot arms, for transferring machinery from the disabled vessel to the repair ship.

In the workshop there are five lathes of various sizes from 15-foot bed and 9-inch centers down to 3½-foot bed and 6-inch centers; two drilling machines, planing, slotting, shaping and punching machines, and a circular-saw bench, a carpenter's bench, fitters' benches and an air furnace capable of melting down two hundred weight of scrap steel in two hours. In the blacksmith shop, on the upper deck, is a powerful hydraulic forging press, a large forge fitted with blower and steam blast, a coppersmith's forge and pipe-bending machine, together with a complete set of tools.

Besides the machine tools she carries a very large and fine lot of stores and supplies—almost as complete as will be found in a navy yard. This includes steel and bronze rods for torpedo boats—in fact, a whole supply store.

The Vulcan made many repairs to our vessels and has proved a valuable assistant in the wrecking operations on the Spanish cruisers. For supplying fresh water to the various vessels she is equipped with evaporators and distillers having a capacity of 10,000 gallons a day.

The nature of the vessel necessitates its presence with the fleet in every engagement, and though it is intended for her to follow in the wake of the battleships, yet it is quite necessary that the vessel should be equipped for both offensive and defensive work.

Several nations have repair and store ships attached to their fleets, but they are more for the repair of torpedo boats and cannot be called machine shops. The name of the repair ship of the British navy is the Vulcan; of the French, the Foudre; of the Austrian, the Pelican.

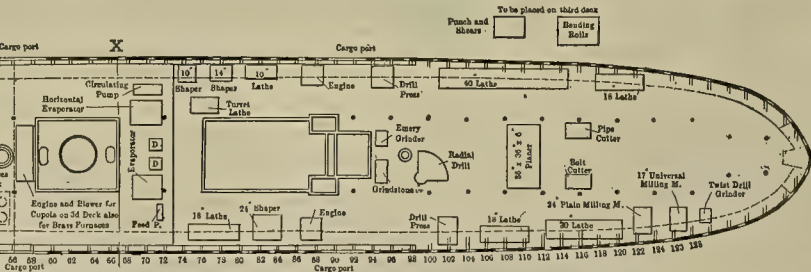
The illustration herewith of the side elevation and general plan are from drawings furnished by Commodore Geo. W. Melville, Chief of the Bureau of Steam Engineering, U. S. N. So valuable have been the services of the Vulcan that the Navy Department has decided to build a duplicate ship, to be ready for a future emergency. Now that in addition to the squadron in the Philippines under the command of Admiral Dewey comes the present transit there of the battleship Oregon and the Iowa, it would be in order for the U. S. Government to have a repair ship similar to the Vulcan equipped and sent to Manila.

During the past week the Vulcan has aided in raising the Spanish cruiser Maria Teresa, sunk by American guns off Santiago July 3, and now floated by her recent antagonists.

Lead Production in the United States.

Washington, D. C., reports that the total production of lead in the United States from all sources during the first six months of 1898 was 156,113 net tons, as compared with 239,558 tons during the entire year 1897, and 264,994 tons in 1896. This includes soft lead, hard lead and metal obtained by smelting foreign base bullion and ores in bond. During the first half of 1898 there were exported 31,439 tons of lead from foreign base bullion refined in bond, and 7308 short tons of lead from foreign ores smelted in bond. Reports from nearly all the important producers show a decline in stocks from 17,608 tons on January 1st to 16,760 tons on July 1st. The estimate for consumption for the first half of 1898 is 118,767 short tons. The figures presented indicate an increased production in this country, balanced fully by a notable growth in the consumption, which is at the rate of 237,000 tons per annum.

chines, made almost entirely in machine shops of various kinds, and requiring the facilities of a machine shop remarkably well equipped to keep them in repair. So many apparently trivial things may



PLAN SHOWING ARRANGEMENT OF THE PRINCIPAL TOOLS OF THE VULCAN.

a fair profit. The pyritic matte smelter at Silver-ton, with a capacity of 150 tons per day, whose main dependence for copper and iron ores was from Red Mountain mines, has not operated this year. Apparently the supply of this class of ore was insufficient for a plant of this capacity. Formerly the smelter owners operated the Yankee Girl on Red mountain, which furnished the principal supply of ore; but this mine is said to have been worked down to the water level, and it must be drained before producing further.

In no other part of the State are veins of ore so readily found as in the San Juan region. The mountain peaks and ranges are lofty and the slide and wash therefrom leave the well-defined fissures exposed. As a rule, the workings are not deep, but great depth can be gained without sinking below the level of the Animas river.

On the Silver Lake, Iowa and Royal Tiger, in Silver Lake basin, there are not less than 500 men employed.

One cannot help being impressed with the vastness of this mineral region and its possibilities. It is being gradually but surely conquered. Silver-ton, Colo., Sept. 12th, '98. WASCOTT.

happen to the machinery that will render a ship of little fighting account without repairs which cannot be done on board, that it is readily seen how absolutely necessary some shop, easy of access, is to a fleet. The only way to secure this under all circumstances is to float it and send it with the fleet. A machine tool will work about as well on ship board as on land, if properly secured, and a method of power transmission adopted that is reliable.

The repair ship Vulcan, shown in the accompanying illustration, was formerly the property of the Merchants' and Miners' Transportation Co. of Baltimore, and was known as the steamship Chatham. The vessel is 285 feet long, 40 feet beam, 25 feet 4 inches in depth, and weighs 1900 net tons, or 2729 gross tons. The vessel is of iron, with five watertight compartments, and has a compound engine with cylinders 40x72 inches and 48 inches stroke. For the variety and excellence of her tools, it is claimed that the vessel can only be surpassed by the larger navy yards, while her equipment is superior to that of the shops found in small ports. The tools and machinery alone represent an outlay of over \$300,000, and are said to weigh something over 100 tons. Nothing is lacking for repairing any part of a

Kryolith—Its Mining, Preparation and Utilization.

The mineral kryolith is the double fluoride of sodium and aluminum, $6\text{NaF}, \text{Al}_2\text{F}_6$: sodium, 32.86 per cent; aluminum, 12.86 per cent; fluorine, 54.28 per cent; sometimes carrying sesquioxide of iron as an impurity. It crystallizes after the monoclinic system—occurs both in the crystalline and massive forms, usually in the latter. It is snow-white to smoky-dark in appearance; cleaves in three directions, showing rectangular cleavages; is brittle, with an uneven fracture; is translucent, and has a vitreous to greasy luster. It has a specific gravity of from 2.95 to 3.0, and a hardness of 2.5. It is fusible in the flame of a candle, its melting point being between 900° and 1000° Celsius. It is soluble in sulphuric acid with the evolution of hydrofluoric acid. Its solubility is one part in 2730 at 12°C .

The deposit of kryolith discovered by Giesecke, at Ivigtut, southwest Greenland, is the only one of commercial importance known at present, and no indications of its existence at any other locality in Greenland have been discovered. Comparatively small quantities have, however, been found at Miask, in the Ural mountains, between Russia and Siberia, separated from the civilized world by 1000 miles of desert; also at the northeast base of St. Peter's dome, in the Pike's Peak region of Colorado, and lately it has been reported from the Yellowstone National Park, Wyoming.

Kryolith was at one time the chief source of aluminum, remaining so until superseded by bauxite. It is still used in the production of this metal, but not as a source of supply. Aluminum was first obtained from kryolith in 1855, by Allan Dick, who fused the mineral with alternate layers of small pieces of sodium, in a magnesia-lined crucible.

The principal use for kryolith is found in the manufacture of soda and the by-products resulting therefrom. From no other known substance can soda be obtained with equal cheapness and abundance; and it is the only natural product, excepting salt, from which this commodity can be procured in quantities sufficient to supply the demands of commerce. The process by which soda is obtained from kryolith was devised by Prof. Thomsen, of Copenhagen, in 1850. Ivigtut (an Eskimo word, meaning "a meadow") is in latitude $61^\circ 10'$ north, longitude $48^\circ 10'$ west, being a spot of land on the Arksuk Fiord, twenty miles from the coast line of southwest Greenland—a remote and gloomy region of the globe, inaccessible during the greater portion of the year, and barren of all commercial products, save kryolith.

The inhabitants of Ivigtut are solely the officers and men who operate the mines, all of whom are from Copenhagen. With but one or two exceptions, there are no women at Ivigtut. The food is almost exclusively supplied from Copenhagen, and consists chiefly of rye bread and salt meat, with fresh meat once a week. The nearest Eskimo settlement to Ivigtut is at Isua, eight and one-half miles distant. As though with a view to insure the speedy discovery of this unique and most remarkable mineral occurrence, nature signally marked the spot with a giant monolith of spotless kryolith, which, carved through countless ages by glacial action, stood, a towering monument upon the buried treasure beneath. It further revealed itself by a series of graceful undulations separated by green sward. Its resemblance to snow was, indeed, so great, that one can readily appreciate the Eskimo belief that it was such, though of a special kind that would not melt.

Remote from civilization as is the location of this isolated deposit, at no other point, in Greenland, at least, could it have been more accessible for removal, no portion of the mineral being at a greater distance than 150 feet from low-water line, and its general elevation not exceeding 10 feet from high water. Its greatest length extends in a direction parallel to the sea in a line running northeast and southwest, covering a distance of about 400 feet, 100 feet of which is washed by the sea. That portion nearest, and facing the sea, descends perpendicularly to an unknown depth; that farthest from the water sinks at an angle of about 45° from the sea.

The deposit of kryolith, at Ivigtut, is owned by the Danish Government. The mining of the mineral is conducted exclusively by a Copenhagen company, by virtue of a lease held by them from the Government. By the terms of this lease, the value of every fifth cubic fathom of kryolith, mined and shipped from Greenland, falls to the Danish Treasury of State, whether the cargo be lost on voyage from Greenland or not. These kryolith mines were opened by Daniel Schmidt, in the year 1858. The first cargo of commercial note was shipped from Ivigtut to Copenhagen, in 1857, on board the bark Christian; the first shipment to the United States was made in 1864, consigned to Philadelphia. In January, 1865, a contract was completed with Handels Selskabet, of Copenhagen (operators of the mines at Ivigtut), by which the Pennsylvania Salt Manufacturing Company, of Philadelphia, became possessed of the exclusive privilege to import the mineral, from this deposit, into the continents of North and South America.

That portion of the mine, which may more properly

be termed the quarry, at present measures about 300 feet in length, 150 feet in width and 120 feet in depth. Three holes have been sunk still deeper into the mass, for the purpose of investigation. The deepest of these is now about 120 feet below the bottom level of the quarry, but even at this depth there are no indications that the lower boundary of the mineral has been approached.

During the summer season, which lasts about April to November, about 140 men are employed in quarrying, mining, sorting and piling the kryolith. The drilling is done by hand, no steam drills being used, and the mineral is dislodged by blasting. It is carefully sorted into two grades, Nos. 1 and 2, of about 99 per cent and 92 per cent, respectively, which are taken to the top of the mine in two-ton cars, running on an incline railway operated by steam. The kryolith is carefully and accurately formed into piles of exactly 100 feet long, 20 feet wide and 4 feet high, containing 8000 cubic feet, or about 37 cubic fathoms. The cubic fathom constitutes the unit used in estimating the quantity shipped, the more general practice of weighing not being adopted at Ivigtut. The weight of a cubic fathom of kryolith is 13.6 tons of 2240 pounds. The greatest quantity of kryolith taken from the mines, in any one season, was that removed during the season of '97. It amounted to 13,000 tons, of which 10,500 tons were received at Philadelphia. The best grade goes to Copenhagen; the second quality to Philadelphia. The waste, including everything taken from the mines except the kryolith, is dumped into the sea, after a regular system, for the purpose of building wharves, and securing more reachable anchorage. This is desirable, owing to the remarkably precipitous character of the coast. Just before winter sets in, a sluice is opened, and the mines are flooded with sea water. The object in this is to prevent them from becoming inoperative through an accumulation

and a solution containing the soda salts. The insoluble fluoride of calcium is purified by washing and is ready for the market. The solution containing the soda salts is conveyed to agitators and agitated in contact with carbonic acid gas. During this operation the soda becomes united with the carbonic acid, to form sodium carbonate, still, however, remaining in solution. The alumina separates out as aluminum hydroxide, which, upon being purified by washing, is either converted into alum, or sold as alumina.

The solution containing the carbonate of soda is concentrated to about 36° Beaume, and the salt allowed to crystallize out, thus finally becoming the sal soda of commerce.

If it be desired to make the bicarbonate, this last product is exposed to an atmosphere of carbonic acid gas, of which it absorbs another equivalent, and yields its water of crystallization.

In the manufacture of aluminum, kryolith is used in the fused bath as a solvent, into which is introduced pure alumina, to the extent of about 21 per cent of the weight of the kryolith (this being a much greater amount than it has been found possible to introduce in any other available substance). By electrolysis, the alumina is decomposed into its component parts, the oxygen uniting with the carbon, furnished by the highly-heated carbon electrodes, to form carbon monoxide, which escapes and burns at the surface of the bath to form carbonic acid gas, the aluminum being deposited at the bottom of the furnace.

Modern Round-House Turntable.

Economics of railway management do not end with the adoption of the high-pressure compound locomotive, or the other contrivances born of necessity, but go on finding a way to eliminate all unnecessary expenditure. The latest economic development is the



THE MODERN ROUND-HOUSE TURNTABLE OPERATED ELECTRICALLY.

of ice and snow, which the whole of the summer's heat would not suffice to melt. The force of men is then cut down to about seventy, whose efforts are chiefly confined to the quarrying of such of the kryolith as can be reached, allowing it to accumulate for removal the following summer. Rails have been laid during the winter upon the ice in the quarry, and the whole operation carried on the same as in summer, except upon a much reduced scale. This, however, has not been found to be thoroughly practicable. As soon as the general thaw takes place, steam pumps are put to work, the mines drained of water (an operation requiring about three weeks to perform), and work is again resumed in earnest.

The vessels employed in the kryolith trade are staunch seacraft, built expressly for the purpose. The Philadelphia fleet musters eight barks, having an average burden of 800 tons; while three small vessels, with an average of 300 tons burden, comprise the Copenhagen fleet. These make two trips to the mines a year, arriving at Ivigtut, on the first trip, about April 10th, and again, on their second one, July 10th. Owing to the lack of reciprocity, these vessels usually make their outward voyages in ballast.

In producing soda from kryolith, Thomsen's method is still employed. The process briefly is as follows:

The previously dried and pulverized kryolith is intimately mixed with an equal weight of powdered limestone, and the mixture calcined at an incipient red heat, during which there is formed calcium fluoride, aluminate of soda, carbonate of soda and sodium hydrate. The calcined residue, known as "kryolith ash," is then subjected to careful leaching, yielding an insoluble residue of calcium fluoride

adaptation of the electric motor to turntables. The device and the method of operating it is illustrated herewith.

It is the product of the Westinghouse Company, and consists of a reversible 10 H. P. motor, mounted in a cast iron frame, with a traction wheel resting upon the rail of the turntable pit. Power is transmitted to this wheel through double reduction gears. The donkey frame is connected by draw-bar and pin to one end of the turntable at the side, sufficient traction for the driving wheel being secured through the weight of the machine, which is 3700 pounds. Wires are run from the donkey to a small platform, on which is a controlling rheostat. By means of this the donkey may be operated in either direction by moving a single lever to one or the other side of a neutral point. Current is supplied by wires brought to a suitable contact overhead and then led to the controller.

In one of the installations, located at an important division point, it was necessary to turn 176 engines each twenty-four hours, or about seven per hour. Previous to installing this donkey, push poles were used, requiring the services of four men, and the operation was a slow one at best. Now, one man does the work in a much shorter time. With the turntable light, the donkey will make a complete revolution in thirty seconds; with a 10-wheel locomotive on the table, weighing, with tender, 100 tons, a complete revolution is made in forty-five seconds.

It is stated that actual tests have shown that the power consumed by the electric donkey is the equivalent of one-half H. P. per hour. Assuming six pounds of coal per H. P., with coal at \$2 per ton, the cost of turning each locomotive would be three-tenths of a cent, or 53 cents for 176 locomotives.

Coast Industrial Notes.

—Sell a man what he wants; if you try to convert him, he will buy elsewhere.

—Coalinga, Cal., announces a new oil well, the flow of which is 700 barrels per day.

—September rains have revived the hopes of the California miners and agriculturists.

—It is again asserted that the Union Pacific and Oregon Short Line will consolidate.

—Grass Valley, Nevada Co., Cal., figures on putting in a \$37,000 sewer system. It needs it.

—The Great Northern Express Co. has taken hold of the Oregon Railway & Navigation system.

—A Prineville, Or., firm has shipped 73,000 sheep to Chicago from Baker City, Or., valued at \$150,000.

—It is locally figured that 17,000,000 pounds Oregon and Washington wool remain over from last year's clip.

—The Union Iron Works of San Francisco has a further U. S. government contract for three torpedo destroyers.

—A new submarine telephone and telegraph cable, 4000 feet in length, has been laid across San Diego bay, Cal., at a cost of \$6500.

—The Secretary of the Navy recommends for new works in the navy yard at Mare Island, \$31,750, and for Puget Sound, \$55,500.

—The earnings of the Mexican Central railway system for the second week of September were \$208,652—an increase of \$9137 over the same time in '97.

—The Marysville, Cal., *Democrat* estimates the amount paid for hop picking this season at Wheatland, Cal., on a basis of 90 cents per 100 pounds, at \$53,181.20.

—Oregon's hop crop for 1898 is estimated to represent \$1,300,000, the yield being 60,000 bales, or 12,000,000 pounds. The prices quoted are from 8 to 12 cents.

—The southern California citrus fruit crop amounts to 15,000 carloads, of which 14,000 carloads were oranges and the remainder lemons, representing \$4,000,000.

—The United States government will build a coaling station at Mission Rock, in San Francisco bay, where battleships can safely coal and take on supplies.

—Puget sound lumbermen will build another sea-going raft of the same size as the two towed to San Francisco this summer and will contain 4500 M. feet lumber.

—The \$343,000 Los Angeles, Cal., 4% twenty and one-half-year average various bonds have been awarded E. D. Shepard & Co., New York, at 105.25, an income basis of 3.635%.

—Over 200 people are employed in the cranberry marsh at Ilwaco, Wash., picking. They are paid 50 cents per box of sixty pounds. It will take six weeks to harvest the crop.

—The gross earnings of the Mexican National railway for the second week in September are given at \$108,510.46—an increase of \$12,406.92 over the same period last year.

—Locomotive engines were imported to Yokohama in 1897 to the value of \$316,415. While the United States shared this trade with Great Britain, the latter had the larger proportion of it.

—Of the dynamo electric machinery imported to Yokohama in 1897 the United States supplied nearly seven-tenths of the total, Germany and Great Britain sharing about equally in the remainder.

—The Manufacturers' and Producers' Association of California has resolved that in its opinion the connection of the United States with the Philippines should be in such form as would protect our people and their industries.

—Compared with previous reports, California's prune crop shows a considerable shortage. The yield early in the season was estimated at 100,000,000 pounds, but now the estimate has been cut down to 60,000,000 pounds.

—The California & Oriental Steamship Co. will operate a line of steamers between San Diego and Hongkong, using three vessels from 4500 to 6500 tons and beginning December next. The Santa Fe road has a contract with them for shipping freight.

—Merchants of Canton, China, who do business with the United States, have protested to the United States Consul against the appointment of F. R. Williams as Vice-Consul on the ground that they do not wish to have all their invoices examined by a competitor in business.

—The Philippine National Assembly has decided to request the Americans to recognize the independence of the islands; to establish a protectorate over their internal affairs; to induce the powers to recognize their independence, and to appoint a joint commission to arrange details to "reciprocate the American's services."

—Dawson is to have electric lights this winter. A full plant, including five dynamos and apparatus for operating twenty arc and 3000 incandescent lamps, is being taken north on the steamer Dirigo. The outfit weighs thirty-five tons. There is a small outfit already at Dawson, which was expected to be operating 800 incandescent lamps by September 15th. The charge for the arc lamps will be \$14 a day and for the incandescents 50 cents.

—The Pacific Coast Co. (successor to the Oregon Improvement Co.) for the seven months ended June 30th shows gross earnings \$3,081,502, operating expenses and taxes \$2,395,145, net income from operation \$686,356. These results are attributed to the fact that the reorganization committee and the company have established close relations with the dominant transportation interests in the Northwest, and to the general revival of business in the territory tributary to Puget

sound. Alaska business has not been so vital in the matter as has been supposed.

—At Oregon City, Or., the falls of the Willamette furnish the power to run paper mills, woolen factory and the electric power company plant which furnishes all the electric power for Portland, fifteen miles distant. The woolen mills employ 300 men and women, the paper mills 400 men. The common laborer in the paper mills gets \$1.50 per day of ten hours and women in the woolen mills from 75 cents to \$1 per day. The work is very hard and nearly all the men are required to work seven days in the week.

—United States Consul Bedloe at Canton, China, says that the Russian method, if enforced in China, will injure our trade in oil, flour, piece goods, and other products we send to China, when once the Russians have completed their railway across Siberia and are in a position to supply the Chinese markets with products of their European factories. Counterfeiting, imitating and false labeling in China are not confined to unscrupulous people in the oil business; immense quantities of goods "made in Germany" and also from Belgium, and "Fairbanks" scales made in Osaka, Japan, are sent to China and palmed off as American products.

—The American syndicate which proposes to build a railroad from Hankow to Hongkong, China, is sending a corps of engineers and other officials, who will make the survey, beginning at Hankow and extending to the city of Canton and thence to Hongkong. There are in the syndicate seven representatives of the Vanderbilt interests and three of the Standard Oil Co., Levi P. Morton, Geo. T. Bliss and the officials of the Carnegie Steel Co. The cost of the road is estimated at from \$30,000,000 to \$40,000,000. The provinces through which the road will pass are the most populous in China, having a population of 300,000,000. Two of the provinces through which it passes have a population greater than that of the United States.

—On the most northerly railroad in the world, the Norton Bay & Yukon, all the preliminary work for road building is completed. Surveys have been run the entire distance from Gardner City on Norton sound to Blair, or Caltag, on the Yukon. Some of the problems that must be met between now and the time the ice goes out of Bering sea are difficult, but with plenty of money they will be solved. The engineers of the Norton Bay & Yukon Railway and Transportation Co. have completed the survey of the entire line from the starting point on the shore of Bering sea to the Yukon river terminus. The highest grade is $1\frac{1}{2}$ per cent and there will be no rock work. The proposition now is to send north 4000 Italians from San Francisco to work under contract for the season.

Personal.

A. J. BOWIE has returned to San Francisco from New York City.

E. BIND, managing owner Blue Gouge mine, Placerville, Cal., is in San Francisco.

S. LOOK, an extensive mine operator at Washington, Cal., is in San Francisco.

S. W. DORSEY of Denver, Colo., is examining mining properties in southern California.

EX-GOV. COLCORD of Nevada has been appointed Supt. of the Carson, Nev., mint.

D. J. McFALL, Supt. Home M. Co., Nevada City, Cal., has returned from San Francisco.

ALF. TREGIDGO has returned from a week's sojourn in Nevada county, Cal., to San Francisco.

J. F. KIDDER, California State Debris Commissioner, is in San Francisco from Grass Valley, Cal.

J. J. MARTIN, Supt. Seattle M. Co. property, Jacksonville, Or., has returned from Seattle, Wash.

EDW. B. NORTON, Sec'y and Treasurer Oakland Iron Works, is on a business trip through British Columbia.

E. W. ROBERTS, Oakland, Cal., is examining mining properties with a view to purchase near Grants Pass, Oregon.

J. KAENE of Redding, Cal., largely engaged in developing mining properties in Shasta county, is in San Francisco.

A. HARRISON THOMAS, B. Sc., has been appointed California agent for the Bennett Amalgamator Co. of Denver, Colo.

J. H. MEANS of the Cal. State Mining Bureau has returned from a reconnaissance of the Santa Barbara, Cal., bitumen deposits.

C. B. WINGATE, San Francisco, managing owner Chloride-Bailey mines, Dedrick, Cal., is at the mine and will remain several weeks.

CHAS. BUTTERS of San Francisco has been examining the Sunshine mine at Mercur, Utah. His experimental cyanide plant, erected at a cost of \$50,000, is about completed.

J. R. TREGLOAN, Supt. South Spring Hill mine, Amador City, Cal., has returned from San Francisco. Mr. Tregloan has received the Republican nomination in his district for State Assemblyman.

IRVING M. SCOTT has returned from an extended European tour, during which he visited several ship-building establishments. He found the great battleship Oregon had attracted universal interest, but believes that her remarkable record only indicates what can be done in that regard. The performance of the San Francisco built ships at Manila and Santiago has greatly increased European respect for the American navy.

COL. CHAS. R. SUTER, Corps of Engineers, U. S. A., who has been president of the California Debris Commission for the past two years, in conjunction with his duties as division engineer of the Pacific division, having been relieved from his present duties, to take effect October 15, 1898, will proceed to Boston,

Mass., and there relieve Col. Samuel L. Mansfield of the duties under his charge. Upon being thus relieved Col. Mansfield will proceed to San Francisco and assume the duties vacated by Col. Suter.

From Alaska, on the steamer Bertha, last Wednesday, came L. N. McQuesten, "the father of the Yukon." He is an old experienced miner, and was in the Frazer river rush forty years ago. He worked for the Alaska Commercial Co. nearly twenty-five years, and at the start of the "rush" of '97 was in business at Circle City. He got in on some good things in the Klondike, and is tolerably well fixed. He brought down his family this time, servants, dogs, etc., and a little matter of \$300,000 in gold and drafts. He says that he is not going back any more, and that California is good enough for him.

J. W. MACKAY has returned East via Winnipeg, where he became reminiscent and said: "A few years ago I was strolling with friends in Virginia City, Nevada. My friends were looking down a smoking cavity in the ground, whose bottom was soon lost in the darkness, at the mouth of which a windlass was slowly grinding. When I came up to them I said, casually, 'Out of that hole I took \$150,000,000 in bullion.' It was one of the famous bonanza mines, and was a 'kidney' or 'pocket' of crude ore about as high as the steeple of Trinity church, New York, and in area as large as the city hall park of your city. I do not know of any laws in mining the application of which would lead to the discovery of other bodies of ore like the one I mentioned. Nature had in a prodigal mood buried this 'kidney' in the Nevada, and perhaps she may not have been less niggardly in British Columbia. But there is no law in mining but the pick."

MR. WM. SCHAW of the firm of Schaw, Ingram, Batcher & Co. of Sacramento, Cal., has returned from England, where he went to bid on the steel pipe contract for the Coolgardie, Australia, water system, 323 miles in length. The bids were opened in London August 23rd, but up to the time of Mr. Schaw's leaving (September 8th) no decision had been arrived at. He found it quite impossible to get any positive information through the office of the agent general of Western Australia, or the office of the consulting engineer in charge of the work. He did, however, receive a hint, which is entirely unofficial, that the bids had been forwarded to Australia, and would probably be acted upon by the local officials there. The contract attracted the attention of the principal manufacturers in Europe and America, and in consequence a large number of bids were received. Mr. Schaw believes that at least a portion of the work will come to the United States.

DR. C. F. KRAFT has returned on the Excelsior from the Port Valdes country. He went north in April, '98, with four others, representing the Alaska Geological Society, visiting different sections along the coast from Port Valdes to points on Prince William sound. He is disgusted with the Copper river district, but staked out some claims on Algenic river, a tributary to Copper river. On the Copper color could be found on the surface, but after the hole is sunk lower the color disappears. He says: "I would not advise any one to go to Copper river. Around Valdes the prospects are good. The formation is a dark slate, and the color improves the deeper you go. On account of the tremendous flow of water from the glaciers now is the best time to prospect, as the ground is becoming frozen. Very few have prospected deeper than 3 feet, but this winter there will be a large amount of work done. I do not think there will be any need of people starving there, as there is any amount of abandoned outfits. For \$15 one can buy an outfit. Flour is only 85 cents a hundred. Bacon is a drug on the market."

R. L. DUNN, a California mining engineer, who has been investigating the Yukon country, has returned to San Francisco. He says: "The country as a whole, in my opinion, is over-estimated; that is to say, the districts that are gold-bearing are not as numerous as is popularly believed. The mere fact of the existence of traces of gold in the shape of colors of gold on the surface has been the foundation for the belief that good placers could be found almost anywhere. These surface color prospects, however, are simply the work of glaciers, and are found in the enormous masses of glacial drift, gravelly and rocky, that fill many of the valleys and the streams. There is no possibility of good placer ground in any of this glacial wash. Aside from that, the placers that are being worked and are being discovered are exactly like placers in other gold-bearing regions of the world. Some are very rich and others only moderately so. Klondike placers are not a fair basis for estimating that country. There is really nothing remarkable about this great gold yield. In Siberia at the present time there are placer localities that are making just as large yields as those in the Klondike. The early-day placers of California, Idaho and Montana were very much richer. The idea that the gold of the Klondike was brought there by glaciers is entirely wrong. It is just exactly as placer gold is everywhere, the concentration by flowing streams. I think the country is getting down to a business basis in mining. The enormous waste of the product in the cost of getting it out is being done away with. Wages are going down to reasonable figures, the cost of supplies and material is much less. I consider the Canadian laws restrict the development of the mines. No gold mining industry in the world can stand a permanent drain of 10 per cent of its gross product as a royalty charge. A few individual mines can for a short time, but the application of the royalty charge to every mine, regardless of its possible profit of operation, has simply the effect of limiting the number of mines. The conditions for successful mining, in my opinion, are very much better in American territory. The claims on the Canadian side are altogether too small, and

the fees and charges and regulations are too onerous. On the American side the law leaves the way open for the miners to modify the general laws by making local laws to suit the local conditions. As a field for investment, I regard the coast region of Alaska as one of the best in the world, very much superior to the interior in its opportunities for profit. The climate and transportation conditions are very favorable on the coast, and admit of all the year round operation of mines. Prospecting in this region I regard as only begun. There are immense bodies of low grade ore which only require systematic exploration to develop into large mines."

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

APPARATUS FOR MAKING GAS FROM OIL.—F. L. Martenette, Chico, Cal. No. 610,994. Dated Sept. 20, 1898. This invention is designed to generate gas from oil. It consists of a furnace, a heating coil contained therein, a chamber adapted to receive liquid to be vaporized, an air-forcing mechanism connecting with the chamber so as to exert a pressure therein to force the liquid from the chamber and through the coil, a pipe connecting the chamber with the coil and a delivery pipe jet nozzle, a second coil within the furnace directly above the first-named furnace conveying air and delivering it into the discharge pipe with the discharge from the first-named coil.

SWIMMING APPLIANCE.—Samuel Stone, Quilayute, Wash. No. 611,005. Dated Sept. 20, 1898. This invention relates to an apparatus which is especially designed as a life-jacket for persons who may be thrown into the sea, and in combination therewith of a means by which persons can propel themselves through the water. It consists of hinged sections, closable about the body, having an extension forward to which an arm is attached, with means for supporting a sail or awning, and a flexible rod extends rearwardly with a propeller carried upon the rear end, a means for operating the propeller so that the person can drive himself and the apparatus through the water at a considerable rate of speed.

FEATHERING PADDLE WHEEL.—Daniel Abbott, San Jose, Cal. No. 611,007. Dated Sept. 20, 1898. This invention relates to a means for turning or feathering the paddles of wheels which are designed to propel vessels through the water, so that the blades are retained in a vertical position while passing through the water and turned to the position of least resistance while passing through the air. The floats may also be so changed that while one wheel is operating to propel the floats of one wheel, the other may be turned to the position of least resistance in the water to assist in turning the vessel. The floats have central end pivots, about which they are turnable in rims, which are mounted upon the driving shaft, and bands extend around the wheel having lugs, which alternately engage slots upon the edges of the floats, the band traveling at a different rate of speed from that of the wheel so that the lug on the band and the slot in the lower edge of each blade are engaged to retain the blade in a vertical position while passing through the water, and disengaged after the blade leaves the water, the lug in front being engaged so that the blade lies flatwise while passing over the top of the wheel. By means of a reversing mechanism, the position of the parts may be so changed that the movement of the floats will be reversed from the top to the bottom of the wheel.

ROTARY SAND PUMP.—John Mann, Butte City, Cal. No. 610,992. Dated Sept. 20, 1898. This invention relates to an apparatus which is especially designed to raise sand, gravel, etc., where there is too much water to be handled otherwise. It comprises an irregularly-shaped oval casing, having a shaft extending through the sides with arms fixed to the shaft extending tangentially outward and having the outer ends bent at right angles, with hook-shaped ends. In combination with these are angular plates, one end of each of which engages one of the hook-shaped ends, the other ends being bent to form a segment, which travels in contact with the inner periphery of the rim of the casing. When the shaft is rotated these plates move and act as suction pistons to draw in the sand through the inlet and discharge it through the outlet passage of the casing.

RIFLE ATTACHMENT FOR SHOTGUNS.—H. A. Darms, Napa, Cal. No. 611,062. Dated Sept. 20, 1898. The object of this invention is to provide an insertible supplemental barrel, which may be placed inside of a shotgun barrel and receive ball cartridges, which are fired by the fire mechanism used by the shotgun, thus enabling the shotgun to be converted into a rifle at any time by simply inserting this barrel. This interior barrel is of less diameter and considerably shorter than the shot barrel. It has enlarged ends, which fit the interior of the outer barrel and the cartridge chamber of the same, and thus center the rifle barrel exactly within this interior barrel. A chamber is formed within this interior barrel for the reception of a rifle shell and ball and slides are arranged upon this barrel with lugs, which engage the rim of the shell and are themselves engaged by the extractor upon the shotgun, so that the rifle shell may be extracted after the discharge of the gun. By a connecting ring, turnable upon the outer exterior of the rifle barrel, these slides may be so locked that the shotgun extractor will act when desired to draw out the rifle barrel itself; the rifle barrel, being short, can be easily carried about when it is not needed and inserted whenever it is necessary for use.

Is Darwinism True?

W. S. PROSSER.

NUMBER VI.

The embryos of higher animals show "reminders" of lower, but with something added. The self-binding reaper has the sickle, wheels, etc., of the grass mower, but with several new inventions added. The most sensible way was to retain all parts of the mower that could be done; but only an inventor and a mechanic could add the new parts. The testimony of the embryo, then, is that an inventive intelligence used, for economy of effort, certain lower forms in creating higher, but adding new devices. It is plainly impossible that the old forms could add to themselves new things, subordinating and superseding themselves. Just as impossible as it would be for the scythe to invent and construct the mower, and then voluntarily retire and hang itself in the tree, as obsolete.

As one of the choicest proofs of common descent the human embryo is often cited: as going through stages corresponding to the distinctive steps of creation—invertebrate, fish, amphibian, reptile, mammal, human. This embryo has, at the fish stage, the vitelline circulation; at the bird and snake stage, the allantoic; at the mammalian stage, the placental. The world has been challenged to choose between accepting these facts as proofs of evolution by natural generation, or passing them as "unexplainable mysteries," as "special creations."

The three circulations afford clear disproof of evolution. How does the vitelline give way to the allantoic, and that to the placental? One does not change into the other, or assist in the formation of the other, in any way. Especially do the former two differ from the last one: they derive air and food from the surrounding fluid and from the yolk within: the placental does neither, but furnishes ready-made blood.

The gap is unbridgable. Not to clearly show how one device can perish utterly, while another, absolutely different in principle, in detail, and even in place, succeeds by "natural selection" and "survival of the fittest," is to commit the absurdity of explaining everything except the only thing that needed explanation. It would be childish to account for the origin of the mower by saying that "once upon a time" a farmer's scythe wore out, but at that exact moment a perfect (though hitherto undreamed of) machine just happened in another part of his field; and began to mow. To commemorate that happy event every farmer begins to cut his crop with a scythe, and breaks it at the exact day and hour that the first man did; and new mowers begin promptly to work. And just as the wheat got ripe, a new self-binding reaper just happened also. These might pass as fairy stories, but hardly explain the origin of the inventions. Yet if they are any more unreasonable than Darwin's supposed explanation, I would like to have it pointed out.

It is seriously claimed that the vitelline and allantoic devices are in mammalian embryos, because they were in the fish, etc., because they are indelible marks of something prior. If such a claim means anything it means they are so used because to drop them is impossible, which by the theory itself is absurd. If nature could change a butterfly into an elephant, it ought to be able to omit a few veins in an egg. If a woodsman has three axes, it would not require great genius to lay two of them aside, even if his father and grandfather did use all three.

The allantois absorbs the yolk and nourishes the young chick for a day or so (a wise plan because the eggs do not all hatch at the same hour), although the digestive organs are all ready for use. The atrophy of the allantois, when the yolk has been absorbed, is easily understood, as it could not act longer having no more yolk to act upon; but the origin, out of the allantois or out of anything else, of an entirely different and very complex set of organs, is not; and no amount of vague talk about "variation" or

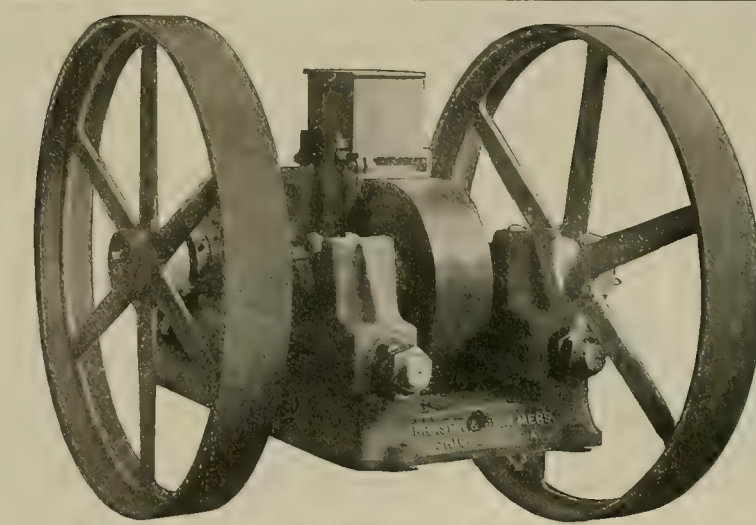
"natural selection" goes one hairs-breadth toward an explanation. There being in the beginning no heart, internal organs, lungs, etc., something had to be used to feed the germ (device A); afterwards other devices more complex (B and C). It seems very plain that A and B were used permanently in simple animal forms, and temporarily in simple embryonic stages for the same reason: the reason that runs through the whole animate creation: the reason why a mechanic does not use a complex machine if he finds a simple one to do the same work. The simpler needs less power, and is less liable to derangement.

The human embryo has at first a heart of one cavity, like the lancelet; then with two, as fish; then three—one auricle and two ventricles—while reptiles have one ventricle and two auricles, a difference small, but great enough to dispose of the idea of descent, and to indicate that the embryonic heart has one, two, and three chambers, just according to embryonic needs, and not that it had anything to do with some imaginary event ten million years ago.

(To be Continued.)

New Style Crushing Rolls.

On this page is an illustration of a new style of crushing rolls, made by Fraser & Chalmers of Chicago, in which the rolls are held to their work with a uniform crushing pressure by nests of springs that do not have to be disturbed for the removal of shells, rolls or shafts, their position being stable and unaffected by such changes. By



NEW STYLE CRUSHING ROLLS.

use of plates on the main bolts the rolls may be set apart positively to any convenient opening. The feed hopper is provided with inclined baffle plates, which distribute the material to be reduced, so as to furnish a more even feed. The cut shows the machine without the housing, which is indispensable for dry crushing, and is furnished when specifically ordered. The housing covers the rolls and prevents dust getting into the atmosphere or to the bearings. It is provided with plates and springs bearing against the inner sides of the frames, so that the housing has an elastic adjustment to conform with any movement of the roll bearings when these shift in their cylindrical seats, and thus remains dust tight in any case. The size illustrated, 30" diameter by 10" face, is of comparatively narrow proportions, which is considered favorable to evenness of feed, uniform wear and long service. These rolls run at the usual peripheral speed of 600 to 800 feet per minute.

THE Walker Electric M'fg. Co. has been absorbed by the Westinghouse Co. This leaves the field of electrical manufacture to the Westinghouse and General Electric companies, which have had a working agreement for a long time, and this transaction terminates a long series of litigation over patents.

Silver-Plated Copper Plates.

TO THE EDITOR:—In your issue of Sept. 10th "A '52 Miner" contributes a criticism on a "Concentrate" in the issue of Aug. 27th. While his remarks contain much useful information, he appears to have in mind only electro-silver-plated copper plates. Every mill man knows how difficult it is to keep those portions of such plates which have been denuded of silver free from the greenish film, or oxide of copper. It is more difficult than when the plate has never been electro-plated. While it is probably largely due to the causes set forth by "52," yet scouring or scraping the copper off below the oxidized surface only partially removes the difficulty, as the greenish film will continue to appear until the pores of the copper are permanently filled with gold or silver amalgam.

The "Concentrate," however, evidently referred particularly to copper plates, not electro-plated, in which case it is undoubtedly correct that the oxidation is in part due to copper in the amalgam, raised by the scouring the plates receive in preparing them for work. This may be proven by removing a portion of the amalgam and rubbing it on the lower part of an electro-silver-plated plate, where the gold will not accumulate rapidly enough to overcome it quickly. The surface of the copper, doubtless, also produces a certain proportion of this troublesome oxide.

The only permanent remedy known to the writer for the difficulty is to keep the pores of the copper filled with gold or silver amalgam. The richer the ore the more easily is this accomplished.

If the ore is poor, it can be most readily done when the plate is not in use, by applying the amalgam to its surface, first made chemically clean, and allowing it to remain undisturbed for a few days, if possible. If the plate must be in continuous use, it is best not to scour it up too much, once a perfect amalgamation with a chemically clean surface of the copper is obtained. "A '52 Miner" is right in stating "no acid should be used in dressing the plates." The practice cannot be too strongly condemned. The same is true of preparing them for electro-plating.

A '98 MINER.

Baker City, Or., Sept. 25th, '98.

Recent Additions to the Collection at the State Mining Bureau Museum.

Sapphires from the Shively placer mine, Rock Creek, Montana—J. T. Pardee.

Fine crystallized galenas and pyrite specimens from Shullsberg, Wisconsin, and a peculiar variety called "reticulated" galena.

Gold in ferruginous jasper, Capital mine, Lincoln Co., Nev.—John Apple. Fuller's earth of good quality from San Bernardino and Kern counties—S. S. Simon.

Gold quartz rich in free gold, Pueblo

mine, Humboldt Co., Nevada—J. H. Deegan.

Gold quartz: characteristic samples from the Arbona mine, Tuttle town, Tuolumne Co., Cal.—E. V. Burke.

Specular iron: peculiar variety called "rose" iron, the laminae being arranged like the petals of a rose, Geneva, Switzerland—Ferd. Burguet.

Ferruginous calcite and oligoclase feldspar from Vermont—Alfred A. Post.

Northupite (a very rare mineral) hanksite and halite in fine crystals and thenardite in large crystals and also crystallized in the shape of crosses, from Borax lake, Slate range, San Bernardino Co., Cal.—C. H. Northup.

Chalcedony geode, Bad Lands, South Dakota.

Chalcedony pebble, including water in which is a bubble of air which can be seen to move, Shoalwater Bay, Washington.

And some others of less interest.

HENRY S. DURDEN, Curator.

Some Electrical Facts and Figures.

In 1884 a 50 K. W. dynamo was considered a large machine, while a 100 K. W. Edison steam dynamo was justly called a "Jumbo." At the present time the largest size generator built or building is of 4600 K. W. capacity. The price of dynamos in 1882 was about 20 cents per watt of output, while dynamos of similar running speed in comparatively small sizes, without switchboards, now cost about two cents per watt.

The cost of generating a kilowatt hour of electric energy from steam for electric lighting appears to have been at least 7.5 cents at the 'bus bars in 1884. At the present time the cost of delivering a kilowatt hour to large street railway systems from steam is only about one cent, and the power house operating costs are reported in some cases as low as half a cent. In municipal electric lighting systems, supplied at low pressure from steam central stations and hampered by relatively heavy distributing expenses, the retail price of the kilowatt hour varies from 20 to about 4½ cents, according to the locality and quantity consumed. Niagara power is now sold to consumers in Buffalo at rates varying, according to amount delivered, from 2 cents to slightly less than two-thirds of a cent per kilowatt hour delivered.

The price of a 16 c. p. incandescent lamp sixteen years ago was \$1. Now it is about 18 cents.

Arc lamps were already so far advanced in 1884 that comparatively little improvement in their effectiveness has taken place, the gain having been made in economy of operation. Thus the carbons, which cost at that time about 6 cents apiece, now cost about 2 cents apiece. The enclosed arc lamp has of recent years become popular, owing to its diffused light and a carbon life of from 100 to 150 hours.

It has been estimated that about \$600,000,000 have been invested up to the present time in electric lighting stations and plants in the United States.

The best storage cells tested at the Philadelphia Exhibition of 1884 gave a yield, under laboratory conditions, of 3.4 watt hours per pound of electrodes, with an energy efficiency of 69 per cent when discharged at the mean current density of 12 amperes per square foot of negative plate surface; while the deterioration was comparatively rapid. At the present time storage cells are in use giving, under laboratory conditions, a yield of from five to six watt hours per pound of charged cell, with an energy efficiency of about 85 per cent, when discharged at a current density of 4.8 amperes per square foot of negative plate surface. There are now storage batteries installed in the United States to the aggregate capacity of about 56,000 K. W. hours. The largest installation has 166 cells, weighs 500 short tons, and has an eight-hour discharge capacity of 22,400 ampere hours, or 3136 K. W. hours at 140 volts pressure.—Dr. A. E. Kennelly, in Casier's Magazine for October.

Mining Summary.

ALASKA.

The Alaska-Treadwell G. M. Co.'s report is for the year ending May 31, 1898. During that time there were mined 254,329 tons of ore; of this amount 227,692 tons came from the 110-foot level and 26,637 tons from the recently opened 220-foot level. In addition 7,324 tons of waste rock were taken out. The cost of mining was 59.49 cents per ton.

Development work on the 110-foot level included 376 feet of drives and crosscuts and twelve upraises for chutes; on the 220-foot level 1832 feet of drives and crosscuts and forty-five upraises. The new main shaft was sunk 455 feet, and stations cut at the 220, 330 and 440-foot levels.

The reserves of ore in sight are estimated by the Supt. as follows: "Adit and 110-foot levels, 2,066,000 tons; 220-foot level, 2,411,500 tons; total ore reserves available for mill, 4,477,500 tons. The reserve ore is measured from the ends of the different east and west drifts. No account is being taken of the ore beyond the faces of the drifts; a fair percentage is also deducted from our actual measurements for waste material that may be in the ore. The fact of cutting the vein at the 455-foot level, exactly where it should be, enormously adds to the value of the mine. In fact, it would not be unreasonable to add 4,000,000 more tons of ore in sight in the mine."

During the year the mill of 240 stamps crushed 254,329 tons of ore, stowed out on the adit and the 110-foot levels, and extending down to the 220-foot level.

The chlorination works were kept steadily at work, three furnaces being run on the company's ore and two on ore from the Alaskan-Mexican mine. The concentrates (sulphurets) saved from the mill amounted to 4432 tons. The concentrates chlorinated were 4447 tons of the company's and 3261 tons for the Alaskan-Mexican Co. The total cost of the chlorination was \$60,329, or \$7.83 per ton treated. The company received \$10 per ton for the Alaskan-Mexican sulphurets, which made the net cost for treating its own concentrates \$27,713, or \$10.23 a ton. The cost of concentrating labor was \$1.67 a ton of concentrates, and a fair proportion of the cost of supplies brought the cost of the concentrates up to about \$4 a ton. The average return was \$4.33.

The earnings and disbursements for the year are shown in the following table:

| | Total. | Per ton. |
|------------------------------------|-----------|----------|
| Bullion sold..... | \$589,149 | \$2 3165 |
| Store profits..... | 29,090 | 0 1176 |
| Total receipts..... | \$618,058 | \$2 4341 |
| Mining labor..... | 97,173 | 0 0381 |
| Mining supplies..... | 54,149 | 0 2129 |
| Total mining..... | \$151,322 | \$0 5950 |
| Milling labor..... | 39,159 | 0 1540 |
| Milling supplies..... | 55,152 | 0 2168 |
| Total milling..... | \$94,311 | \$0 3708 |
| Chlorination of sulphurets..... | 27,713 | 0 1000 |
| Gen. expenses, Douglas Island..... | 12,575 | 0 0494 |
| Gen. expenses, San Francisco..... | 6,110 | 0 0240 |
| General expenses, London..... | 1,517 | 0 0060 |
| General expenses, Paris..... | 281 | 0 0011 |
| Consulting engineer..... | 1,438 | 0 0057 |
| Legal expenses, San Francisco..... | 2,195 | 0 0086 |
| New dividend warrant charges..... | 2,250 | 0 0088 |
| Bullion charges, freight, etc..... | 6,270 | 0 0237 |
| Total operating costs..... | \$375,797 | \$1 4776 |
| Construction costs..... | 99,815 | 0 2745 |
| Total costs..... | \$375,797 | \$1 4776 |
| Profit..... | \$243,261 | \$0 9585 |
| Balance from previous year..... | \$300,683 | |
| Total..... | \$443,924 | |
| Dividends paid 6 per cent..... | 300,000 | |
| Surplus, May 31, 1898..... | \$143,924 | |

Of the bullion reported, \$389,740, or \$1.53 a ton, was free gold from the mill; \$197,117—being \$44.33 a ton of concentrates, or \$0.78 per ton crushed—was from sulphurets; the balance of \$2292, or \$0.01 a ton, was in base bars from the mill.

The average number of employees, not including wood contractors and choppers, was 263 white men and 24 Indians. The average wages paid are as follows, board and lodging being furnished in addition to the money payment: Miners, \$2.50 a day; laborers, \$2; drillmen, \$2.50 in summer and \$3 in winter, with bonuses; concentrators, \$5 to \$100 a month; feeders, \$70; amalgamators, \$90 to \$100; roasters (in the chlorination works), \$2.60 a day; helpers, \$2; floormen, \$3; mechanics in the shop, \$2 to \$6; blacksmiths, \$4; smiths' helpers, \$2. Indian laborers were paid \$2 a day, without board or lodgings.

The bark Hunter arrived on the 28th from St. Michael, Alaska, with ninety-five passengers and \$20,000 in gold from the Klondike.

The steamer City of Seattle, with forty empty-pocketed Klondikers, brings news from Dawson to Sept. 12th. They say that W. Ogilvie, the new Yukon Commissioner, has disappointed the miners by not removing the royalty and turning out Gold Commissioner Fawcett.

At Dawson deaths from fever are from five to ten per day, and the disease seems to be on the increase.

The steamship Bertha arrived on the 28th from St. Michael with thirty-seven passengers and about \$500,000 in gold, fourteen boxes of which belonged to the Alaska Commercial Co.

ARIZONA.

About December the water will be turned on gravel beds and bars of the Colorado river in Mohave county by the Temple Bar M. Co. The operations contemplated are among the most extensive in the placer fields of Arizona.

At Mineral Park, Mohave county, in the Dewey mine a rich chute has been struck. The Lone Star is turning out shipping and concentrating ore. The Buckeye, Katy and Report properties are being extensively developed and showing well.—The Cherry Creek

G. M. Co. of Yavapai county is reducing the ores of the Etta mine with a 10-stamp mill. The vein produces ore ranging from \$15 to \$40 per ton, most of it free milling. The last carload of ore from the Blackfoot mine, in Mohave county, averaged 204 ounces in silver per ton, seven per cent copper and several ounces gold.

In 1894 the output of the Arizona copper mines was 44,531,108 pounds, and in 1897 the total output was 51,019,222 pounds. Following is the product of Arizona mines in pounds for 1896 and 1897:

| | 1896. | 1897. |
|-------------------|------------|------------|
| Arizona..... | 13,012,000 | 13,727,912 |
| Copper Queen..... | 23,298,150 | 23,999,473 |
| Commercial..... | 46,040 | |
| Detroit..... | 7,016,348 | 8,440,138 |
| Old Dominion..... | 5,450,000 | 2,000,000 |
| United Verde..... | 22,327,350 | 31,355,025 |
| United Globe..... | 2,021,505 | 1,241,975 |
| Other mines..... | 345,288 | 200,000 |
| Totals..... | 73,745,321 | 81,019,222 |

The Little Jessie mine at Chaparral is reported sold to an English syndicate for \$50,000. They will increase the force in the mine and erect a 200-ton cyanide plant.

The Tombstone *Epitaph* says that the Wolf-ran mines in the Dragons, recently sold by Moore & Co. to Stein & Boericke, comprise twenty-four mines and the price paid was \$34,500. The value of the ore ranges from \$200 to \$500 per ton. Twenty-three tons shipped by the discoverers netted the former figure.

CALIFORNIA.

Amador.

Dispatch: The Ivanhoe—formerly Wheeler—mine near Plymouth, which has been worked for years by S. C. Wheeler & Sons and has yielded a fair income, has been bonded to J. A. Brent, Gill S. Peyton and C. McCornick of Salt Lake. These men have completed the addition of fifteen stamps to the mill, making twenty stamps in all. The stamps weigh 950 pounds each, and are calculated to crush about seventy-five tons of rock every twenty-four hours. J. A. Brent is Supt.—At the Anita, Jackson, sinking progresses. A station will be cut at once at the 700 level.—Rock from the Oneida mine is being crushed at the Zeila mill.—Repairing and sinking of the old shaft is in progress at the Zeila.—The Argonaut mine is running full as usual.

Butte.

At the Huse mine near Bidwell Bar the arrastra is nearing completion, and crushing ore will begin soon. The dredger near Oroville is working steadily and the result is said to be of an encouraging nature.

Calaveras.

At the Gwin mine, Mokelumne Hill, twenty of the forty stamps are dropping. Steam power has been introduced.—The Favorite quartz mine has been bonded to W. C. Fitzsimmons of New York and E. H. Davidson of New Mexico. Work will begin without delay.—The Coralie quartz mine has been bonded to a Chicago company represented by E. A. Converse. Development work will begin immediately, and as soon as sufficient ore is blocked out a small mill will be erected.—At the Fellowcraft the mill is crushing ore remaining in the bin, and work has begun in the shaft, it having been unwatered.—The Empress, Bullion, Tip Top, La Palomita, Mountain View quartz mines and the Bullion millsite, in West Point Mining district, have been conveyed by P. Shuman, et al, to the Paragon Con. G. M. Co. for \$500,000 value in stocks of the last named company.—The Nellie mine near Argus has installed new machinery and started a shaft, which is down 60 feet. The mine is owned by a Stockton company.—Cleaning out the Lightner mine from the water and debris that flowed into the works from the Potter mine is being pushed. The mine was considerably damaged by the gouge slide, but the management thinks it will be in running shape before the rains set in.

Del Norte.

D. Seyov of Smith River has a quartz ledge on Big Flat sufficiently rich to occasion taking up several claims in that vicinity.

El Dorado.

(Special Correspondence).—Work has resumed on the Baltic mine, twenty-five miles east of Placerville, by an Oakland company. The property was opened by men from Santa Cruz and Salinas, but with insufficient capital to push the work. It has been idle about two years.

The Chili Bar slate quarry has been bonded to J. Hardy, who is in London organizing a company for the extensive operation of the property. He writes encouragingly of his efforts.

Before my next letter it is probable that a sale of the Blue Gorge property, comprising fourteen claims, will be made. The examination of the property and the numerous ore tests have proven satisfactory to the intending purchasers. The ore bodies are large but quite low grade.

Work has begun on a third slate quarry by W. Cummings & Son within a mile of Placerville.

The Gentle Zephyr group at Volcanville, recently bonded by R. S. Raw, has been taken up by San Francisco capitalists and active work begins for their development without delay.

Work on the Crawford electric power plant is moving apace with the business energy of its promoters. The new mill on the Griffith Con. at Diamond Springs is nearing completion. A large amount of high-grade ore is ready for crushing. Diamond Springs, Sept. 27, '98.

At their annual meeting at Placerville last Saturday, the El Dorado County Miners' Association elected Thos. Clark, Pres.; D. H. Jackson, Vice-Pres.; C. H. Weatherwax, Sec.; M. Q. Meehan, Treas.

Work is progressing at the Mt. Pleasant mine, Grizzly Flat. The water is out of the

three shafts to the 600 level.—R. Claiborn found a chute of rock in his mine and is crushing some of the ore, which is turning out well.

Fresno.

(Special Correspondence).—To dispel the idea that the river beds of California have long since been worked out, and that the old streams no longer hold sufficient of the golden treasure to encourage further search, a trip along the San Joaquin river, among other streams of the State, is convincing that gold can be found nearer home than far-away Klondike.

Near the town of Pollasky the Donahue Co. has for some time been prospecting in the river, taking advantage of the dry season and the consequent easy method of studying the deposits. The company is building a dredger, with which work will be carried on upon a larger scale than has been seen upon the San Joaquin in a long time. The royalty to be paid by the operators to the owners of the land adjacent to the river is 10 per cent on the gross output.

In addition to this work numbers of smaller outfits are wingdraming the stream, and all along a scene rather unusual is presented amid the ranching outfits of old San Joaquin county.

As in many other sections of the State, so here the ubiquitous Chinaman has found an abiding place. A company of Mongols has built a dam 250 feet long and put in a flume 350 feet long and about 20 feet wide. They are working a bar 4 feet deep and 350 by 250 feet in extent. The plant is well equipped with the requisite machinery, wheel and pumps, and when the autumn rains swell the river these men, with the success usually attending their race, would surprise the ordinary individual with their gold output, were they not so characteristically silent upon the subject. It need not be alluded to here that probably the most successful small gravel miner in California, or perhaps in the world, is the Chinaman. This company will pay the riparian owner 25 per cent on the gross product.

At another place on the river a company has built a dam of fair proportions to work out a pothole 60 feet wide and 600 feet long. This they expect to empty of 20 feet of water with a centrifugal pump. The people operating this are known as the Ohio Co.

To work another stretch of potholes and pools the Higgins Co. has built flumes and dams and put in costly pumping machinery.

Two additional companies are all prepared to work the river deposits, or will be within thirty days—the Sullivan and the Deegan & Hollenbeck, who likewise have expended much money and labor in outfitting for their operations.

Pollasky, Sept. 25th, '98.

Kern.

Randsburg Miner: The Mayflower, Randsburg, is outputting good ore. It is owned by Brown & Delameter.—The Red Dog mill cleaned up \$8000 worth of bullion last week from a run of 100 tons of ore from the Butte mine.—The Rademacher mine near Randsburg is making a good showing. The shaft is 200 feet deep with drifts each way. It is sunk in the ore vein and neither hanging nor foot wall has been discovered. The ore varies from \$15 to \$75.—The Dean quartz mill has been moved from Oro Grande to the Slate range and they expect to start October 15th on the Hogan mine. From this mine 100 tons plated \$33 a ton. The shaft on the mine is 150 feet deep, with drifts in ore which runs from 2 to 13 feet in thickness.—The Wedge mine has struck rich vein at a depth of 350 feet in the west drift that mills \$200 per ton.—In the Buckboard mine the ledge is wide, running \$5 or \$6 all through, with streaks of rich ore up to \$100 per ton. The shaft is down 125 feet with drifts on both sides.—Harrison & Llewellyn have taken a bond on the Radcliffe mine in Pleasant canyon for sixty days and paid \$2000 down. They have begun work.—To the Barstow mill the Wedge people have shipped a carload of ore and the Little Butte 100 tons as a test, and the Big Butte will send a lot. This camp can keep the Barstow mill running on low-grade ores alone.—J. James has sunk a shaft at the junction of the Treasure and Nellie M. mines, and has a vein 5 feet thick, 2 feet of which is good and the balance will all burn a little.—At the Meredith mine in the Slate range they have a pipe line three miles long. Some ore shipped to Selby returned \$215 per ton, and altogether they have taken out over \$25,000.

Review: Supt. Meade will put in a fifty-ton cyanide plant at the Long Tom mine near Bakersfield.—The Johannesburg Reduction Works made a 100-ton run for the Big Butte.—The Esperanza mine near Garlock is opened by a 260-foot tunnel, on ore all the way; there is 3 feet of it that averages \$17.60 to the ton.—The Yellow Aster Co. is shipping seventy-five tons of ore per day to Barstow. Their product last month was one of the largest in the history of the company. At the wells the 113,000-gallon tank has been completed and the work of filling it with water has begun. Work on the pipe line is progressing and will be finished the middle of November.

Mariposa.

(Special Correspondence).—Work is to be resumed on the Lost Friend mine at Horse Shoe Bend. A new shaft is to be sunk 200 feet and some drifting done. There is a vein of 2 feet of \$15 ore in the bottom of the present 60-foot shaft. The Keystone Co. made the first cleanup in its 2-stamp mill on the Porter property last week, with results said to be highly satisfactory. The Merced Co. started the stamps in its 40-stamp mill on the 27th after nearly a year of idleness. A new 10-ton locomotive has superseded mules on the ore tramway, but its weight necessitates entire reconstruction of the track. The Penon Blanco properties have been

under examination the past week and there are rumors of extensive operations later. Mariposa, Sept. 28th, '98.

The report of the directors of the Merced G. M. Co. is as follows:

| | |
|---------------------|-------------|
| Capital stock..... | \$1,500,000 |
| Amount paid in..... | 1,200,000 |
| For property..... | 333,330 |
| Cash..... | 866,670 |
| Indebtedness..... | 67,325 |

Mono.

The Lundy cyanide plant at Lundy is running full capacity; L. Bell is Mgr.

Nevada.

(Special Correspondence).—Since the discovery by McKnight of gold quartz on Gold Mountain, afterwards Gold Hill, in the fall of 1850, Grass Valley has maintained a prominent place in the records of great California gold mines that from their incipency, in the early fifties, have paid from the verdant sod to thousands of feet beyond, and are to-day yielding handsome profits.

The Omaha mine of the Omaha Con. group was located in '65. A few years thereafter active operations began under the management of Geo. Norton and the present Omaha shaft was sunk 200 feet along the vein and lateral drifts run, from which very rich ore was extracted. M. Dodswoth succeeded Mr. Norton in '76 and continued work until the shaft was sunk to the No. 10 level. Lateral drifts were extended opening up the Omaha No. 2 chute. It was found, after considerable exploratory work, that the Omaha No. 2 chute passed southward into the Lone Jack mine. Both companies were now in a quandary. They did not know whether to buy, sell or consolidate. The Lone Jack Co. could not work without the Omaha on account of the excessive inflow of water, and consequently both closed down without agreeing. In '85 both parties got together and a consolidation was reached, and the present Omaha Con. G. M. Co. organized. Geo. Mainhart, one of M. Dodswoth's trusted bosses in the early working of the mine, was made superintendent, and has since held that position. Under his management the company has sunk the shaft to the 1500 level and the Lone Jack to the 1700 level. Two years ago they bought the Homeward Bound property, adjoining the Lone Jack on the south, and have put down a shaft which is now approaching the 1800-foot level; it has a good-sized ledge of fair to good ore. All shafts on the property are connected with drifts from the various levels. The company's 28-stamp mill is kept running day and night. The ore is trammed in ton cars from the new shaft to the mill, one-half mile distant. Sixty men are employed. The motive power at the Omaha Works has been water and steam, but the company is now installing electric power. An "S. K. C." type of synchronous motor of 120 K. W. capacity will drive a 90 K. W. direct current machine, which in turn will generate power for the direct connected motors of the hoist and pump. When this is completed, the Omaha will have a fine electric plant and will be the first mine in northern California to apply electric power direct to a hoist. The power will be furnished by the Nevada County Electric Power Co.

One-half mile south of Grass Valley, on the easterly side of Wolf creek, lies the Granite Hill mine. This, though worked for years, has attained a depth of but 600 feet, due to limited assessments, but it has proved profitable. The company, the majority of whom are Sacramentans, are at present driving the drifts on the 600-foot level and have a good showing of ore. The motive power is water, which runs a 10-inch Pohl pump and a 6-inch lift pump, a hoist and a mill of five stamps and concentrator. The mine is under the superintendency of T. E. Phillips.

The Massachusetts Hill is increasing its power-house to twofold its present extent, and when the new air compressor machinery is in place, as also the large electric generator, this company will undoubtedly have one of the largest as well as one of the best equipped mining power plants in California. The Massachusetts Hill mine has made a great record for the depth attained. The ore is taken from the bins at the mine in large wagons pulled by a heavy traction engine to the North Star mill, where it is reduced. The mine is under the efficient management of T. D. Foote.

At the Golden Treasure mine work is being vigorously prosecuted. Five distinct veins are known to cross this property, undoubtedly extensions of the W. Y. O. D., Pennsylvania, Diamond and Bullion mines. The general strike of the veins is north and south with a westerly dip. On the North extremity of the claim, near the W. Y. O. D., between two of the veins, was sunk some years ago a vertical, two-compartment shaft, which attained a depth of 180 feet. The company then developing the claim, through some financial hitch, ceased operations. The present company—of which C. P. Gray is Pres., Edw. Dudaud Vice-Pres., Fred Franks Sec'y and First National Bank Treas., all of San Francisco—several months ago unwatred the mine and prosecuted developments to cut the ledge. A few months ago the ledge was cut and drifts have since been run upon it north and south from both crosscuts, and to-day the showing in the drifts from the east crosscut is of such a nature that the company has decided to raise from the south drift to the surface and put down an inclined shaft and sink 500 feet. These two veins will come together, provided they maintain their present pitch, before this depth is attained, and form a stable pay chute. The mine is under the superintendency of J. E. Stearns, who was secretary of the Mines and Mining Committee of the World's Fair, and for twenty-five years past has been connected with mining in Colorado, New Mexico and Idaho. Grass Valley, Sept. 27th, '98.

It is locally reported that the river mining claim near French Corral is turning out big. The company has built a flume which turns the 16,000 inches of water in the river. Good

gravel has been found.—The Franklin mine near Nevada City, idle twelve years and which produced good ore, is to be operated again by Caldwell & Hussey, who have begun work. The old shaft is down 200 feet.—Work has been temporarily suspended at the Milliken gravel mine near Nevada City. A survey is being made.—Twenty cars of ore were shipped via Wheatland from the Spenceville mines to Stege.—Morgan & Co. are running a tunnel on a fair-sized ledge of good quartz at Lake Faucherie.

A Pelton wheel for the Central shaft has arrived at Grass Valley that is 32 feet in diameter and is the largest Pelton wheel on the coast.—The new 5-stamp mill for the Golden Gate mine is being put up and will soon be crushing ore.

Development at the Lecompton mine near Nevada city continues with encouraging results.

Herald: The Texas M. Co. will build a 20-stamp quartz mill, ten to be completed this fall and the rest to be added next spring. It is to be run by water power. Some 2000 feet of 15-inch pipe is being laid to bring in water. An air compressor will run the power drills.

Placer.

(Special Correspondence).—G. W. Gagan and Julius Holm are erecting a 5-stamp mill upon the Jim Dandy mine at Blue Canyon, Placer Co. Rock has been struck which goes over \$22 per ton. After following up the leads running east and west from the main ledge they felt justified in placing machinery upon the property, which is located down in steep ravine of over 2400 feet. So precipitous is the canyon that all the equipment had to be put upon sleds and skated down. The ore body is of a kidney formation and some of it runs as high as \$80 per ton while the sulphurets assay \$180. A. J. Russell late of the famous Leary mine of Butte, Montana, is to be in charge of the property.

Towle, Sept. 29th, '98.

The bond on the Oro mine, near Iowa Hill, has been extended until Aug. 1, 1899, and development work will continue. E. M. Armstrong will remain as Supt. The company is composed of Woodland, Colusa and Red Bluff people.

The August statement of the Pioneer G. M. Co. makes the following comparisons:

| | 1898. | 1897. |
|------------------------|---------|----------|
| Tons rock crushed..... | 536 | 765 |
| Value gold bars..... | \$5,982 | \$14,543 |
| Expenses..... | 5,459 | 6,090 |

Net.....\$ 503 \$ 8,453

Colfax Sentinel: The Hidden Treasure Gravel M. Co. at Sunny South and Centerville employs 230 men. The power to operate the mine is generated by a \$25,000 electric plant. The water from the mine tunnel at Sunny South, a flow of about 40 inches, is used to furnish pressure to operate the machinery at the power plant. The trainloads of gravel, the blower, saws for framing timbers, and other machinery, are operated by electric power. The present force is able to mine an average of 400 cars of gravel per day with two shifts. The mine is lighted by electricity, and the residences at Centerville are being wired for electric lights. The Dam tunnel is now in 7800. The crosscut shows a width of channel of 1000 feet. At the close of one of the driest seasons ever known in California the flow of water from the Hidden Treasure tunnel continues almost the same as former seasons.—At the Eureka mine near Centerville work on the new upraise is progressing in a satisfactory manner. Supt. Chappell has ten men on the roll. The new upraise, started from the 2500-foot mark in the main tunnel, is now up 78 feet. This is one of the most extensive properties on the divide.—At the Paragon gravel mine at Bath twenty-four men are working. A lead of good gravel has been struck and the mill is running every day. W. H. Grennell is Supt.—At the Basin Con. mine near Deadwood gravel is being breasted one-half mile in on the tunnel. Water for washing gravel on the dump is scarce. Nine men are employed, and J. Dunlap is Supt.—At the Buckeye placer mine in Brushy mining district, owned by J. A. Johnston and Mrs. J. V. Collins, the main tunnel is in over 1000 feet. Blue gravel has been struck from an incline. Nuggets worth as high as \$2.25 have been secured, and the future for this mine looks promising.—Lofruth & Co. are working their Elkhorn gravel mine near Deadwood and take out about ten cars of gravel per day.—Some rich quartz is being taken out of the Rawhide mine on Texas ridge. The property is owned by J. T. Patrick & Co.—Supt. Rodger of the Cedar Creek mine at Shady Run is getting the property in shape for winter. He expects to start up with twenty men.

Gagan & Holm are erecting a 5-stamp mill on the quartz ledge owned by Laveau and others, near Shady Run. Holm is interested in several mining industries throughout the State. He is operating the black-sand plant near Crescent City with satisfactory results.

Plumas.

A discovery of "natural coke" has been made in Genessee valley. Prospectors found a vein 15 feet thick of coal formation. The same formation was again tapped at a distance of a mile. T. Price & Sons, who were given some of the pieces for examination, say the samples had been subjected to heat at some previous period, converting it into natural coke, and that the article is of commercial value. A test of 1000 pounds in the Greenville foundry showed its heating qualities to be but four minutes short of the best Eastern coal.

Sacramento.

Telegraph: Cobb & Kinney are prospecting with a view to purchase the Mississippi Bar gravel mines near Folsom. If the results are satisfactory, they will build a dredger of 2000 cubic yards capacity per day. The cost of the dredger will be about \$30,000, and it will be

similar to the one now in use on the Feather river.

San Diego.

Union: About ten men are working in the Bay Horse mine of Mesquite district, which has been sold to a company of Eastern capitalists. The deepest shaft of the Bay Horse is down 165 feet and is in low-grade ore, in which pockets of rich rock are sometimes found. It is the intention of the company to run a 6-inch pipe line from the Colorado river, a distance of twenty miles, for the operation of a 20-stamp mill, which will be erected this fall, and as soon as practicable increase to forty stamps or more.—The Irma, another property belonging to the Bay Horse Co., is being gradually developed and is displaying some good ore. Other promising properties of Mesquite district have been partially developed, but are idle for want of water. With the coming of that there will come a general revival.

Shasta.

(Special Correspondence).—The stability of the Mountain Copper Co. in the mining industry of this county becomes more evident as time progresses. The residences built for the officers of the company and the neat cottages erected for the families of many of their employees form a village, which is pleasantly located on the hill overlooking the smelter plant. The company, in addition to its large boarding house and lodging apartments, will erect still larger accommodations, as is shown by an order placed with the lumber company at Buena Vista for 1500 M. feet of lumber. The additional accommodations will enable the company to employ about 300 more men, bringing their total upwards of 800 laborers.

I am informed that the clearing of ground now going on is for the erection of several additional smelters. The company has recently built and furnished a general merchandise store which would compare favorably with those of larger towns.

The company's hospital is a model of neatness and is by no means a small affair. The company employs a physician, who gives his services exclusively to the employees.

I am told that for the time being it is not intended to change from the system of shipping to the refinery in New Jersey. However, there is a probability that contracts may be made for furnishing the Orient with its product; in that event, as in other trade relations consequent upon recent international occurrences, San Francisco becoming the head of commerce for the United States, the company is prepared to erect in this section a copper refinery equal to if not larger than any like plant in operation to-day.

The acquisition of the large amount of territory to which reference was made in my letter two weeks ago, and the large amount of development and costly machinery put upon it, together with the projected extension of the company's railroad to the new property, are additional evidence of the permanency of the industry. This new purchase lies about a mile N. E. of Copper mountain. An erroneous idea exists with many in reference to the contiguity of the smelter and the mine. The latter is about seven miles above the smelter plant, and is connected by a circuitous route of standard gauge railway, thirteen miles long, to the top of the mountain. Here again is a distinct camp, with its offices, store, boarding and rooming houses, accommodating from 400 to 500 men. These, in conjunction with the newly acquired property and the smelter at Keswick, show somewhat the magnitude of the Mountain Copper Co.'s holdings. Redding, Sept. 26th, '98.

D. B. Hunt, managing owner of the Milkmaid mine near French Gulch, has closed the mine because the pay shoot could not be found in the lower level. The company will lease ground on the several claims to miners.—R. E. Hanley, Supt. of the Niagara mine near French Gulch, is interested with J. L. Cannon in a quartz property on Tom Neal creek. They have put six miners at work to further develop the property.

Free Press: At Harrison Gulch in the neighborhood of 200 men are employed in the Midas Co.'s mine and ditch.—Capt. Roberts is considering the displacement of the cyanide plant by a roasting process. Several dozen men working on the former were laid off a few days ago, and nothing further will be done until the plans for the future are decided.—A new quartz mill is en route from San Francisco for the Washington mine at French Gulch.

Sierra.

The Blue Ribbon, Oakland and Young California mines near Downieville report good progress.—At La Porte J. C. Thomas has men cleaning out the ditch to convey water to Spanish Flat. It will be put in repair as far as Yankee Hill for mining purposes.—Work at the Claybank mine is being pushed ahead and it is hoped they will reach the channel.—The La Porte Con. M. Co. have completed their ditch repairs and are ready for work when water comes.

Siskiyou.

The Aromas M. Co. has deeded all its property in the Salmon country to the Pajaro Valley Bank.

A claim strike is claimed to have been made in the Siskiyou mountains, on Sterling butte, by Angle & Brown. They claim to have fifty pounds of gold dust. The mine is said to be 7200 feet above the sea level.

On Cherry creek Wadsworth & Ironsides have struck a ledge as wide as the tunnel. It carries good quartz.

Journal: S. Barton has begun hoisting pay gravel on his river claim at Oak Bar.—Jillson & Co. are taking out good quartz from their ledge at Cottonwood.—The Greenhorn Blue Gravel M. Co. at Eureka contemplate putting in an electric plant to run the pumps and hoisting machinery. Boiler and engines arrived from San Francisco this week.

Sonoma.

The Great Eastern quicksilver mines at Guerneville have forty men on the payroll.

During August 140 flasks of quicksilver were shipped to San Francisco; the output for September will be 160 flasks.

San Bernardino.

There are four stamp mills at Dale crushing the quartz.

Tuolumne.

(Special Correspondence).—The Norwegian mine, at Tuttle town, that has had a checkered career since the early 50's, and which has been taken up within the past two years by San Francisco capitalists, is giving substantial proof of its values. Owned originally by M. Lawson, it had been worked in a desultory manner since 1851 and produced something over \$80,000. The property, comprising three claims, was secured by the present company a little more than a year ago. They procured a patent, equipped the mine with an air compressor, power drills and a prospect mill, then began sinking. They took out their first gold Jan. 17, 1897. That same year they took out \$51,000. After getting to some depth they struck a horse, which they have since cut, and last week found a chimney at a depth of 350 feet, 20 feet long and 6 inches thick, that is extraordinarily rich. The writer saw a gold pan almost filled with a product that had been run through the crusher and came out almost solid gold. Along with the gold-bearing quartz tellurium appears occasionally, and high grade sulphurets are shown in fair percentage.

Tuttle town, Sept. 27th, '98.

In sinking for a sump Fraser & Dorsey recently uncovered a pocket of several hundred dollars in their mine at Jackass Hill.—In the Confidence mine a winze from the 810-foot level, the lowest in the mine, is to be carried to a depth of 300 feet in new ground.—At the Dreisam mine sinking a winze on a 2-foot vein of \$100 rock goes on. The mill is operating three stamps out of the twenty-four, the water used being pumped from the mine.

On the Great Eastern mine, on the east belt, considerable work has been done without success until recently. A ledge was found 15 feet wide. Some 350 feet of drifts on the ledge have been run. A large amount of ore was extracted which is said to assay \$10 to \$30 per ton in free gold.

Democrat: The Great Eastern mine, on the East Belt, owned by Restano Bros., is being operated under a bond by an Eastern Co. In past years the Great Eastern was worked at various points. The present company run a tunnel 100 feet and tapped a vein 15 feet wide. The drift is 350 feet on the ledge. A large amount of ore is on the dumps. Assays give returns of \$10 to \$30 per ton gold, and a fair percentage of sulphurets worth \$200 per ton. The work of development will go on until next summer, when a mill, either twenty or thirty stamps, is to be put up and the property otherwise equipped.—At the Golden Eagle, near Sonora, the vein averages from 12 to 24 inches wide, and milling tests give returns of \$31 per ton in free gold. The quartz also carries sulphurets.—A winze is being driven on the Hope at the 260-foot station. The vein is 14 inches wide and carries good ore.

Yuba.

(Special Correspondence).—In the Pennsylvania mine at Brown's Valley unwatering the shaft has been completed. The ledge, which was found by F. W. Page previous to the recent closing of the property, is being followed, and it proves to be from 8 to 12 feet wide, and the ore runs from \$7 a ton upwards. J. Hibbert is Supt.

Brown's Valley, Sept. 26th, '98.

COLORADO.

BOULDER COUNTY.

Denver Mining Record: The sale of the Kekionga mine and Delano Co.'s chlorination plant at Boulder, by the first cash payment of \$30,000, marks the beginning of a new era of mining and milling in that county. The property will be managed by T. A. Rickard for the Ventura M. Co., who made the purchase.—The Kilton Reduction Co. at Boulder has bought 100 per cent more ore during the past six months than during the same period last year.—Ore shipments over the Colorado & Northwestern from Boulder the past week have averaged five cars a day.—Five hundred pounds of tellurium ore were brought from the Rip Van Dam mine at Springdale, some of which runs \$20 a pound. The Rip Van Dam has fifteen men at work; the shaft is 140 feet and the tunnel 550. The mine is equipped with air compressors, and in a few weeks an electric light plant will be put in.—At the Forest mine twenty-three tons a week is the output and each ton averages about \$80 in silver.

After a series of tests, a chlorination mill for the treatment of the ore around Eldora, with a 50-ton daily capacity, will be built at a cost of \$60,000, and so arranged as to be automatic from the time the ore goes in at the top until the tailings are drawn.

CHAFFEE COUNTY.

At Whitehorn the building for the concentrate mill is about completed and the office is well under way. The mill is expected to be running early next month. Another concentrate mill will be erected on the Calumet branch of the D. & R. G. railroad, costing \$15,000. They claim that fully 90 per cent of the values can be saved.—In the Turret district Chicago capital has bought for cash the Vivandier and Golden Wonder and taken a \$30,000 bond and lease on the Jasper.

The Mary Murphy mine and mill at Romley are in operation. The mill handles 100 tons of ore in twenty-four hours.—At Whitehorn, O. W. Crawford et al bought the Independence mine, on which they took a ninety-day lease, and began removing 50 feet of water from the shaft. A large force will be put on as soon as the shaft is clear and the ore will be shipped from the 6-foot ore body that runs \$20 and better in gold. The low grade ore will be treated by the home mill and the high grade shipped.—The Sedalia in the Poncha district is one of the big copper producers and shippers of the State; another rich find is re-

ported which shows rich copper and also carries \$300 in gold per ton.

CLEAR CREEK COUNTY.

Ore running 2000 ounces in silver and a little gold is found in the Glance and Ruby mines in the Daily mining district.

The Gold Coin people, operating at Idaho Springs, say that the Freeland group is the best paying property under their control. They are working in this and the Toledo and have been fortunate in opening into ore bodies. The Freeland adit was driven for over 2000 feet, and for most of the distance some mineral was cut. For many years it was neglected until recently, when retimbering and cleaning out was begun. It has resulted in reaching the ore streak, and, in upraising, the first-class ore has increased in width from a few inches to 20. All of this is smelting ore and ranges from \$60 to \$120 per ton.

DOLORES COUNTY.

From Rico were shipped the third week of September fourteen carloads of ore. From January to September were shipped 566 carloads—an increase over the same period of 1897 of 222 cars.

EL PASO COUNTY.

The Gold Cross M. & M. Co., near Woodland Park, has a 60-ton milling plant on the ground and it will be completed in fifty days. The ores of this section have been treated in both large and small quantities by every known process, and it has been demonstrated that cyanide is the proper treatment.—The Frisco G. M. Co.'s mill, near Woodland Park, with a daily capacity of fifty tons, has begun work.

At Victor, notwithstanding that work was suspended in the Gold Coin for one day, the week's output amounted to 720 tons of ore. The highest tonnage for any one day was 140 and the lowest 115 tons.—The shipments for August from the Hull City placer yielded a gross value of \$103,855.73, upon which the company receives a royalty of \$30,123.55.—The Denver Republican says that beginning with 1891 the Cripple Creek district produced to September 1st of this year over \$47,000,000 in gold, while for 1896 alone up to September 1st the production was almost \$10,000,000, and it is estimated that the total production for this year will be at least \$15,000,000. The August product was almost \$1,500,000, and it seems more than probable that the four months succeeding will average fully as large. Total dividends to September 1st were almost \$6,500,000, and of this amount the first eight months of 1896 supplied \$1,636,535, more than one-half of all the dividends declared prior to 1897, and that the total dividends for 1898 will probably exceed \$2,600,000.—A quarter interest in the Dillon, a non-producing Battle mountain property, was sold last week to J. M. Day of Illinois for \$25,000.—Of the Vindicator leases the Holman is producing fifty tons per week and Whiteside and Stark seventy-five tons. The ore runs from \$30 to \$80 per ton.—The various lessees operating the Free Coinage group are making money for themselves and the company. The output of the Pinto is eighty tons a week, worth \$40.

The August report of the Independence T. & M. Co. shows the net output was \$80,975.63 and the royalties \$20,123.55. The total net receipts since Feb. 1, 1898, were \$312,746. The ore chute is 650 feet long. The high grade runs from \$240 to \$320 per ton. There are twelve shafts on the property.

GILPIN COUNTY.

The East Notaway mine near Central City shipped ore early in September running over fifty ounces gold, or \$1066 per ton. Ore taken out last week, a sack lot of which was sent to the State ore sampling works, gave 344 ounces gold, or a commercial value of nearly \$7000 per ton. The lessees shipped another three and a half tons of this ore. Nearly four tons of ore were shipped which ran twenty-two ounces gold per ton, or about \$400.

In Apex a third interest in the Geiger mine was sold last week for \$215,000 cash. Hundreds of tons of ore are blocked out in the mine and heavy shipments are made daily to Black Hawk. The owners are planning the erection of a smelter close to their mine.

HINSDALE COUNTY.

(Special Correspondence).—The Ute and Ulay mill is handling 150 tons of ore per day from the mine of that name. The product is a concentrate containing about 60 per cent lead and 15 ounces to 18 ounces silver and small values in gold. The mill contains crushers, rolls, vanners and round tables. Hampson & Palmer have just put in a plant of canvas tables and distributors to handle the tailings from this mill. They can handle about seventy-five tons per day of the slimes. The Ute and Ulay mine and mill employ about ninety men under the superintendence of M. A. Nicholson.

The Hidden Treasure mine and mill, under the management of E. C. Dewey, are running regularly and have excellent equipment, as has been heretofore noted.

E. C. Wager, of Lake City, is developing the Copper Coin up Henson creek, which has a remarkable showing of native copper in place.

The St. Jacobs mine, at Carson, belonging to Pittsburg parties, resumed work this year after several years of idleness. It is a producer of silver and copper and employs about twenty-five men.

The Golden Fleece, which has long been the great producer of tellurium ore in this county, contemplates the driving of a 3000-foot tunnel from a point near the shore of Lake San Cristoval, which will cut the vein 1000 feet below the present lowest workings. The plans of this management also contemplate the building of a mill to handle the lower grade ore which the mine is said to possess in abundance.

The topic of paramount interest at this place now is the proposition to open the Lake Fork of the Gunnison river for power and milling purposes. This stream is the outlet of the

beautiful Lake San Christoval and flows through the town of Lake City. The only obstruction to the proposition is that the city has a water supply plant on the upper course of the stream. To open the stream for milling would foul the water for domestic use and make it necessary for the city to secure its water supply elsewhere. It is believed this may be done and that the way may be opened for making this a milling center.

WASCOTT.

Lake City, Colo., Sept. 24th, 1898.

LAKE COUNTY.

The Mab mine, Leadville, is outputting 140 tons daily. The output for September will reach 3500 tons.

At Leadville the output for September will be fully 50,000 tons of all kinds of ore.

SAN JUAN COUNTY.

The daily output from the Tiger mine at Silverton aggregates in first and second class about twenty-six tons. The heavy sulphides are shipped to the smelters and the quartz put through the mill. The Sunnyside mine last week produced over 100 ounces of gold in a single retort, the season's product from amalgamation alone. The weekly output of first class ore from the Congress mine is from ten to twelve carloads. The mineral runs high in copper and silver. The dump is being sorted and about twelve to sixteen tons of second class hauled therefrom daily to Ouray. The mine is being worked on lease, the force consisting of twenty-eight men.

SAN MIGUEL COUNTY.

The Carribeau mine near Ophir shipped seven cars of high-grade concentrates. The product is steady and regular. The Suffolk mill is dropping thirty stamps on custom ore furnished by various leasers, and valuable reports are turned out. The Shoemaker output keeps ten stamps busy, while the product from Suffolk properties taxes the capacity of the remaining thirty stamps. Small lots from other properties on Silver mountain are being treated, some of it returning an average of \$50 to the ton.

Last week's ore shipments from Ophir were seventeen cars. The shipments for the year aggregate 508 cars.

SAGUACHE COUNTY.

The Nelson tunnel at Creede has reached a depth of 6000 feet and is almost completed. The tunnel drains twelve of the largest properties in the camp, but will also be used for transportation purposes.

IDAHO.

At Elk City two large hydraulic companies are washing out considerable gold. One is the American Hill Co. and the other is the Buffalo Hill Co.

The Bruiser mine, at Centerville, is reported sold to Woodburn & Anderson for \$10,000. The vein is $\frac{3}{4}$ feet wide and averages \$20 a ton in gold. The new owners expect to mill twelve tons a day. The Lorraine mine, operated by Pettis & Co., has opened up 27 feet of ore averaging \$7 a ton. In the Joy & Hobson property 6 feet of ore has been developed that carries \$22 a ton.

At Gem the new ore bins for the Black Bear mine are nearing completion, and the mine will soon be in shape to ship ore as it is taken out. The flume is being repaired, and it is possible that the mill will be run some, if the fall rains cause enough rise in the creek to furnish power.

The Salubria Citizen says that the Bay City mines have cleaned up three times this season, and from the first a run of ten days netted \$274; second, \$1000; and third, \$1200.

The Ketchum *Keystone* learns from reliable authority that the Copper Basin mines have been sold to a Canadian company and that men will be put to work on the property this fall.

W. A. Wilson, in the employ of Thos. Kearns of Utah, is examining a gold property near Hailey. There were twelve tons of ore shipped from the property that netted \$100 per ton. The ledge averages 2 feet in thickness and crops out for over 1200 feet.

MICHIGAN.

The Belt copper mines of Greenland, Ontonagon county, Mich., consisting of 3300 acres of mineral land, machinery, buildings and improvements thereon, were recently sold at auction, bid in by Wolsley and Mercer as trustees for the debenture holders for \$256,000.

Houghton reports that a three-ton mass of copper has been found at the bottom of No. 2 shaft of the Winona mine. The shaft is in rich ground from top to bottom.

MONTANA.

The annual statement of the Boston & Montana Con. C. & M. Co. shows: Capital stock, \$3,750,000; amount paid in, \$3,750,000, as follows: For property, \$2,500,000; by cash, \$1,250,000; amount of existing indebtedness, including bonded indebtedness secured by mortgage, \$1,245,500.76, of which sum \$747,000 represents bonded indebtedness, secured by mortgage on the corporate property.

NEVADA.

P. McKenzie who recently bought the Cooper claim on Bull Run mountain is said to be extracting ore which will grade \$300 per ton. The Dexter mine at Tuscarora is dropping fifteen stamps, is rushing the work of obtaining power from Chicken creek and will have the 40-stamp mill running in sixty days. The Young America Co. is understood to have let a contract for the erection of a mill to be completed before December 1st. The Eira is producing at the rate of three carloads of high grade ore per month besides a large tonnage of low-grade which will be treated in the old Nevada mill as soon as the repairs are finished. L. Parsons is reported to have a strike near the Dexter mill of a large ore body. J. Talbot has a property bonded and is reported to have struck pay ore. Twelve men are at work. The shipments last week over the E. & P. railroad were 374,260 pounds. J. Smith, at Pine Grove, is operating the old Wilson mine and the tailings dump from

the stamp mill that has been working for many years. In the tailings are found sufficient gold values to justify working them. A cyanide plant has been running since last spring. The shipments are productive of profits. The tonnage in the tailings dump is reported large and it is said will yield a fortune.

The Dayton *Times* says that the force of the Reno mine was increased last week, which indicates that the bullion returns from the test run at the new mill are satisfactory.

NEW MEXICO.

New Mexican: At Cooney the Copper Queen mine has suspended indefinitely. The ore is too hard to mine and of too low grade to pay.

A. E. Dawson, Supt. of the Santa Rita Copper & Iron Co., is shipping six cars of iron ore per day. He is also Mgr. of the Santa Rita copper mines for the Hearst Co., and is sending twenty tons of copper ore per day to the Silver City Reduction Works. At Mogollon the Little Fanny mine remains closed with large bodies of ore in sight. Offers of a good royalty have been made to the company, but they will neither work the mine nor lease it to be worked. The Confidence mine is working seventy miners. The main adit level is in 1700 feet, and has produced good bodies of ore nearly the entire length of the drift. The ore varies in width from 5 to 20 feet and is of good milling grade. The end of the adit has attained a depth of 550 feet. At 1200 feet from the mouth of the adit a shaft has been sunk from the surface. The mine is producing eighty tons of ore per day, which is hauled to the company's 30-stamp mill at Whitewater.

OREGON.

(Special Correspondence).—A company of merchants have opened up the Queen of the West, Gold Reef, Red Cross and Center, with the Mayflower adjoining. The first named has a ledge of good milling ore 6 feet wide. Shipments of ore to Tacoma, at an expense of \$34 per ton, returned a net profit of \$84 per ton. The mineral belt here is two miles wide; contact granite and black slate, with a pitch to the southeast. A large deposit of mottled black and white marble has been found and a sample sent to the Mining Bureau at San Francisco.

Cornucopia, Sept. 25th, 1898.

At the Black Butte Cinnabar mine in Douglas county the smelting furnace for the reduction of the ore is just finished. There are fifty men on the company's payroll.

Near Ashland fifteen men are cutting the three-mile ditch to the Poorman mine. The Shorty-Hope mill which has been shut down for several weeks on account of a shortage of water has started up again. Edwards & Evans have begun development work on the Fairview property. At Mount Reuben in Josephine county, Senator Jones of Nevada has eighty men developing a quartz ledge and on Grave creek are miles of new ditches and new hydraulic pipe to carry water for placer mines as soon as the fall rains set in.

Bement Bros.' quartz mill at Eagleton is crushing ore from an 18-inch vein. The discovery of a copper deposit is reported from Quartzburg in Grant county.

The Baker City *Democrat* says there is a probability that operations will soon be resumed at the Virginia Consolidated. Prospecting above the 300-foot level can be carried on, though the Virtue shaft is not cleared of water.

Journal: Near Grants Pass the Gold Key, operating the Braden mine, are putting in new machinery. J. J. Martin, Supt. for the Seattle M. Co., has bought seven claims in the Big Applegate district for \$5250. The S. F. people interested in the Hammersly property at Jump-off-Joe district will shortly resume work. D. Cameron has bought the Chinese property on Pleasant creek paying \$2400, and is preparing it for the winter season. J. D. Stevens has sold to Lister & Calvert his half interest in three placer claims for \$1000. The Rogue river gold dredger started last week near Tolo. They found 8 feet of gravel. The dredger is run night and day. On Upper Grave creek near Leland this winter three hydraulic plants will be in operation in addition to those already established, and every claim along the creek for a distance of six miles seems to be taken up. Caldwell & Kelman have leased the Mayflower mine in eastern Oregon and will put up a smelter of ten to fifteen tons per day capacity to be in operation next month.

UTAH.

At Park City over 1500 tons of Crescent ore is awaiting shipment, and the amount is being added to as fast as the tramway can get it down from the mine. The jiggling plant has produced about 200 tons of concentrates and good results have been obtained. The Silver King's new mill will be finished by the time bad weather sets in. The ore shipments last week were 1,752,770 pounds. At Mercer the Chloride Point made a shipment of 300 pounds of cyanides, the third shipment from the new mill. The Geyser-Marion made a shipment of cyanides of 800 pounds. The Frances group is showing up well. The vein has been reached and assays sixty-two ounces of silver. Ore has been found in all three shafts on the Omaha, and prospecting the vein by drifts is progressing. A sample from the dumps assayed \$12.80 per ton. The Daisy made a shipment of cyanides consisting of 158 pounds. This lot will bring \$6000. It represents the product of the mine for two weeks. The Mercur shipped 1000 pounds of auro-cyanides of the value of \$25,000. There has been an increase in the values of the Mercur mine tapped by the Lulu incline. When work was started in the ore body at that point values were below the average, but now they are better than in the parts of the mine already stopped. Four assays give from \$12.50 to \$14.60 per ton. The North Star of Tintic shipped three cars of ore, making 200 tons the present month. They expect to take out a carload of ore daily. The Mammoth mine at Mammoth has found

the ore in the drift off the 1700-foot level. This gives 80 feet of stoping ground, the vein above at places being as much as 14 feet wide, bearing gold and silver.

In the Treasure Hill mine near Silver City ore has been found showing 330 ounces in silver to the ton and from \$19.20 to \$5 in gold. The company has thirty-five men on its payroll, and this month has shipped twenty carloads of ore.

Shipments from Tintic last week were seventy-nine carloads of ore, fifteen of concentrates and twenty-eight bars of bullion. Operations at the Hailton & Lark at Bingham are mostly in the 800 and 850 levels, thirty-five men being employed. Since work was started last June in the 850 a drift has been run 400 feet. It is now in about 3 feet of first and second-class ore, assays from first showing 37 per cent lead, 10 per cent copper and 34 ounces silver. Stoping is progressing in both levels. Three cars of crude were shipped last week and there are several more in the bins, besides eight or ten of concentrates.

WASHINGTON.

Near Meyers Falls the Vulcan M. Co. has begun work on a 200-foot tunnel. Work has resumed on the Silver Queen. A large amount of development has been done on the property and considerable ore taken out. The Acme is the most extensively worked property in that vicinity. A large body of ore has been found and shipments will soon commence. At Northport the smelter has blown in. A daily shipment from the Le Roi mine is coming to the smelter of 400 tons. Roast heaps containing from 2500 to 3500 tons of ore are burning.

At Republic a new pulverizer is being placed in the Republic mill; with a daily capacity of fifty tons, the mill is turning out bullion at the rate of \$1000 per day. At Colville the men employed at the Old Dominion mine have finished clearing out and timbering the 4000 feet of tunnels in the property.

At Republic the control of the Iron Monitor claim is said to have been sold for \$12,000.

WYOMING.

At Grand Encampment a discovery has been made in the Haskins property, in running their prospect tunnel, of an ore vein 5 feet in width that yields 40 per cent copper.

Riedl & Labada have opened a copper vein in the Sampson mine, near Grand Encampment, that is 3 feet wide and carries pyrites and red oxides of copper to the amount of 30 to 50 per cent.

FOREIGN.

AUSTRALIA.

At the Broken Hill Proprietary 21,163 tons of ore were treated for the four weeks ending Sept. 15th. The output from the refinery for the same period was 413 ounces gold, 404,880 ounces silver, 1998 tons lead, 73 tons antimonial lead. The copper matte contains 26 tons copper and 20,020 ounces silver.

BRITISH COLUMBIA.

Preparations are being pushed for the erection of a large stamp mill at the Ymir mine. A few months ago the London & British Columbia Gold Fields, Ltd., decided to erect a 40-stamp mill, but since then such large bodies of ore have been exposed that the company rescinded the order for the 40-stamp mill and contemplate putting up 80 to 100 stamps. They have installed a 5-drill compressor and are sinking a 100-foot shaft on the 300-foot level to ascertain the probable extent of the ore. Average assays ran \$154 to the ton. The ore chute is from 30 to 50 feet wide and it is estimated by the engineer that there is enough ore in sight to pay for the mine, developing same, putting up the mill and leave a profit of half a million dollars. Contracts have been let for 240,000 feet of lumber for flumes and mills. For the present they will use tramways to carry the ore from the mine to the mill, but will push a 3000-foot tunnel to disperse with hoisting and tramways. The Big Three G. M. Co., operating the Mascot, Southern Belle and Snowshoe at Rossland, will put in a 7-drill electrically driven air compressing plant, hoisting engine and drills. The dynamo is a three-phase synchronous motor, and will deliver 100 H. P. at a speed of 900 revolutions per minute. This will be the second electrically operated compressor plant in Rossland, and, in fact, in Canada. The War Eagle plant, now in transit, will be the first. Several other mining companies contemplate the installation of electrical plants. The final payment of \$15,000 has been made on the Pothook group of claims at Kamloops. They pass to an English company, of which H. Croft is the head. Work is being pushed on the tunnel on the Humming Bird claim at Boundary Creek. There are on the dump seventy tons of mineral which assays \$30. The second payment on the Slocan Boy deal has been made by J. L. Retailack. This mine was bonded to him several weeks ago for \$50,000 and a 10 per cent payment made at the time. This second payment was also 10 per cent.

J. F. Bledsoe of Vancouver, B. C., says that Vivian & Sons of Swansea are arranging to have a cargo of ore shipped to them from properties on Texada island, with a view to determining whether there is enough of certain kinds of ore to justify them in putting a smelter on the British Columbia coast.

Rossland Miner: At the War Eagle, at the 625-foot level, sinking is going ahead. At the 500 level drifting is in progress, and the ledge is 30 feet wide with 10 feet of good smelting ore, while the rest is of a silicious nature, adapted to milling. The British Columbia Bullion Extracting Co., which has a contract for treating 4000 tons of the silicious ores from the War Eagle dump, has nearly completed its plant, and will probably commence treating the ore in a few days. At the Le Roi the shaft is down to the 760-foot level and is being timbered. The west drift at the 700 level is about 200 feet; the west 600-foot level is also in promising shape. Recent ship-

ments for the week amounted to 2565 tons—the largest amount of ore produced in a single week by any mine in the camp. About 260 men are at work, operating twenty-six drills. At the Monte Cristo the work of development is in progress in the 300, 400 and 600 foot levels.

CANADA.

The Canadian Mining Annual shows that mining enterprises in Canada are on the increase. The geological survey places the total value of the mineral output for 1897 above \$28,000,000, or an increase of \$6,000,000 over the previous year. The output is divided as follows among the principal mining provinces: British Columbia, \$10,455,268; Nova Scotia, \$6,000,000; Ontario, \$5,000,000; Quebec, \$2,063,266; Northwest Territories and Yukon, \$3,000,000.

JAPAN.

The manganese ore mined in Hakodate, at the Setani mines, in 1897, was 5200 long tons, nearly all of which was exported.

LOWER CALIFORNIA.

Gold bullion to the amount of \$1100 was shipped to San Diego from the gold mine at Escondido, a large bar from the Reconquista mine at Jacalitos and bullion valued at \$1027 from Alamo.

MEXICO.

At Nacosari, Sonora, the Copper Queen Co. is opening a group of copper and silver mines, and has a narrow-gauge road six miles in length and a smelter running. At Mesa Quemada, Sonora, the shaft on the Francesa mine is 200 feet deep, showing a vein of \$9 gold ore over 20 feet wide. The tunnel which cuts the Guillerma mine is in 100 feet. This shows a large vein of \$10 ore, and the Giant Zodiac is also being developed, experiments showing that it is adapted to the cyanide process.

Near Monterey there are two smelters in operation, the larger having a daily capacity of 500 tons, which, in 1897, produced 7,076,544 ounces of silver, 23,330 ounces of gold, and 22,912 tons of lead. The smaller smelter has a capacity of ninety tons daily. The larger has ten blast furnaces, while the smaller has six water jacket furnaces of a capacity of ninety tons daily and three revolving furnaces of forty tons per day. The annual output of ore amounts to 112,000 tons. Twenty thousand tons of coke and 5000 tons of coal are annually consumed at the smaller smelter, and a proportionate amount at the larger. Of lead 30,740,942 pounds were produced in the smaller smelter from May 1, 1897, to April 30, 1898, and 39,683 pounds of silver and 661 pounds of gold during the same period. From 400 to 500 men are employed at the smelter, the daily payroll of the latter being about \$1000 in Mexican money. Laborers at the smaller smelter receive from \$1 to \$5 daily in Mexican money, and are paid weekly. Skilled labor is paid monthly. Salaried officers receive from \$100 to \$600 in Mexican money monthly. Both establishments do a large business with the United States, the products being shipped, and practically all supplies being obtained therefrom.

R. Bartlett has sold his bond on the Santa Gertrude mine in Sonora to J. D. Wilbur of San Francisco who will at once put in machinery and work the mine.

ONTARIO.

Near Mine Center the Olive mine shipped \$1200, the product of a week's run from a 2-stamp mill. The average yield of the ore was \$46 per ton.

Commercial Paragraphs.

The Gates Iron Works, Chicago, Ill., has an order for the machinery for a 1000-barrel cement plant in England.

SCHILLING & SONS recently shipped a 25 H. P. improved model Golden Gate gasoline engine and hoisting outfit to the Inyo Mining and Development Co., Keeler, Inyo county, Cal. They have also just shipped one of their Golden Gate engines to the Ribbon Rock Gold Mining Co., Jamestown, Tuolumne county, to operate a blower and pumps.

The Simonds Saw Co. have moved into the building No. 33 Market St., where they will carry a large stock of goods and enjoy better facilities for conducting their business, manufacturing saws, knives, repairing, etc., as well as a more central location.

In Siskiyou Co., Cal., at the Oro Fino mine, near Fort Jones, a third improved Evans elevator, together with a large consignment of the Evans riffles, also several of the Rusby patent ball bearing giants, have recently been shipped and will soon be placed in position. This is the third Evans elevator that Supt. Rusby has placed on this old time property, which is now being operated in splendid shape under the Evans system. The Risdon Iron Works are also shipping a very large Evans elevator, which will weigh in the neighborhood of ten tons, to the Aromas Mining Company on the Salmon. This elevator will have a throat 18 inches in diameter and will utilize about 2000 inches of water per day. This machine will elevate about 40 feet.

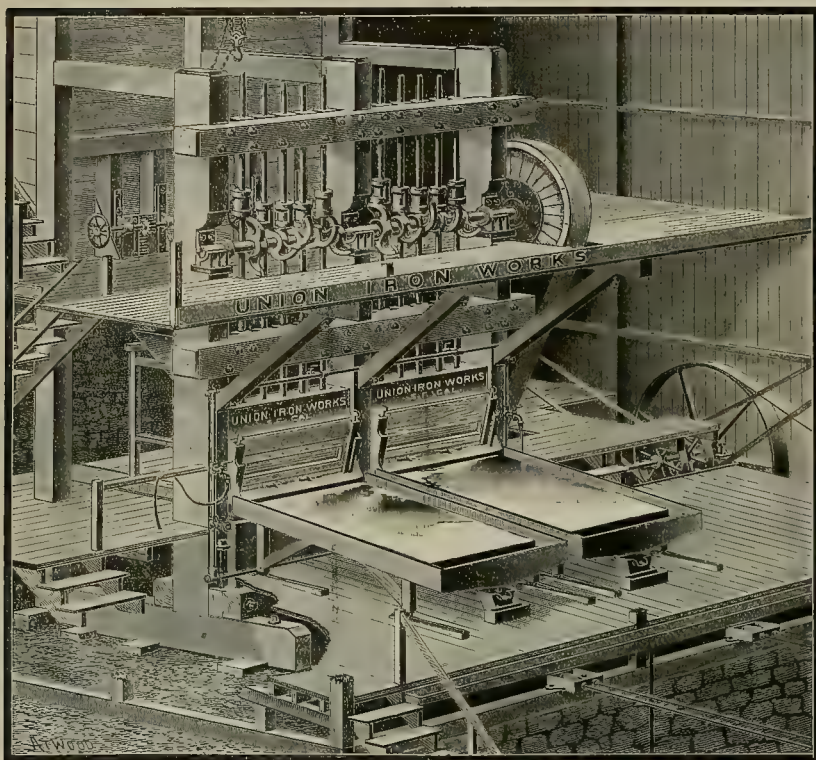
The Edward P. Allis Company of Milwaukee report considerable demand for the new Leyner drill and that the results obtained from every drill sold are satisfactory, mine managers being quick to see the advantages the drill possesses. The following are a few of the plants sold during the last two weeks: Four drill plant to Auburn, Cal., four drill plant, Ground & Irwin, Carthage, Mo., five drill plant, Ingauran Copper Co., Mexico, two drill plant, T. J. Steers, Joplin, Mo., three drill plant, Swansea Mining Co., Tintic, Utah, four drill plant, Kerr, Brownlee & Co., Webb City, Mo., and two drill plant, Chas. Boyd, Aurora, Mo. This company is also putting on the market a new hand rock drill suitable for prospectors and leasers, to be used where power is not available and judging from the number of inquiries received the Allis Co. say they expect to do a large business in this particular branch.

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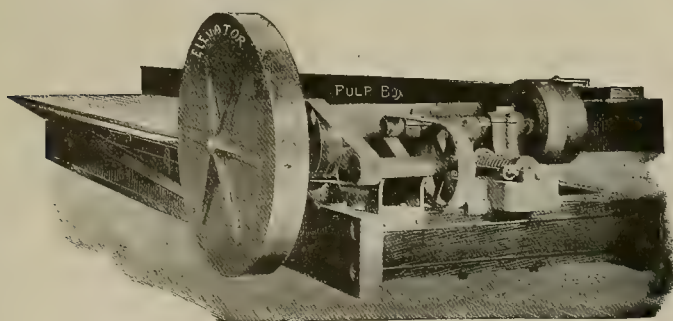
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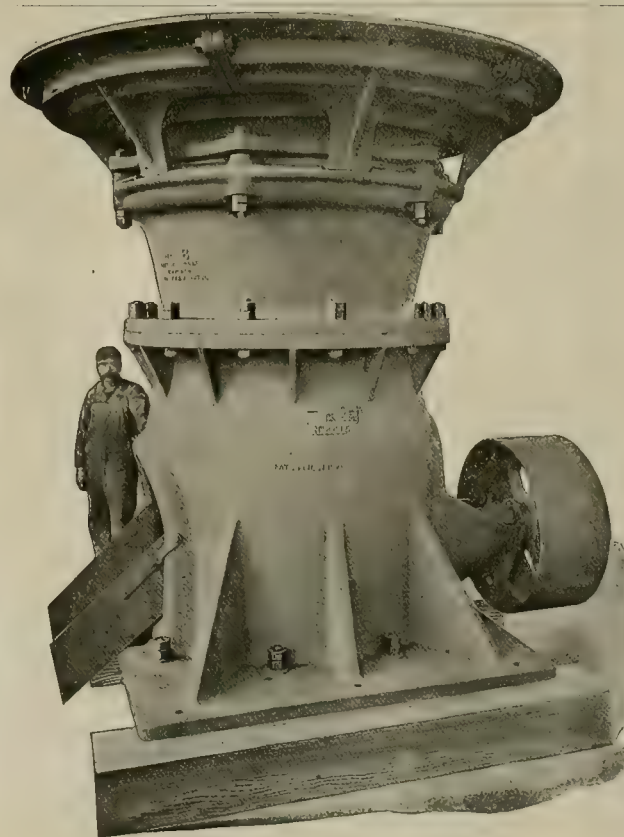
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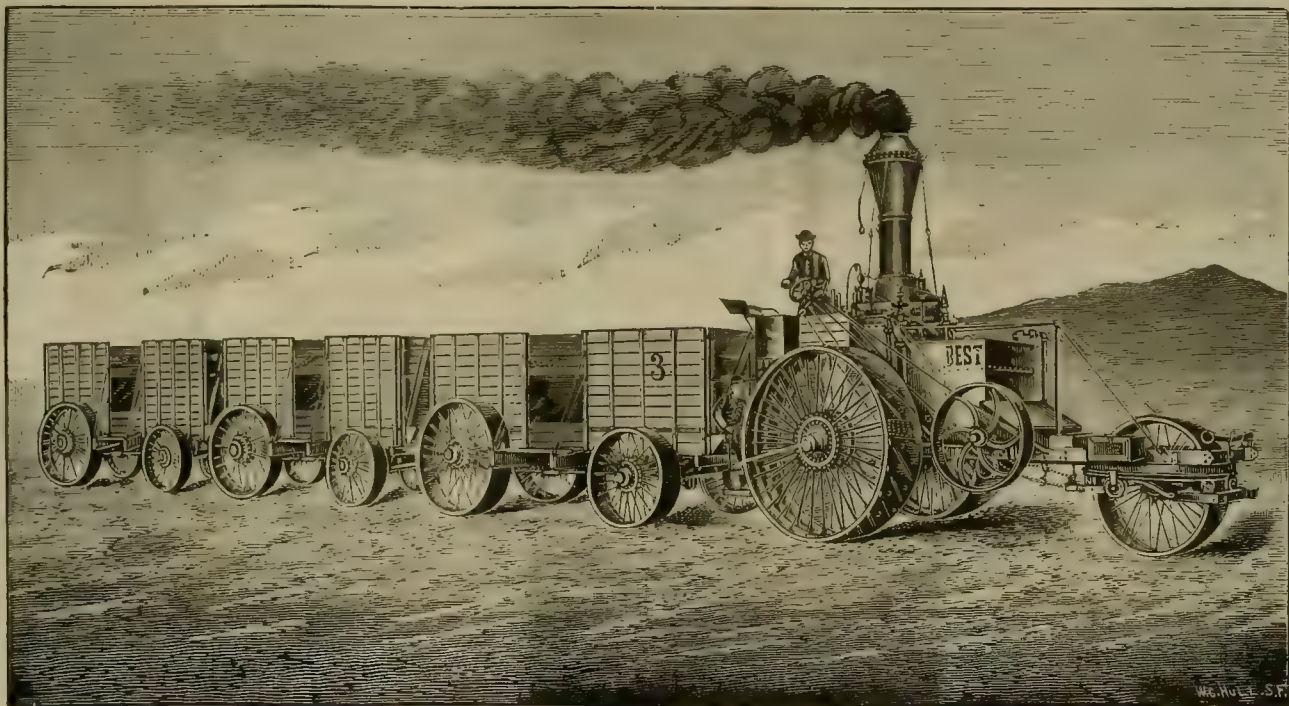
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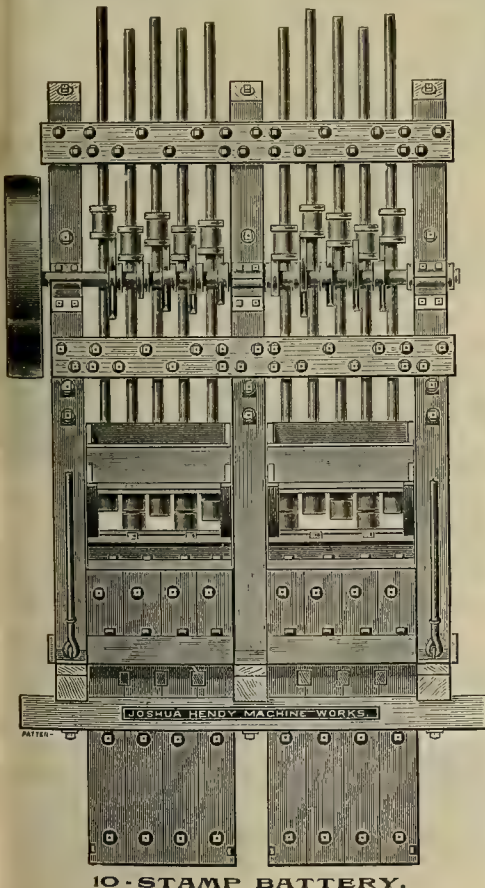
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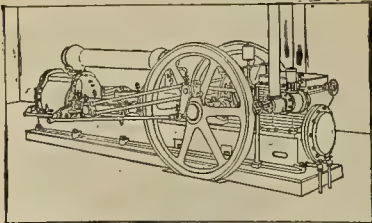
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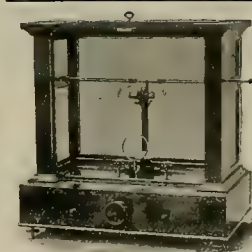
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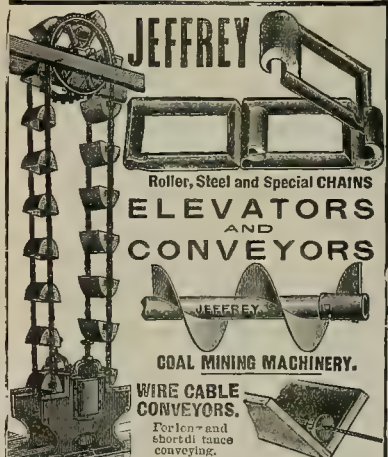
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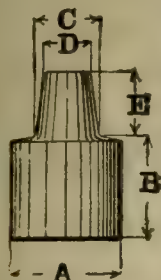
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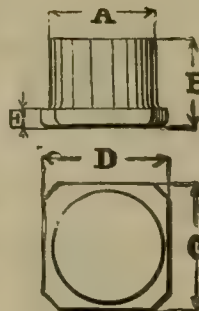
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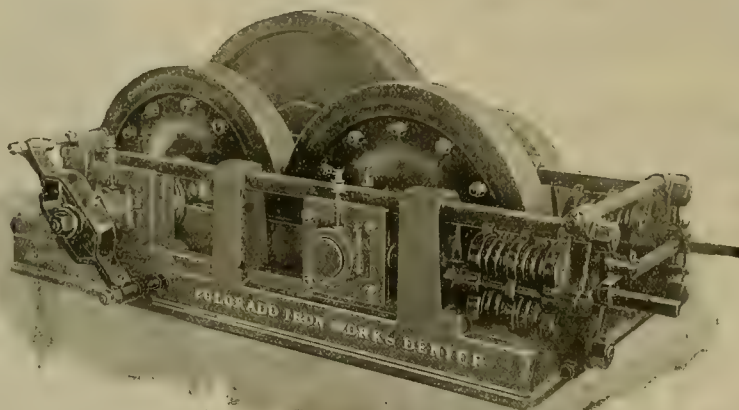
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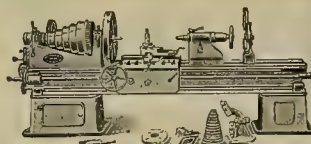
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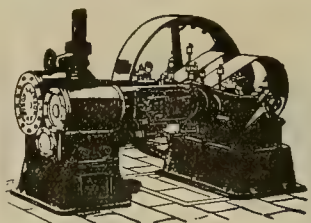
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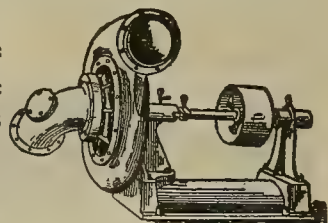
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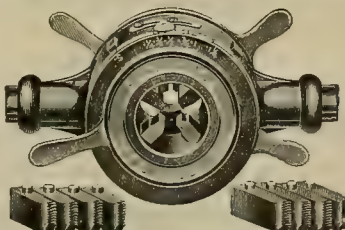


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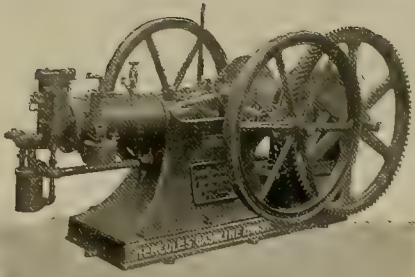
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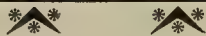
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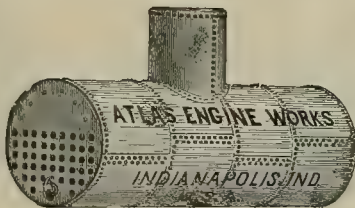
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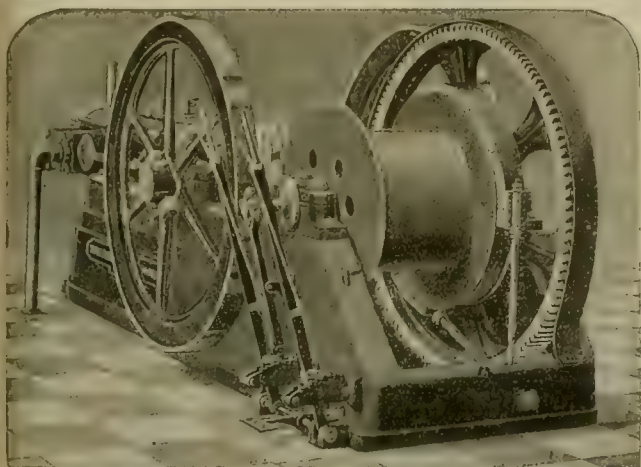
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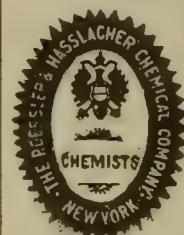
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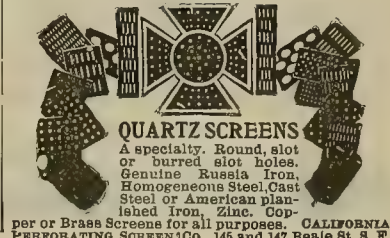
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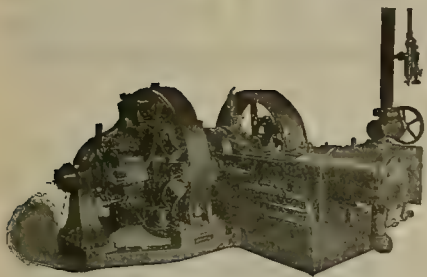
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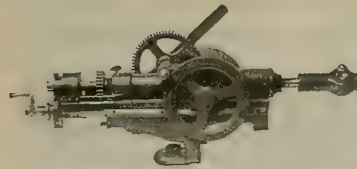
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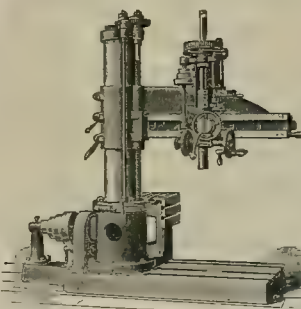
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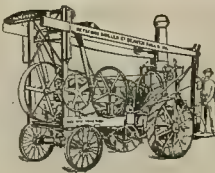
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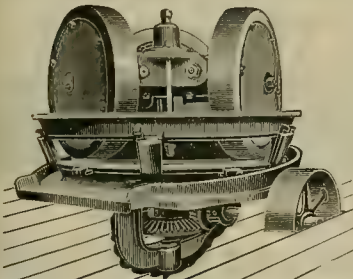
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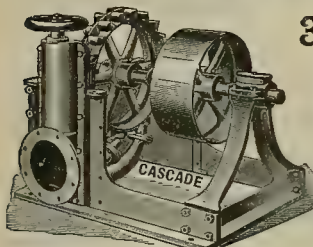
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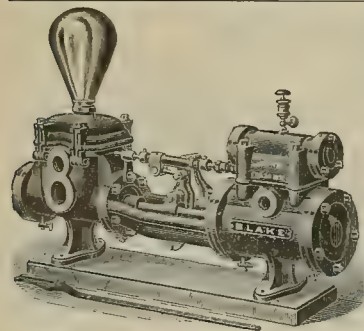
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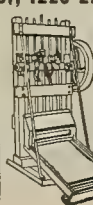
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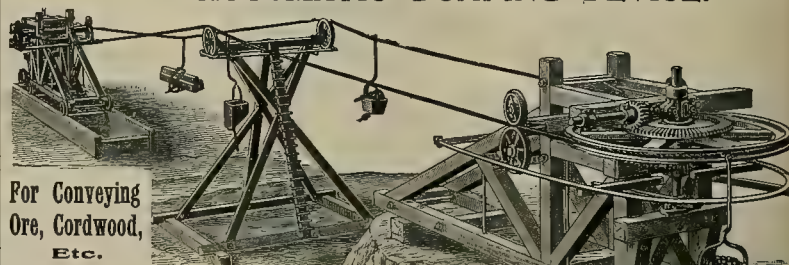
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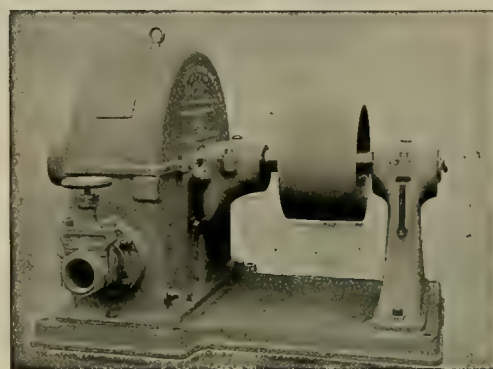
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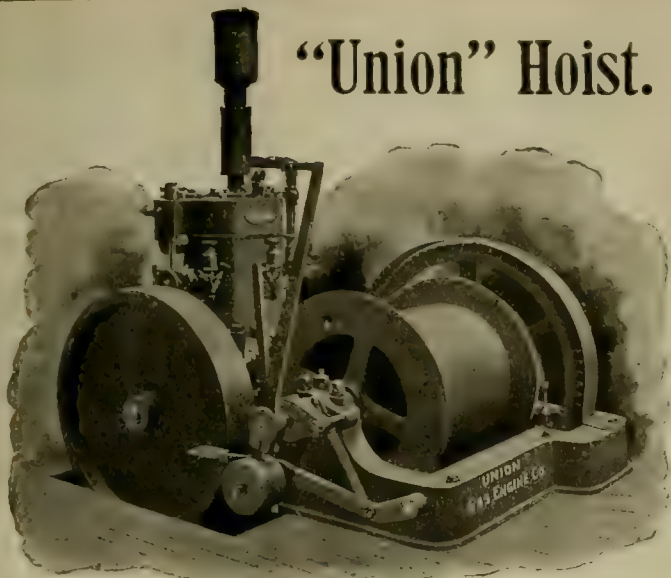
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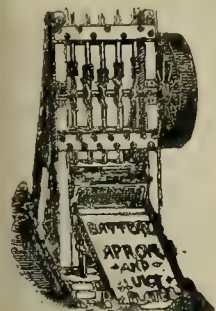
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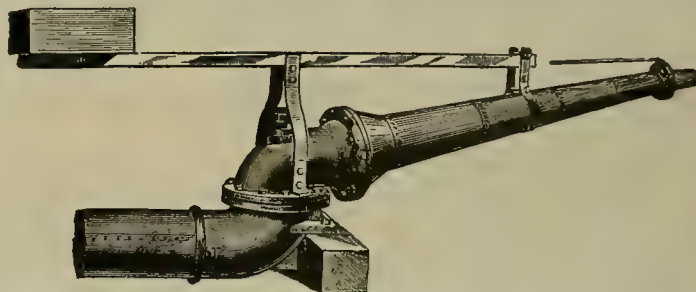
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Address Book Dept. Mining and Scientific Press, 330 Market St., San Francisco.

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 29, 1898.

SILVER.—London, 28 $\frac{3}{4}$ d; New York, 61 $\frac{1}{2}$; San Francisco, 61 $\frac{1}{2}$; Mexican Dollars, 47 $\frac{1}{2}$ @ 47 $\frac{1}{2}$. The Indian demand for silver increases. Bars this week touched the highest figure since the beginning of 1897. Spain is reported to be "a sparing purchaser." New York exchange, sight, 17 $\frac{1}{2}$; telegraphic, 20.

LEAD.—New York reports "weak;" exchange, \$3.92 $\frac{1}{2}$; brokers', \$3.83 $\frac{1}{2}$. Local, pipe, 6@6 $\frac{1}{2}$ c; sheet, 6 $\frac{1}{2}$ @7c; pig, 5 $\frac{1}{2}$ c; bar, 6c.

Regarding lead and zinc in general, *Iron and Steel* says: "The demand for lead and zinc has been on the increase during the entire year and prices advanced last week to the highest quotations recorded in recent years. The increase has been so great that mine owners in the Missouri districts have become so dubious of the ore brokers and mill men that the market is being quietly manipulated by the smelting companies in the Southwest. Last week the zinc market reached \$34 a ton at St. Louis and \$32.50 at the mines when it was \$1 a ton more than the price at the mines during the corresponding week of last year and an advance of \$3 over the preceding week. Last week's output of 1,910,720 pounds was greater than the corresponding week of last year, but the lead output showed a falling off of 20,530 pounds. Leading zinc men attribute the strength of the market to the increased uses of zinc."

"Ore buyers attributed the sharp advance to the demand for high grade ore from some of the smelters that were forced to have large quantities in order to profitably smelt the low grade ores they had on hand. This, however, is but a minor factor in the results obtained, as the fight between the smelting corporations and the manipulation that is going on among the brokers is considered to be the real cause of the increase in price, and as long as the smelters continue to buy the market will continue firm, even if it does not advance still higher. The increase in the use of zinc is to be noticed in the increased use of iron and steel, especially steel sheets and roofing plates, for purposes of shipbuilding and the smaller trades. The market price has increased abroad and the lead and zinc mines of other countries have felt the benefit of the expanding demand and higher prices. The Missouri district has taken the lead in the lead and zinc industry, and the district total for thirty-five weeks this year was 294,124,230 pounds of zinc and 37,692,230 pounds of lead. The total value of this product was \$4,304,399."

COPPER.—New York reports Lake, \$12.25 @ 12.37 $\frac{1}{2}$.

A Boston copper talk says: There has been much discussion in copper mining circles of late over what has appeared to some to be an anomalous situation in the copper market. The copper market is not so much an open field as the positive quotations would seem to indicate. Copper is not bought and sold daily on this side of the Atlantic at open market rates. It would indeed be difficult to quote the actual copper market at present. Some people hold that the copper market is strong at 12 $\frac{1}{2}$ c; others say it is weak at 12 $\frac{1}{2}$ c. As a matter of fact, copper is not selling at either price, and it might not be possible to buy it at either price. What has been done in the copper market can be told. When the market had receded from 12c to 11 $\frac{1}{2}$ c and appeared quite weak, the Calumet & Hecla, which deals only with its customers, notified the manufacturers that they could have all the copper they wanted for this year's delivery at 11 $\frac{1}{2}$ c if they would then announce the amount desired. Round lots were sold at this price, and then the company withdrew from the market. Thereupon there was quite a spurt in the price and a very great demand. The Calumet then offered to their customers a "second helping" at 12 $\frac{1}{2}$ c. The demand this time appeared greater than before, but the company told its customers to take all they wanted for this year's delivery, and many million pounds were sold at this price. The Calumet then again retired from the market with a nominal asking price of 12 $\frac{1}{2}$ c, but copper can probably be purchased under this figure of other interests. Still, Calumet is out of the copper market for the time being, but will have copper to sell later in the year. At the present time it is simply willing that other people should do the selling.

Business in this country is increasing, but the foreign situation is a little weaker. No material decline in copper prices this year is expected, but if the foreign situation does not improve the increase in American consumption next year may not keep pace with the increased American production.

All copper people are figuring upon lower prices for copper two or three years hence, as the present price of copper will of course stimulate production. Copper mining in Arizona is certainly booked for a very large increase in output.

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—Unchanged, 5 $\frac{1}{2}$ @5 $\frac{1}{2}$.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c; Bar, 19c.

ANTIMONY.—9 $\frac{1}{2}$, 10.

BABBITY METAL.—10-12-14—best 16c.

QUICKSILVER.—Weaker. Domestic, \$40; export, \$36.50; carload lots, special rates.

POWDER.—F. o. b., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15 $\frac{1}{2}$ c; less than one ton, 17 $\frac{1}{2}$ c. No. 1* 60%, carload lots, 13 $\frac{1}{2}$ c; less than one ton, 15 $\frac{1}{2}$ c. No. 1* 50%, carload lots, 11 $\frac{1}{2}$ c; less than one ton, 13 $\frac{1}{2}$ c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9 $\frac{1}{2}$ c; less than one ton, 11 $\frac{1}{2}$ c. No. 2* 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car

728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45. **CAPS.**—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8.00 Coos Bay, \$5.00 Seattle, 6.00 Southfield, 7.50 Cargo lots, Eastern and foreign: Wallsend, 7.50 Cumberland, \$10.00 Brymbo, 7.50 Cannel, 9.50 Pennsylvania, hd., 14.50 Welsh Anthracite, 12.50 Scotch, 8.00 Rock Springs, 7.60

COKE.—Foreign, \$18; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.12 per gal.; bbl., \$1.07; pure No. 2, cs., 85c; bbl., 80c; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.11; less than 200 gals., \$1.20; in bbls., 4c per gal. less than case; Baker's Crystal, \$1.50; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 43c; cs., 45c; raw, bbl., 41c; cs., 46c; lots of 5 bbls., 1c less; Lucol, boiled, bbl., 38c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17c; Astral, 17c; Star, 17c; Eocene, 19c; Extra Star, 21c; Elaine, 22c; Water White, bulk, in tanks, 11 $\frac{1}{2}$ c; Mineral Seal, iron bbls., 21c; wooden bbls., 23 $\frac{1}{2}$ c; cs., 26c; Mineral Sperm, 27c; Deodorized Stov. Gasoline, bulk, 12 $\frac{1}{2}$ c; do., cs., 13c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11 $\frac{1}{2}$ c; do., in cs., 16 $\frac{1}{2}$ c; Lard Oil, Extra Winter Strained, bbl., 56c; 61c; No. 1 bbl., 45c; cs., 51c; Neatsfoot Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs., 60c; Sperm, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25 @ 1.35 per gal.; wagon colors, \$2 @ 2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31c per lb.; carloads, 29c; in 10-lb. tins 37c; sulphuric acid, 2 $\frac{1}{2}$ c per lb. 66% B.; soda ash, \$1.60 per 100 lbs. 55%; hyposulphite of soda, 2 $\frac{1}{2}$ c per lb.; blue vitriol, 4 $\frac{1}{2}$ c per lb.; borax, refined, 5@6c per lb.; chlorate of potash, 9 $\frac{1}{2}$ @10c; roll sulphur, 2 $\frac{1}{2}$ c; alum, \$1.90 @ 2.00; flour sulphur, French, 2 $\frac{1}{2}$ @2 $\frac{1}{2}$ c; California refined, 1 $\frac{1}{2}$ @1 $\frac{1}{2}$ c; nitric acid, in carboys 8c per lb.; caustic soda, in 10-lb. tins 15c per lb.; Cal. s. soda, bbls., 65c; sks., 60c @ 100 lbs; chloride of lime, spot, 2.10 @ 2.25c; saltpeter, 15c; chlorate of potash, 25c; caustic potash, 12c.

CORDAGE.—Manila Rope, 10 $\frac{1}{2}$ c; Sisal Rope, 9 $\frac{1}{2}$ c; Duplex Rope, 8 $\frac{1}{2}$ c.

CANDLES.—Electric Light Candles—6s, 16 oz., 7 $\frac{1}{2}$ c; 6s, 14 oz., 6 $\frac{1}{2}$ c; 6s, 12 oz., 5 $\frac{1}{2}$ c; 6s, 10 oz., 4 $\frac{1}{2}$ c; Granite (Mining) Candles—6s, 16 oz., 8 $\frac{1}{2}$ c; 6s, 14 oz., 7 $\frac{1}{2}$ c; 6s, 12 oz., 7 $\frac{1}{2}$ c; 6s, 10 oz., 6 $\frac{1}{2}$ c. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8c; colored, 9c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.35; cut, \$2.25; 10 to 20d, wire, \$2.40; cut, \$2.30; 8d, wire, \$2.45; cut, \$2.35; 6 and 7d, wire, \$2.55; cut, \$2.30; 4 and 5d, wire, \$2.65; cut, \$2.40; 3d, wire, \$2.80; cut, \$2.55; 2d, wire, \$3.05; cut, \$2.95. In carload lots, 10c per keg less.

Mining Share Market.

SAN FRANCISCO, Sept. 29, 1898.

About 97% of the amount required by the the Comstock drainage and deep mining committee has been pledged by the different companies, and plans and propositions are now in embryo as to the details and cost of the preliminary work. Pending the commencement of such work the stock market is not overly buoyant.

San Francisco Stock Board Sales.

SAN FRANCISCO, Sept. 29, 1898.

9:30 A. M. SESSION.

| | |
|----------------------------|---------------------------|
| 300 Con. Cal. & Va.....85c | 700 Potosi.....18c |
| 50 Confidence.....53c | 100 Sierra Nevada.....84c |
| 200 Mexican.....24c | 300 Union Con.....28c |
| 300 Ophir.....62c | 100 Yellow Jacket.....24c |

2:30 P. M. SESSION.

| | |
|----------------------------|---------------------------|
| 200 Alpha.....04c | 400 Ophir.....58c |
| 700 Best & Belcher.....30c | 100 Sierra Nevada.....81c |
| 200 C. Cal. & Va.....80c | 400 Yellow Jacket.....24c |
| 100 Crown Point.....15c | |

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPTEMBER 30, 1898.

611,007.—PADDLE WHEEL.—D. Abbott, San Jose, Cal.
611,084.—Hook.—C. L. Baker, Watford, Cal.
611,087.—PLOW.—P. Bayer, Knight's Ferry, Cal.
610,889.—ICE LOCOMOTIVE.—Bowles & Hansbrough, S. F.
611,062.—RIFLE ATTACHMENT FOR SHOTGUNS.—H. A. Darms, Napa, Cal.
611,114.—BRUSH.—D. B. Forward, Alturas, Cal.
611,032.—ANTI-FRICTION BEARING.—T. R. Garnier, Los Angeles, Cal.
610,886.—FIRE KINDLER.—G. I. Green, Petaluma, Cal.
611,118.—POPCORN PRESS.—A. C. Grube, Los Angeles, Cal.
611,173.—DRILL.—J. L. Jones, Starbuck, Wash.
610,992.—ROTARY SAND PUMP.—J. Mann, Butte City, Cal.
610,994.—GAS FROM OIL.—F. L. Martenette, Chico, Cal.
611,208.—PRESERVING WOOD, ETC.—V. D. & H. R. Rood, San Diego, Cal.
611,005.—SWIMMING APPLIANCE.—S. Stone, Quillayute, Wash.
610,927.—TROLLEY.—O. W. Swanson, Tacoma, Wash.
611,025.—CAR COUPLING.—H. H. Warner, Tacoma, Wash.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

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Finds buyers or working capital for meritorious mines or good prospects. Correspondence invited. W. E. Holbrook, Pres't. L. F. Haskell, Sec'y. 29-30 Chronicle Building, S. F.

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It is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

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For Sale.---A Bargain.

35 H. P. HERCULES GASOLINE HOIST.

New and first-class in every particular; geared to 700 feet per minute; all latest improvements; made in sections weighing not over 1000 pounds each.

Outfit built to order; has never been used; price very low; builders will give full guarantee.

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Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco.

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THE BUCYRUS COMPANY,

DESIGNERS AND BUILDERS OF

DREDGES, STEAM SHOVELS, EXCAVATING MACHINERY, WRECKING CARS, LOCOMOTIVE CRANES, PILE DRIVERS, CENTRIFUGAL PUMPS, WITH SIMPLE, COMPOUND OR TRIPLE EXPANSION ENGINES,

MACHINERY FOR PLACER MINING. SOUTH MILWAUKEE, WISCONSIN.

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Write us for particulars for use of the

Webster System of Steam Heating.

It will save you money.

WARREN WEBSTER & CO., Heating Engineers.

1116 17th St., DENVER, COLO.

Recent California Mining Incorporations.

Amo M. Co., San Francisco; capital stock, \$60,000, all subscribed; G. H. Fuller, A. B. Krefl Jr., T. W. Reece, H. R. Riley, J. W. Cummins.

Warren Development Co., Colton; capital stock \$100,000, B. K. & W. J. Warren, H. G. Chambers, H. B. Morris, S. W. Bayless.

Amo M. Co.; capital stock \$60,000; all subscribed; G. H. Fuller, A. B. Krefl Jr., H. R. Wiley, J. L. Cummins, T. W. Reece.

Recently Declared Mining Dividends.

Merrimac, California, 5 cents per share; Sept. 21.

Victor, Colorado, \$100,000; Sept. 20.

Highland, South Dakota, 20 cents per share, \$20,000; Aug. 30.

Boston & Colorado Smelting Co., 1 $\frac{1}{2}$ per cent; payable October 1.

Books Received.

"Hand Book of Corliss Steam Engines;" F. W. Shilletto, Jr.; 8vo.; pp. 196. The American Industrial Publishing Co., Bridgeport, Conn. A modest little treatise on how to set up and run a Corliss engine, with more solid meat in it than is often found in many larger volumes; price, \$1.

"A Manual of Quantitative Chemical Analysis;" E. F. Ladd, B.S.; 12mo.; 88 pp. John Wiley & Sons, N. Y. City. A compilation of methods found to be effective, and of value to the general student. Price, postpaid, \$1.

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage. MONEY loaned, mines, MINING companies organized, their property experted, financed and managed, MINES, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated, EXAMINE mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

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Heavily Timbered Scow, 150x60x8 Ft.
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First-class apparatus. Inventory \$950. Will teach
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COMPLETE ASSAY AND LABORATORY
OUTFIT.

Office furnishings, including Hoskins furnaces,
Berthel balances, chemicals, glass and earthen-
ware apparatus, roll-top desk, bookcases, etc., etc.
At a bargain. Address ASSAYER, Mining and
Scientific Press Office, San Francisco, Cal.

Mine and Mill Superintendent

Will be open for an engagement Oct. 1, '98.
Highest References Furnished.

Can also do Mine Surveying, Mapping and As-
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or silver property anywhere.

As to terms, qualifications, etc., address F. G.,
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Will be open for engagement October 1st as
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Thoroughly competent in analyzing, assaying,
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SILVER CITY, GRANT COUNTY,
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Purchasers and Smelters of Gold,
Silver and Copper Ores.

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on the Pacific Coast :

Through frequent complaints made
to us, we have learned that unprin-
cipated and dishonest dealers on the
Pacific coast have counterfeited our
trademark numbers and substituted
inferior, spurious goods as ours, when
ours were distinctly ordered, thus de-
frauding the customers and injuring
our trade and reputation.

Our goods are acknowledged to be
the best, and are fully warranted by
us, and are marked with our name or
initials or with our well-known trade-
mark and catalogue numbers.

We request direct notice if any goods
alleged to come from us, or bearing our
trademark or numbers, prove to be
other than the best, and perfect in
every respect, as we will follow up and
expose such frauds for our customers'
and our own protection. We have no
exclusive agents on the Coast, but our
goods are obtainable from all respect-
able dealers in drawing materials,
stationery, hardware, artists' material,
etc. Respectfully,

KEUFFEL &

ESSER CO.,

New York.



Assessment Notices.

EUREKA CONSOLIDATED DRIFT MINING COM-
pany—Location of principal place of business, Forest
Hill, Placer County, California.

Notice is hereby given, Direct at a meeting of the
Board of Directors, held on the 12th day of September,
1898, an assessment (No. 13) of one-half cent
per share was levied upon the capital stock of the
corporation, payable immediately in United States
gold coin, to the secretary, at the office of the
company, Nos. 1209-11 Claus Spreckels building, San
Francisco, California.

Any stock upon which this assessment shall re-
main unpaid on the 13th day of October, 1898, will
be delinquent and advertised for sale at public
auction; and unless payment is made before, will
be sold on TUESDAY, the 1st day of November,
1898, to pay the delinquent assessment, together
with the costs of advertising and expenses of sale.

By order of the Board of Directors,
J. J. CRAWFORD, Secretary.
Office—Nos. 1209-11 Claus Spreckels building, San
Francisco, California.

MARINA MARSICANO GOLD MINING COM-
pany—Location of principal place of business, Sunny
Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the
Board of Directors, held on the 24th day of Septem-
ber, 1898, an assessment (No. 16) of 2 cents per share
was levied upon the capital stock of the corpora-
tion, payable immediately in United States gold
coin, to the secretary, at the office of the company,
217 Sacramento street, San Francisco, California.

Any stock upon which this assessment shall re-
main unpaid on the 31st day of October, 1898, will
be delinquent, and advertised for sale at public
auction; and unless payment is made before, will
be sold on MONDAY, the 21st day of November,
1898, to pay the delinquent assessment, together
with the costs of advertising and expenses of sale.

By order of the Board of Directors,
CHARLES BOVONE, Secretary.
Office—217 Sacramento street, San Francisco, Cal-
ifornia.

LEON GOLD MINING COMPANY.—Location
of principal place of business, San Francisco,
California, location of works, near Winchester,
Riverside County, California.

Notice is hereby given that at a meeting of the
Board of Directors, held on the 16th day of May,
1898, an assessment (No. 1) of 1 1/2 cents per share
was levied upon the capital stock of the corpora-
tion, payable immediately in United States gold
coin, to the secretary, at the office of the company,
room 7, fifth floor, Mills building, San Francisco,
California.

Any stock upon which this assessment shall re-
main unpaid on the 25th day of July, 1898, will
be delinquent and advertised for sale at public auc-
tion; and unless payment is made before, will be
sold on MONDAY, the 25th day of July, 1898, to pay
the delinquent assessment, together with the costs
of advertising and expenses of sale.

By order of the Board of Directors,
R. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San
Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon
Gold Mining Co., the day of delinquency of the
above assessment is postponed to July 9th, 1898, and
the day of sale to MONDAY, August 8th, 1898.

R. L. CHENEY, Secretary.
Office—Room 7, fifth floor, Mills building, San
Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the Leon
Gold Mining Co., the day of delinquency of the
above assessment has been postponed to September
6th, 1898, and the day of sale to MONDAY, Septem-
ber 6th, 1898.

R. L. CHENEY, Secretary.
Office—Room 508, Safe Deposit building, Cor. Cali-
fornia and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.

By order of the Board of Directors of the Leon
Gold Mining Co., the day of delinquency of the
above assessment has been postponed to Septem-
ber 3rd, 1898, and the day of sale to MONDAY, Octo-
ber 3rd, 1898.

R. L. CHENEY, Secretary.
Office—Room 508, Safe Deposit building, Cor. Cali-
fornia and Montgomery streets, San Francisco, Cal.

POSTPONEMENT.

By order of the Board of Directors of the Leon
Gold Mining Co., the day of delinquency of the
above assessment has been postponed to October
1st, 1898, and the day of sale to TUESDAY, Novem-
ber 1st, 1898.

R. L. CHENEY, Secretary.
Office—Room 508, Safe Deposit building, Cor. Cali-
fornia and Montgomery streets, San Francisco, Cal.

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Gold, Silver, Lead and Copper Ores and Matte
sampled and marketed to the best advantage.
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Our long experience in the market enables us
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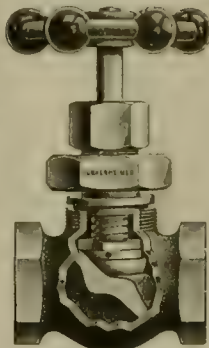
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Peterson Current Motor for streams not less
than 3-mile current. Horse Powers, Portable
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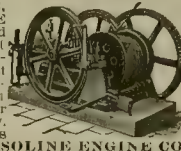
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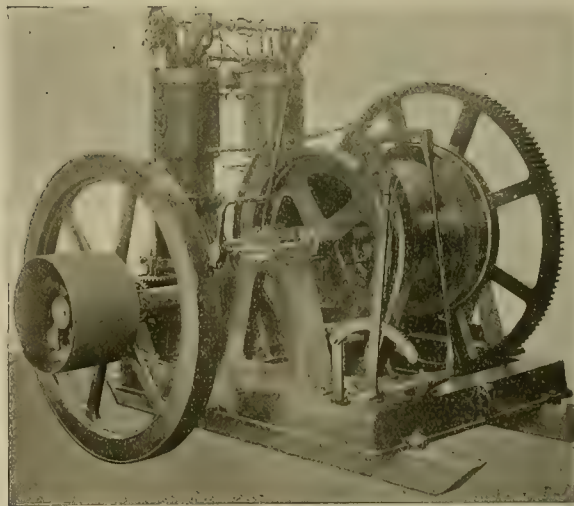
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DISTILLATE or CRUDE
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saving over steam, especi-
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water are scarce. Send for
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State size wanted. Address
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Improved Mining Hoist.



THE
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POWER.

Will Raise More Ore
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MANY IN USE
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Where, with Enlarged and Increased Facilities,
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Promptly, and at Reasonable Prices, and will
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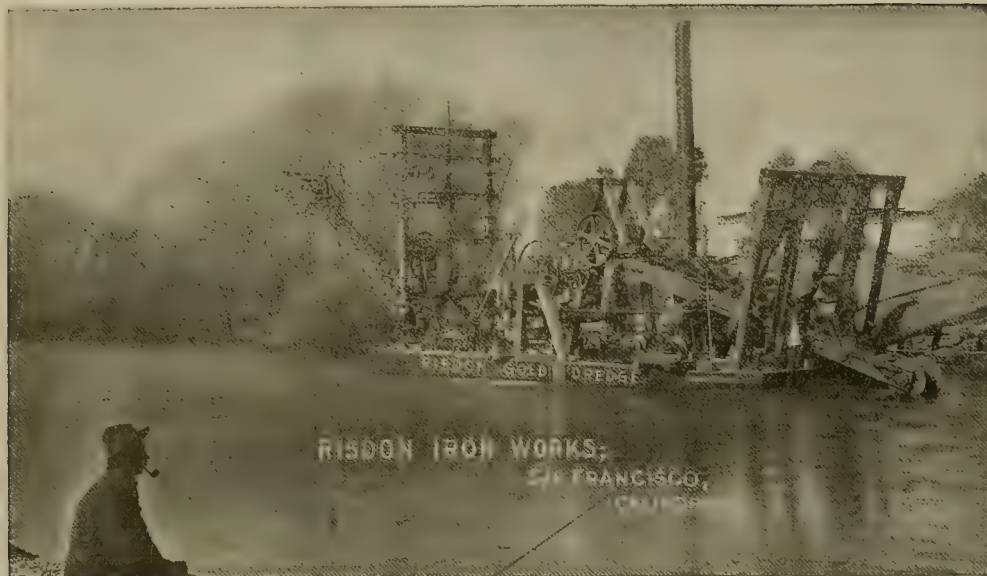
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For transporting Ore, Fuel, Merchandise, etc., in bulk or in packages.

LOADS MECHANICALLY.

DUMPS AUTOMATICALLY.

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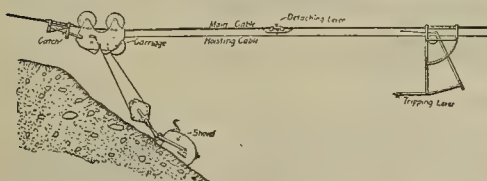


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HOISTING ENGINES

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BOLTHOFF'S IMPROVED DESIGNS.

Single and Double Cylinder Flat Friction,
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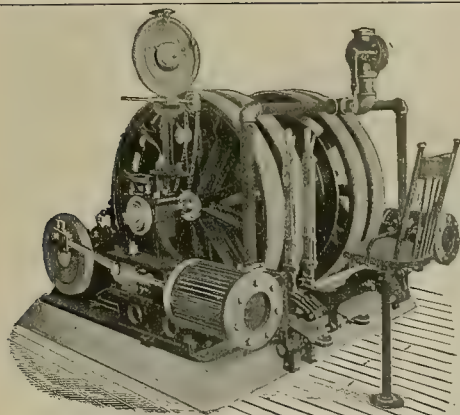
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Direct Acting, First and Second Motion Hoisting Engines.

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10 x 12 LIGHTNING QUADRUPLE FRICTION HOIST.

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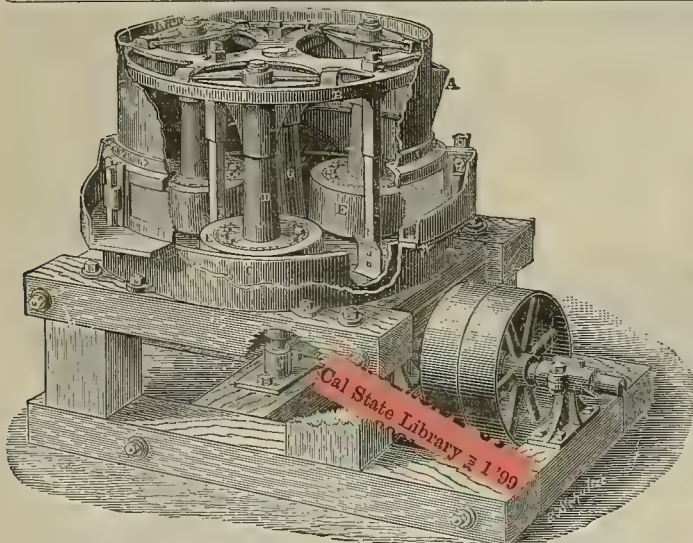
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Rock Breakers, Cornish Rolls, Pulverizers, Concentrators, Ore Feeders,
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Estimates Furnished for Complete Plants for Hoisting Works, Smelters, Concentrators and Stamp Mills.



The Huntington Mill is so well and favorably known among mining men throughout the world that any description of it would seem superfluous. They are in use in the United States, Canada, Mexico, Central and South America, Australia, China, Japan and South Africa—in fact, wherever mines exist, and have given the best satisfaction of all quartz-crushing mills. The construction of this Mill has lately been much improved and we claim it to be the cheapest, most efficient, simplest and most durable Mill upon the market. Catalogue upon application.

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Adopted, Used and in Force in Accordance with State Law.

For the convenience of our readers in the mining counties we print in legal size, 12x36 inches, the Mine Bell Signals and Rules provided for

in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness. 50 Cents a Copy.

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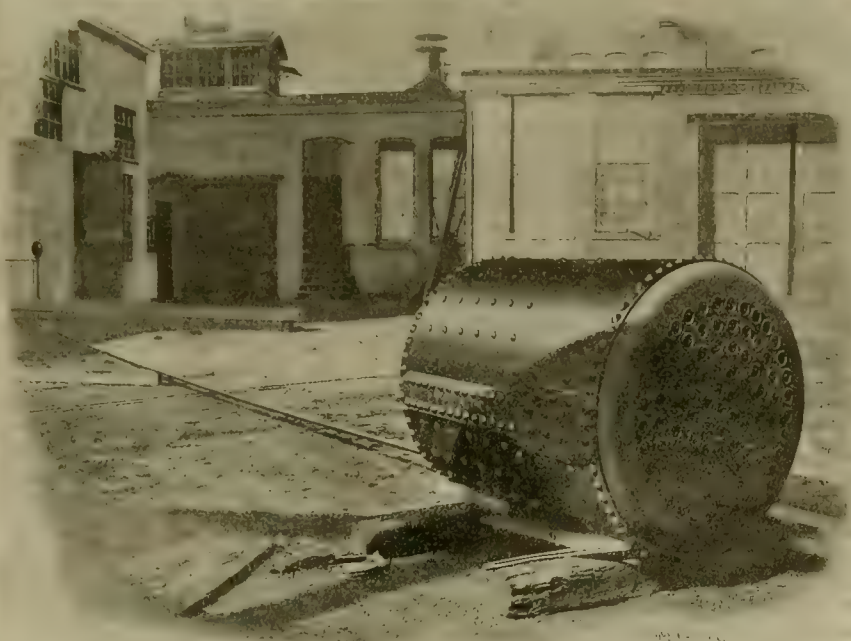


FIG. 1.—SHOWING THE BOILER, SUPPLY PIPE AND PRESSURE GAUGE.

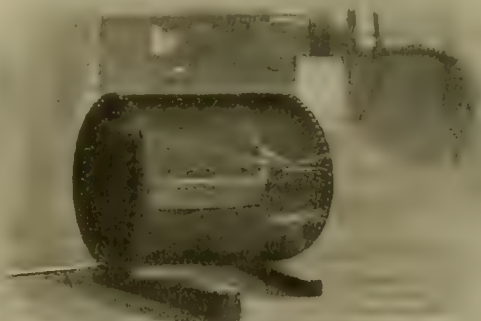


FIG. 4.—SHOWING THE FIRST LEAK.



FIG. 5.—LEAKAGE AT THE TRIPLE RIVETED JOINT.

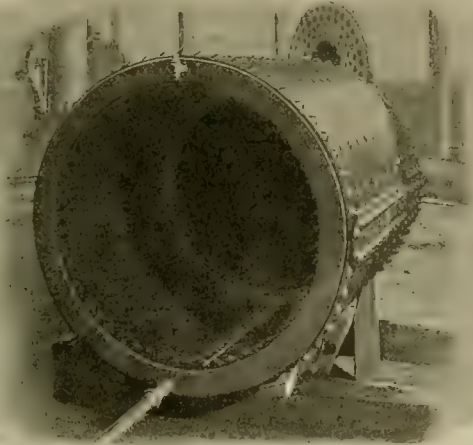


FIG. 2.—SHOWING THE FURNACE END OF THE BOILER.



FIG. 6.—LEAKAGE AT THE END OF TEST.

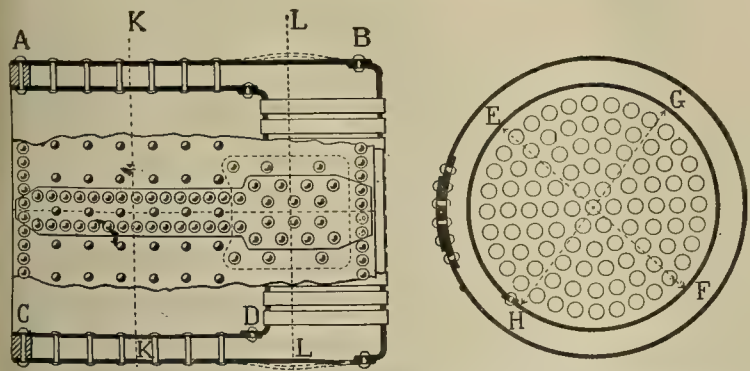


FIG. 3.—SHOWING THE CONSTRUCTION OF THE EXPERIMENTAL BOILER.

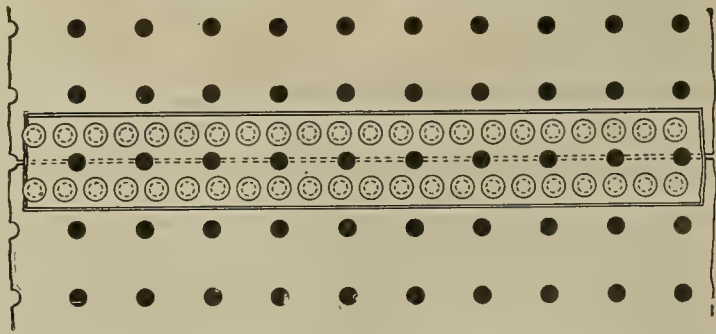


FIG. 7.—STYLE OF JOINT ADOPTED IN EXPERIMENTAL BOILER.

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San Francisco, October 8, 1898.

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A RECENT ruling of the Supreme Court of New Mexico, to the effect that one can locate a mining claim on an unconfirmed grant, and if the courts refuse to confirm it the location will hold the same as if it were made on known public domain, is considered to be a settlement of a long disputed question in that region of old Spanish land grants.

THAT portion of southern Nevada to be traversed by the projected Utah & Pacific Railway will be greatly benefited by the improved transportation facilities. There is considerable there of what in the old days of 15c-a-pound freight was called "base metal," and let alone, but which with improved methods and lower rates can be profitably worked.

EVEN among the present consolidation of great interests, and the formation of huge trusts, is noticeable the formation last month of the Federal Steel Co., incorporated in New Jersey, with a capital stock of \$200,000,000. It is a consolidation of the Illinois Steel Co., the Minnesota Iron Co., and an Illinois railroad company, with further intent to absorb an Ohio and Pennsylvania steel company.

THE States of Colorado and California, especially the latter, have this season suffered tremendous losses through forest fires, a species of destruction which particularly affects the mining industry. Strict enforcement of existing laws, and a quickened public feeling on this important subject, in place of the present reckless disregard can alone aid in stopping the general summer destruction of our forests.

WITH unusual enthusiasm, and amid surroundings that lent dignity to the occasion, California celebrated last January in San Francisco the fiftieth anniversary of the discovery of gold in California. Colorado, which now stands in the foremost rank of gold producers, proposes to celebrate next January the fortieth anniversary of the discovery of gold within the borders of that commonwealth. It was in January, '59, that Geo. A. Jackson discovered placer gold at Idaho Springs, Colo., and that event, which did so much for that State, deserves fitting commemoration.

UNDER date of Sept. 22nd, the general manager of a London, England, smelting company writes that his concern can successfully treat zinc-lead ores, and would buy them on the terms named in an article on page 225 of the issue of Sept. 3rd, '98, being the prices proffered by Eastern smelting firms. He adds that "freight is heavily against us, and \$10 for zinc expenses is too low; \$15 would be nearer, but, on the other hand, would likely give 25 cents a unit for the zinc above 22%." An article on page 304 of the issue of Sept. 24th sufficiently illustrates the impracticability of the proposition, the matter being referred to here to indicate the universal interest manifested in these matters.

Work on the Comstock.

On page 353 Almarin B. Paul suggests that if the money proposed to be spent in unwatering the Comstock, Nev., lode, with a view to deeper mining thereon, were expended elsewhere in development work in Nevada on possible new Comstocks it would be of more value to that commonwealth. He also implies that the Comstock is a "has been" and that further money spent there will be without satisfactory result.

That intelligent expenditure of money and effort in development of mining properties is productive of good results is manifest, and Mr. Paul is correct in the suggestion that Nevada has a vast mineral area that could with profit receive attention from the prospector, the miner and the investor; so has California, and every other State and Territory in this west half of America. The attention of the mining world, so far as Nevada is concerned, was, however, concentrated on the Comstock a generation ago, and the wonderful yield of that lode sufficiently accounts for the continued interest maintained.

THE MINING AND SCIENTIFIC PRESS has long argued that deeper mining on the Comstock would be profitable. It has cited facts in support of its position, and still holds to that belief. It is not prepared, however, to put implicit confidence in the present project, so far formulated, for the Comstock's revivification. The old name and fame of the Comstock have been repeatedly used to conjure with, and it is now questionable as to the true meaning and intent of the proposed work. Assuming the honesty, good intent and ability of the projectors; taking it for granted that the idea is not to work up a last "boom" on the street during which those who are loaded up with stock can have a final opportunity to dump it; but on the assumption that the idea is actuated by honest business intent to unwater the mines and go deeper, it is believed that the means as outlined are wholly inadequate. The \$100,000 proposed to be raised would not be enough to buy the requisite machinery and lower the water sufficient to resume deep mining therein. It would take at least five times that amount to push the entire project to a satisfactory conclusion.

The plan of draining the Comstock and of subsequent deeper working can be accomplished; it is merely a question of money, and it is believed that if any association of men can be induced to furnish the requisite capital, that its intelligent and economical use would ultimately result in profit to the investors, but the time has passed when the stock gambling public can be depended on to supply the money for an undertaking of such magnitude.

Lured to Death.

This paper has published a great deal of reliable statement regarding the Yukon region, and since the inception of the recent northern movement has thoroughly ventilated the heartless schemes of those who have tried to coin money out of the credulity of those who contemplated effort in that direction. That it has been reasonably successful is evinced. That many a poor fellow has lost life, health and fortune by belief in fraudulent statements is as evident. No human law can reach those who have so egregiously deceived men desirous of going to the Yukon. It is pitiful to read of the suffering and misery consequent upon such action. The following is selected as a fair sample of several similar stories:

Early in this year a party of twenty-six men left San Francisco for Dawson via the Stickeen trail. One, H. Lang, was the only one that got through. According to authentic accounts, the horrors that this big party went through are out of the ordinary, even for the Klondike records. Two of the number were drowned, two are insane, others remain far in the interior in deplorable condition. In the Chesley river seven of their ten boats were dashed to pieces on the rocks and the outfits lost. In two of the wrecks Black and Morgan of California were drowned. It was then that some of the men went insane and had to be restrained from taking their own lives. The party started up the Stickeen over the ice, determined to be the first to cross to Lake Teslin. They made forced marches, dragging heavily loaded sleds through the slush-covered ice. They were "wrecks" when they reached Telegraph creek.

There they found the promised wagon road to the lake had not been built, nor even started, but found as smooth a liar as the man who first persuaded them to take that route. With a map of his own he proved to them conclusively that the easiest way to reach Dawson City was by following the Chesley and Niline rivers into the Telin river. Accordingly they started overland for the headwaters of the Chesley river. The distance was fifty miles, and the snow was so far gone that they had to pack their outfits on their backs. They reached the river only to find it a series of rapids almost as bad as Five Fingers or the White Horse. After a great deal of hard work, they built ten small boats and started down stream, shooting rapids studded with big boulders and sunken rocks. Seven of the boats were lost with their contents and two men drowned. At last they reached a point near the Teslin river and made a portage, abandoning the three boats. On reaching the river, some remained at the trading post, others built new boats and started on to Dawson; Lang alone got through.

This is partly in answer to a question: "Why does the MINING AND SCIENTIFIC PRESS so persistently dwell upon the perils and hardships of the Yukon?" The above is sufficient reply. It is not the natural and unavoidable difficulties of gold seeking in that region that this journal has commented on unfavorably, but on the cruel, lying policy of so many unscrupulous men connected in various ways with means and routes of transportation and travel, who are morally guilty of murder for their part in the hideous record.

COMPRESSED AIR furnishes power to riveting machines in present use in the construction of a gasometer, 175 feet diam., at Washington, D. C. The tank consists of four telescopic sections, each 35 feet deep. The lower section has 3-inch steel bottom plates, side plates 1 inch thick, 6 feet wide; the rivets in the lower section are 1½, 1¼ and 1 inch in diameter; ¾-inch rivets are used in the other sections. All the riveting is done by eight yoke riveters, having a reach of 6 feet, consisting of a yoke frame made of plates and angles, upon which are mounted pneumatic hammers, four of which have a 1¼-inch piston and a stroke of 6 inches; the others have each a piston 1½ inches diameter and 5-inch stroke. Each riveter is suspended by a block and tackle from the top of a traveler supported by rollers which run on the upper edge of the side plates; the frame is held in any position by wedges driven between the upright posts and the tank plates. Compressed air is furnished at a pressure of 100 pounds to the square inch by a compressor run by steam from the boiler of the hoisting plant. Two men tend each riveter. In one day of ten hours 530 1¼-inch rivets were driven with one machine, and it is stated that 700 ¾-inch rivets is not an extraordinary day's work. A good local example of successful pneumatic riveting is to be seen in the pipe manufactory of the Risdon Iron Works, San Francisco.

In the case of Gillis vs. Downey, 85 Fed. Reports, 483, the U. S. Circuit Court of Appeals decided that the filing of an application for a patent does not suspend the obligation to keep up the required manual work where, without paying the purchase money, the claimant permits his application to sleep for years; and that upon such failure to comply with the conditions, the claim is open to relocation in the same manner as if no location had ever been made. The fact that the sixty days prescribed by Sec. 2325, U. S. Revised Statutes, for application of a notice of application for a patent has expired before the application is adverse, does not preclude a contest and the applicant's right to a patent, where the adverse claim does not arise until after the expiration of the sixty days, and where the applicant has allowed his application to lie dormant for years without either paying the purchase money or doing the required work each year.

"ASSESSMENT WORK" for the calendar year will be done to a considerable extent during the remaining eighty-four days of '98. Though fully recognizing the fact that a rich prospect is sometimes ruined by developing it, yet it would be well in doing development work to have less sinking of shallow shafts and running of short tunnels, and more sinking that would be of greater permanent use than "goph-ering."

The Biggest Mine of All.*

He was a mining engineer,
Thoroughly trained in every sphere
Of knowledge scientific;
The catalogue of things he knew,
In theory and practice, too,
Would cast a spell on me or you,
As something quite terrific.

Chemical unions he could loose
And most refractory ores reduce
To reguline condition;
And, having conquered many lands,
He sought fresh triumphs for his hands,
When, walking on the ocean sands,
He felt a new ambition.

Before him in the sunshine rolled
The largest known supply of gold,
Though somewhat low grade was it!
The stuff was soft and easily won
And carried (said Professor Don)
About nought point three cents per ton—
A wonderful deposit!

And it was uniform, no doubt;
If it were mined, year in, year out,
With proper assiduity,
It would go on and pay to man,
As no mere land deposit can,
The dividends it first began,
In endless continuity!

Besides, of such productive work
No "apex-right" or legal quirk
Could thwart the rich requital;
For everybody knows the sea
To everybody's use is free,
With neither rent nor royalty,
By immemorial title!

The sailor cleaves it with his keel
For cod or mackerel, whale or seal;
It yields the bather's toilet—
Why should not the metallurgist,
On small or large scale, if he list,
A part that never would be missed
Abstract, and simply boil it?

"The scheme's complete!" he proudly cries.
"It only needs that I devise
"My skill profound displaying,
"Some process, either cold or hot,
"Thorough and practical, and not
"Too costly, which will give me what
"The wild waves are assaying!"

He built a wondrous structure then,
Which thoughtless, undiscerning men
Despised as hocus-pocus.
It held a monstrous burning-glass
Through which the solar rays would pass
To pierce the seething, sizzling mass
Of ocean at the focus.

And then there was a coffer dam,
Which, inexperienced as I am,
I dare but slightly mention,
And wires electric—what their need
Or use, I cannot say indeed;
But they belong, it is agreed,
To every new invention.

When all was done, he calmly sat
As some contented, stately cat
Sits gravely looking at us,
And waited for the fateful day
When he should reap the golden pay
Resulting from the operation
Of his apparatus.

The process turned out cheap but slow;
He saw the seasons come and go
With patient desperation,
While bravely he would still repeat
To all the explanation neat,
That his solution was complete,
But lacked precipitation.

His eyes grew dim, his hair grew white,
His creditors forgot him quite;
The speculative fever
Had ceased, except in him, to burn—
They did not even care to turn,
And get the leaky old concern
Attached to a receiver.

At last there came a stormy day
When a great wind laid bare the bay—
A most uncommon antic—
And what was more, the hurricane
Banked up the dunes along the main,
So that no drop came back again
Out of the vast Atlantic.

The aged mining engineer
At this catastrophe, I hear,
Was staggered for a minute.
But science was not long at fault;
After a transitory halt
He mined that coffer dam for salt,
And found a fortune in it!

—R. W. Raymond.

Concentrates.

In gelignite, gelatin is the base; in dynamite, infusorial rth.

About 1000 miners find present employment in and around ndon, B. C.

In English gold coins the copper alloy is one-twelfth; in merican, one-tenth.

QUICKSILVER melts at 39° F., evaporates slightly at 62°, boils 686°, and volatilizes at 680°.

The "rating" of a steam boiler is the number of pounds of iter it will evaporate per square foot of heating surface per ur.

The shipments of the Rossland, B. C., mines for the week ding Oct. 1st broke all previous records. The output was 39 tons.

The Silverton, Colo., Standard announces the discovery in e hills of San Juan of an ore body carrying 30 per cent agsten.

Recent rains at Minas Prietas, Sonora, Mexico, have filled

*Seldom do mining men lapse into verse, but at the Atlantic City elling of the American Institute of Mining Engineers, Bossiter . Raymond, the secretary, adopted this rhythmical form of com- ncatating his criticism on various efforts to extract gold from se- ster.—EDITOR.

the reservoirs and assured a long run for all the mills and cyanide plants.

PATENTED MINES are subject everywhere to assessment. In California county assessors arbitrarily assess unpatented min- ing claims at \$100.

At the Utica mine, Calaveras Co., Cal., by the cyanide pro- cess, is secured 85% of the gold assay value at a cost of \$3.50 per ton of ore treated.

ALL the ordinary ores of silver are soluble in dilute cyanide solution, the process of dissolution requiring, however, more time than in the case of gold ore.

AN electric railway seems a certainty from Colorado Springs across Pike's Peak to Cripple. The distance is about twenty-five miles. The estimated cost is \$700,000.

BUTTE, Montana, is the largest mining town in America; Houghton, Mich., the next in size; Cripple Creek, Colo., stands third, and Dawson City, N. W. T., fourth.

MEXICAN exports of silver in '97 were 55,850,000 ounces fine, valued at \$70,928,925, Mexican money. The value of silver bullion exported shows an increase of \$7,000,000 over '96.

THE British Columbia Review says that the Pilot Bay smelter will make another start, this time under the man- agement of the British East Kootenay syndicate of Cardiff.

THE 3-foot gauge road in Boulder county, Colo., cost, to build, total for the forty-nine miles, \$168,540; equipment, \$50,450. It is a great factor in the mining prosperity of that section.

THE electrical conductivity of magnesium is 41.2 per cent that of copper. It has a tenacity of 27,000 pounds per square inch. Its elastic limit in the shape of wire is 8750 pounds per square inch.

THE Board of Equalization of Trinity Co., Cal., has raised the county assessor's figures on five mining properties from \$49,050 to \$209,500. The five companies have joined issue and appealed to the courts.

THE total value of the mineral products of the United States for the year 1897 amounted to \$632,312,347. The gold produced was valued at \$57,363,000; copper, \$54,080,180; silver, (commercial value), \$93,316,000.

THREE lessees on the Matco mine, Cripple Creek, Colo., in August, netted \$38,416.55. The shipments for the month were 2,459,850 pounds of ore of a gross value of \$55,734.93. They paid a royalty of 20 per cent.

TWO cases are reported this week—one from Mariposa Co., Cal., the other from San Diego Co., Cal.—of swindlers start- ing miners to work and decamping with the mill proceeds. Those frauds are less common than formerly, but still exist.

MEXICO, in '97, imported 460,000 tons of coal and coke—an in- crease of 35 per cent over '96. About three-fourths was coal. Of the coal 55 per cent was from the United States, the re- mainder from England. About 80 per cent of the coke was American.

IN the Bushwhacker mine at Aspen, Colo., A. Baldrige, in company with S. Cole, had spit the fuse and retired to await results. The fuse of Baldrige falling to spit he returned to relight it; when he reached the breast the other shot went off and killed him.

L. BANDING, in the Sonora, Cal., Democrat, controverts a statement recently made that molybdenum lately found in Fresno county was the first discovered in California. He says that a vein 3 feet wide of sulphide of molybdenate was found near Sonora eight years ago.

IN Bisbee, Ariz., the town library, supported mostly by the Copper Queen M. Co., has 3053 bound volumes, to which 200 will be added within a month. Fifteen magazines, seven daily and twenty-five weekly papers are on file. The average monthly circulation of books is 852.

THE report of the assayer of the Denver mint shows an in- crease for September 1898 over the same month in 1897 of nearly 100 per cent. For the nine months ending September, 1898, over the corresponding period of 1897, the increase is nearly 65 per cent. The amount of bullion treated in 1898 is \$14,376,- 351.10, a gain over 1897 of \$5,938,266.54.

CENTRAL ASIA is said to be rich in gold, silver, copper and iron. Russians, though aware of this, either have not the en- terprise or the money to develop mines and are jealous of any one else exploiting the country. In the Alan Tau mountain range M. Cobbold obtained numerous specimens containing the above named minerals in his journey across the Pamirs.

REFUSAL last July of the Canadian Senate to ratify the con- tract for the building of a railway from Glenora, Upper Stick- ine river, N. W. T., to Teslin lake, made by the Canadian cabinet, wreaks present hardship on some hundreds of pros- pectors and miners in that region, by reason of suspension of work on the wagon road that was expected to connect there- with.

THE average annual production of iron ore in Sweden for each five years from '61 to '95 has risen from 453,486 tons to 1,517,434 metric tons. In '97 the output was 2,086,119 tons. In twelve iron mines there the depth varies between 200 and 275 meters; in fifty-two mines between 100 and 200 meters. Only two—the Taberg in Vermland and the Dalkarlsberg in Nerike—have reached a perpendicular depth of over 300 meters.

IN Boulder county, Colo., there are being built four stamp mills of a total daily capacity of 200 tons, and one chlorination plant of fifty tons capacity a day. In San Juan county mills are building of 400 tons total capacity in twenty-four hours. At Leadville a large concentrator and cyanide plant is being built on the Resurrection mines. It is estimated that these new plants will add \$5400 a day to the gold output of the State.

IN the case of Hartman vs. Smith, Montana, 19, the court decision was that: "all that is necessary to make the claim of a mill site by the owner of a non-contiguous mining claim valid, is the reasonable use and occupation thereof for mining purposes in connection with a mining claim. A mill site may be patented by compliance with the same requirements re- garding survey and notice as are applicable to mines or lodes."

ISAAC BANTA, who some years ago had a "secret sluice pro- cess" for treating gold beach sands, is reported working in Clallam Co., Wash., on the ocean beach along the straits of Fuca, at Ozette, where eight machines and thirty men are to secure in fine flour gold \$7.50 per day per man. A full descrip- tion of the machine and the process, furnished by one of the firm then interested therein, was published in the issue of April 25, 1896.

IN the California Supreme Court this week another and a final decision was given in the Fox vs. Hale & Norcross case,

substantially confirming the judgment of the lower court. The plaintiff, Fox, sued the company directors for sums aggregat- ing about \$1,000,000, to be recovered because of faulty and im- perfect milling of Comstock ore, and damages. The final re- sult is a verdict for the plaintiff for \$210,197.50, with 6 per cent interest from June 11, '92, to date.

CANADIAN officials at Dawson are reported to be secretly preparing for a threatened outbreak of the miners in the Klondike district. The meetings of the miners' associations of the Yukon are rapidly becoming more pointed in their threats against the officials, especially Gold Commissioner Fawcett and his office. At the last meeting of the association 300 men clamored for justice in the recording of claims and a motion to take the Gold Commissioner's office by force and nail up the doors almost passed.

FREQUENTLY queries are received that are very difficult to answer. Usually those questions are in inverse ratio to their value. A Wyoming State official asks: "1st. What cities or towns contain the greatest number of individuals who have made their fortunes directly or indirectly through the mining industry? 2d. What cities or towns have the greatest num- ber of mine owners working mines that are paying good divi- dends, or that ever were good-paying ventures? Cities and towns referred not to exceed a population of 50,000, and to be west of the Mississippi."

THE right to repudiate a subscription to a stock company which has been obtained by misrepresentations, fraudulent or unintentional, is universally conceded. No one can be com- pelled to hold an interest in a corporation when that interest has been obtained by misstatements. But in order to make such a privilege or right operative, there must be a movement toward repudiation the moment there is knowledge of a suffi- cient cause existing. It will not do for a subscriber to stock, when he knows of fraud, to wait, and, after making ineffectual attempts to unload his liability upon others, to then enter a protest. In so doing he would not only shut himself out of any remedy by a rescinding, but would himself become a party to the fraud. One or the other horn of the dilemma must be chosen. Either he must repudiate quickly or stay in and take his chances. What constitutes knowledge is always an open question. Mere suspicion or rumor cannot beso regarded, but a subscriber to stock must use ordinary means of inquiry which are subject to his use in verifying what comes to him as the truth.

THE zinc precipitation of gold from cyanide solution is illus- trated by experiments made at the Utica mine, where a solu- tion assaying 5.7 ounces gold and 2.2 ounces silver per ton was passed through a column 14x9x140 inches, which contained twenty pounds of zinc shavings at the rate of 700 gallons (= 5850 pounds) per twenty-four hours. The column was divided into ten equal sections or compartments. Assays of the solu- tion flowing from each were:

| Compartment number. | Column inches. | Gold ozs. per ton. | Silver ozs. per ton. |
|---------------------|----------------|--------------------|----------------------|
| 1..... | 14 | 0.800 | 0.260 |
| 2..... | 28 | 0.270 | 0.071 |
| 3..... | 42 | 0.130 | 0.035 |
| 4..... | 56 | 0.058 | 0.026 |
| 5..... | 70 | 0.052 | 0.023 |
| 6..... | 84 | 0.046 | 0.001 |
| 7..... | 98 | 0.032 | ..... |
| 8..... | 112 | 0.031 | ..... |
| 9..... | 126 | 0.227 | ..... |
| 10..... | 140 | 0.025 | ..... |

The solution contained 0.3135% potassium cyanide and re- mained constant during the passage of the column.

SEVERAL questions relating to locators' rights may be an- swered by quotation from a decision of the U. S. Supreme Court, in the case of Black vs. Elkhorn M. Co. (163 U. S., 445), in which it is laid down that "the interest in a mining claim, prior to the payment of any money for the granting of a patent for the land, is nothing more than a right to the exclusive possession of the land based upon conditions subsequent, a failure to fulfil which forfeits the locators' interest in the claim. To sum up as to the character of the right which is granted by the United States to a locator, we find: (1) That no written instrument is necessary to create it. Locating upon the land and continuing yearly to do the work provided for by the statute gives to and continues in the locator the right of possession as stated in the statute. (2) This right, conditional in its character, may be forfeited by the failure of the locator to do the necessary amount of work; or if, being one among several locators, he neglects to pay his share for the work which has been done by his co-owners, his right and interest in the claim may be forfeited to such co-owners under the provisions of the statute. (3) His interest in the claim may also be forfeited by his abandonment, with an intention to renounce his right of possession. It cannot be doubted that an actual abandonment of possession by a locator of a mining claim, such as would work an abandonment of any other ease- ment, would terminate all the right of possession which the locator then had."

THE following are conclusions arrived at by the general manager of the Association des Propriétaires d'Appareils a Vapeur, in consequence of his investigations into various non- conducting substances for cleaning steam pipes and boilers. (1) Condensation in an uncledared steam pipe is rather slighter in the case of copper than in that of cast iron. (2) The effi- cacy of a cleading under the same conditions, is therefore slighter when applied to a copper pipe than to one of cast iron. (3) A non-conducting substance should be efficacious for a slight thickness; and the efficacy of a cleading does not in- crease in proportion to its thickness, while it even may be diminished with a too great thickness. These results, already pointed out by M. A. Brull, are due to the fact that the thickness of the non-conducting substance increases the sur- face exposed to cooling down, so that the loss of radiation can exert more influence than the slight conductivity of the sub- stance. (4) It is advisable to varnish plastic coatings. For instance, with cement over cork and not varnished, a conden- sation of 29.7 per cent was observed, which was reduced to 21.7 per cent when the same cement received three coats of varnish. Not only does the varnish exert a good effect as regards condensation, but it also retards disintegration of the substances used for cleading. (5) The use of zinc is advisable over any non-ducting material, the effect of which it un- doubtedly increases. For instance, the condensation in a cop- per pipe cleaded with cork was 33.8 per cent, which was re- duced to 24 per cent when the cork was enclosed in zinc. The condensation in a copper steam pipe cleaded with cork covered with a coat of cement was 29.7 per cent, which was reduced to 21.7 per cent after three coats of black varnish were added; and by enclosing the whole in zinc the condensation was further reduced to 19.2 per cent.

Test of an Experimental Boiler.

Difference of opinion exists among engineers as to the strength of the water legs of upright, internally fired boilers, the main question being, whether the action of the stay bolting is or is not substantially the same as it is in a flat water leg. In former years, when vertical boilers were comparatively small, this question was not of much import; but when the sizes were increased so that the water legs were 6 or 8 feet in diameter, the problem became a serious one.

The mathematical discussion of such a structure as a curved water leg is involved, but investigation shows that for water legs that actually occur in practice, the following conclusions are true: (1) The stresses in the plates of a curved water leg are never greatly different (at the usual working pressures) from those that prevail in a similarly designed flat stayed surface; (2) The curved form of the leg does, however, cause the tension on the outer sheet to be somewhat greater than it would be in a flat leg; (3) The stress on the inner sheet is never a compression, but always a tension; (4) This tension on the inner sheet will differ (usually by a small amount) from the tension on a similar flat stay-bolted sheet, being sometimes greater and sometimes less, according to the design and proportions of the water leg; and (5) The curvature of the leg causes the stress on the stay bolts to be somewhat less than it would be on a similar flat leg. From formulae given for calculating the effect of the curvature of the plates, both upon the shell tensions and upon the stay-bolt tension, it is concluded that within the range of pressures and proportions that are met with in practice, "the strains in a curved stay-bolted structure are not materially different from those in flat surfaces, similarly designed."

If this general conclusion were correct, it is evident that the shell joints of the water leg would be amply strong if they were simply double riveted or even if they were single riveted, provided they were carefully designed and constructed. Experience has shown, however, that in boiler practice it is not always safe to trust implicitly in the indications of an abstract mathematical formula, no matter how carefully that formula may have been prepared. This is particularly true when the structure under consideration is at all complicated; for the actual iron and steel of the shop are different things from the fictitious materials whose properties are assumed in mathematical equations. Till recently, no actual tests have been made upon curved water legs; and in the absence of such tests, the use of triple-riveted butt joints for the outside shell, in cases where large boilers are to carry heavy pressures, has been suggested.

A New Haven, Conn., company that builds steam engines and boilers, has taken a special interest in this matter, owing to the fact that it is difficult, when using a triple-riveted butt joint, to space the stay bolts properly, in the vicinity of the joint. This difficulty is a real and serious one, as all boiler makers and designers are aware. If the attempt is made to space the stay bolts along a triple-riveted butt joint precisely as they are spaced along the rest of the water leg, it will be found that even with the most ingenious arrangement, it is not possible to prevent the stay bolts and rivets from coming too closely together in many places. To obviate this difficulty, it is common to make some of the stay bolts fulfill the functions both of stay bolts and of rivets; but this almost invariably requires the pitch of the stay bolts to be modified along the joint. An example of this kind, taken from actual practice, is shown in Fig. 8 where the stay bolts are shown

ings on the outside page. Its general dimensions were as follows: Shell plate, fire-box steel, $\frac{7}{16}$ in. thick; furnace plate, fire-box steel, $\frac{5}{16}$ in. thick; upper head, fire-box steel, $\frac{5}{16}$ in. thick; lower head, flange steel, $\frac{5}{16}$ in. thick; bottom ring, forged wrought iron, $2\frac{3}{4}$ in.; length between girth seams (A to B in Fig. 3), 48 $\frac{1}{2}$ in.; diameter outside of shell, 42 $\frac{3}{4}$ in.; length of fire-box between rivets (C to D in Fig. 3), 33 $\frac{1}{2}$ in.; internal diameter of furnace, right angles to joint (EF), 35 $\frac{1}{4}$ in.; internal diameter of furnace, close to joint, outside lap (GH), 35 $\frac{1}{4}$ in.; number of tubes, 93; diameter of tubes, 2 in.; length of tubes, 15 $\frac{1}{2}$ in.; circumference of shell at KK before test, 11 ft. 4.80 in.; circumference of shell at LL before test, 11 ft. 4.81 in.

The stay bolts were pitched 4 $\frac{1}{2}$ in. from center to center, circumferentially, and 4 $\frac{1}{2}$ in. lengthwise of the boiler. They were cut from stock 1 $\frac{1}{2}$ in. in diameter and were threaded with ten threads to the inch. The diameter of each stay bolt at the bottom of the thread was therefore about $\frac{3}{4}$ in., or 0.953 in. The joint in the furnace sheet was lapped and single riveted with $\frac{3}{4}$ in. rivets, pitched 1 $\frac{1}{2}$ in. from center to center, the rivet holes being $\frac{3}{4}$ in. in diameter. The joint on the shell plate is shown clearly in Fig. 3. The ends of the sheet were butted together and each was secured to an outside strap $\frac{7}{16}$ in. thick and 7 in. wide, by means of a single row of rivets, which were pitched 2 $\frac{1}{2}$ in. apart and driven in holes that were $\frac{3}{4}$ in. in diameter. Beyond the stay-bolted part of the shell, the outer strap was increased in width and an inner strap $\frac{3}{16}$ in. thick (shown dotted in Fig. 3) was added. A triple-riveted butt strap joint was then put in at this part, the pitches being 3 $\frac{1}{2}$ in. and 6 $\frac{1}{2}$ in., while the holes were $\frac{3}{4}$ in. in diameter as before. Owing to the short space allotted to the triple-riveted section of the joint, there was only one full space of 6 $\frac{1}{2}$ in. on the outside row of rivets, the pitch between the two outside rivets nearest the furnace end of the boiler being reduced of necessity to 4 $\frac{1}{2}$ in., as indicated in the engravings. One row of stay bolts, it will be seen, was tapped into the covering strap, passing through holes drilled in the abutting edges of the outside sheet.

The boiler was supplied with water from a powerful hydraulic apparatus, through 50 feet of 1 $\frac{1}{2}$ in. pipe, which entered the wrought-iron ring at the bottom of the furnace, as may be seen in the engravings. Just as it entered the boiler, the pipe was reduced to $\frac{1}{2}$ in. in order that the ring might not be materially weakened. The pressure gauge was near the pump; it is shown in the background in Fig. 1.

When the test began, nothing was noted until the pressure exceeded 800 pounds to the square inch. Between this pressure and 1000 pounds, the shell began to show signs of distress, and the triple-riveted butt joint began to leak. The appearance of the boiler at this stage is shown in Fig. 4. The rise of pressure was so rapid between 800 and 1000 pounds that it was impossible to say at precisely what point the distortion and leakage began. The pressure was maintained at 1000 pounds while the boiler was examined. The shell had bulged at the section LL around the entire circle of the boiler except at the joint, where the straps had sufficient stiffness to prevent serious distortion. The circumference at this point was now 11 ft. 7.22 in., or 2.41 in. greater than the original measure. It was noted that about one-half of this extension occurred while the pressure was stationary, and the measuring tape was in position. The circumference was also taken at KK, and found to have identically the same value as at the beginning of the test. No leakage was observed, except along the triple-riveted butt joint.

The pressure was then raised until the gauge showed 1100 pounds per square inch, though the leakage had meanwhile become so serious that it is

doubtful if there was any actual increase in the pressure in the boiler. The circumference at KK still remained unchanged, but that at LL showed a further increase to 11 ft. 7.72 in. The appearance of the boiler at this time was again photographed, and is represented in Fig. 5. The triple-riveted butt joint was leaking badly at several of the rivets and along the outer strap, so that the pressure could not be longer maintained with any approach to steadiness. The pump was therefore stopped and the pressure removed, and the leaks were thoroughly calked. The pressure was then run up once more, till the gauge read 1250 pounds. Leakage began again at about 1000 pounds, and at 1250 pounds it was so severe that the pressure could not be increased, even with the pump running at full capacity. At this point the shell showed the same circumference at KK, but at LL it had stretched further, to 11 ft. 9 in., recovering after the release of the pressure to a permanent value of 11 ft. 8.50 in. The photograph shown in Fig. 6 was then taken, and the test was discontinued. No

severe leakage was noted either at the tube ends or along the furnace seam, either inside or outside, during the test. The furnace sheet had bulged between the stay bolts, so as to take a permanent set, in the center of each square, of about $\frac{1}{16}$ in.

Allowing 85 per cent as the efficiency of the triple-riveted butt joint, the calculated bursting pressure of the bulged part of the shell may be shown, by the usual rule, to be about 1050 pounds per square inch. It is doubtful if the actual pressure in the boiler exceeded this value by any considerable amount on account of the severe leakage which occurred when the gauge pressure was 1200 pounds or so. The triple-riveted section was so short, too, that it was undoubtedly stiffened and sustained, to an appreciable extent, by the upper head at one end, and by the stay bolting at the other. The stress on the stay bolt, per square inch of sectional area at the base of the threads, was about 31,200 pounds when the test pressure was 1000 pounds per square inch, when reckoned in the usual way—that is, by treating the curved leg as though it were flat. The formula above referred to gives about 28,000 pounds as the actual stress per square inch of sectional area under these conditions, when the curvature of the leg is taken fully into account.

The general conclusion to be drawn from this experiment is that the mathematical analysis, whose results are mentioned above, was in substantial agreement with the actual facts; and that it is not necessary, except perhaps in special cases, to provide a triple-riveted butt joint on the outer sheet of a curved and properly stay-bolted water leg. The data in this article are taken mainly from the *Locomotive*.

Stamp Mill Practice.

TO THE EDITOR:—Although stamp mill practice has made rapid advancement during the past ten years, there still remains considerable difference of opinion among manufacturers, as well as millmen, as to the best arrangement of its machinery and the best methods of running it. To even briefly describe these differences would take up too much of your valuable space for a single article; therefore but one of its features will now be considered, viz., the rotation of the drop of the stamps as usually found in the modern stamp mill.

The most common rotation met with (and we believe the best) is where the stamps drop in the order of 1, 3, 5, 2, 4 or 1, 4, 2, 5, 3, which is the same in reverse order. Another quite frequently met with is 1, 5, 2, 4, 3 or its reverse order 1, 4, 2, 3, 5. There are other eccentric variations made by the sometimes too original millwright, but we will confine ourselves to the two just mentioned. In either case where ten stamps are run by one cam shaft, those in one battery are arranged a one-half drop in advance of those in the other, to better equalize the load, so the drop of the ten stamps in the first named system would be 1, 6, 3, 8, 5, 10, 2, 7, 4, 9, or the reverse: 1, 6, 4, 9, 2, 7, 5, 10, 3, 8.

The ideal rotation would seem to be that which would produce an even distribution of the pulp under the stamps and a correspondingly even splash and discharge through the screens. To reach this result in a 5-stamp battery no stamp should drop directly after the one next to it, but there should at least intervene one stamp. One reason for this is that, at the moment the stamp drops, those next on either side of it should be raised sufficiently to allow the ore to be spread beneath them, at the same time equalizing the splash and discharge through the screens. It will be observed that five is the least number of stamps which can be so arranged. These required conditions are met in the first rotation stated, while they are not in the second, where No. 3 stamp follows No. 4 in its drop, whereby the pulp is violently splashed against the screen instead of being partially spread beneath No. 4. This concentrated splash causes excessive wear upon the screen opposite No. 3 stamp, rapidly enlarging the holes, and allowing pulp and gold too coarse for close amalgamation to escape from the battery before the rest of the screen begins to show signs of wear.

The apparent intention of this second system of rotation is to work the ore from the ends of the mortar toward the center; but in practice it will be found that No. 4 will generally begin to pound the die before any other stamp in the battery, for the reasons above stated. These remarks do not apply to a 2-stamp battery, where, although the drop of one stamp necessarily follows that of its neighbor, the latter is partially raised before the former drops.

It is usually necessary to give the end stamps from one-half to one inch more drop than the others to prevent the pulp from banking at the ends of the mortar. Consequently, the end stamps will soonest strike the cams, preventing the others from being run at the higher speed that their shorter drop would otherwise allow. The writer in his travels once came across a sort of picked-up 5-stamp mill, in which the end stamps were heavier than the rest, allowing the drop to be the same for all five, which worked very well, especially when high speed or fast drop was required. The plan might perhaps be adopted with advantage by stamp-mill manufacturers.

MINE SUPERINTENDENT.

Baker City, Or., Oct. 1st, '98.

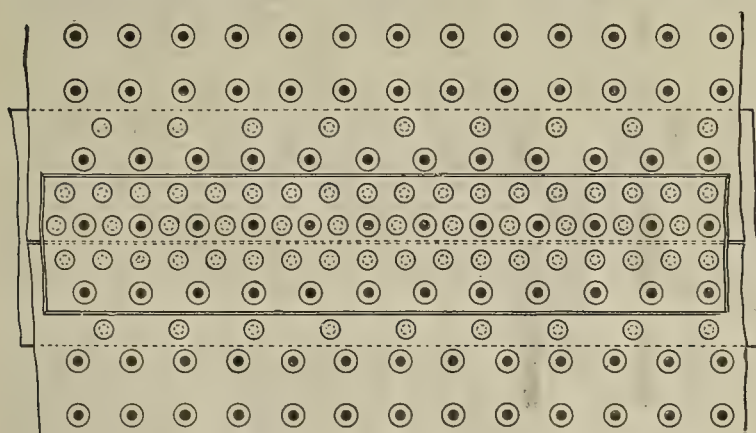


FIG. 8.—A TRIPLE RIVETED JOINT, WITH STAY BOLTS.

with black centers. Last January President J. M. Allen of the Hartford Steam Boiler Inspection and Insurance Company, and Treasurer Barnum of the engine-building company referred to, arranged for a careful test of this kind to be carried out at their works at New Haven. An experimental boiler was then built and the test made on February 26, 1898.

The boiler that was tested is shown in the engraving

Great Mining Enterprises vs. Small Ones.

TO THE EDITOR:—No one is a greater admirer of great enterprises than myself. I love to see and contemplate the progress which advanced thoughts bring forth, but while there may be greatness and glory in building great battleships and the annihilation of a navy in an hour, yet there are things which may pass the point of general good so far that not only those in direct interest but the general public are placed at a disadvantage. Pursuits in which a vast body of people can become workers, and by their labors become independent and more useful, should be kept outside of the grand schemes of vast individual expansion which only aggregate capital is a power.

Of all pursuits gold and silver mining, for more reasons than one, should not be circumscribed by law, but by reason. It should be for the greatest good to the greatest number. As I throw my recollection back to the earlier days, not only in California but on the Comstock, I see the entire mining field with an industrious, prosperous and wide-awake people, who built up and were satisfied with their more moderate institutions, that gave general employment and prosperity to their respective communities; but as larger ones took their place the advantages of labor and the communities' prosperity branched in proportion. There are two factors that come in for making this more especially apply to old and silver mining. One is the greater economy observed and a higher per cent of values obtained.

As illustrative of my idea I will take the State of Nevada and the Comstock. Having built the first mill for working its ores, and having invented the process for their cheap and practical extraction, and having worked for years upon the lode, it must be conceded that I have had a great interest in it and the State of Nevada.

The Comstock was a great field; it expanded the minds of mining men more than all the mining enterprises of the age. But this was the period of smaller operations, and when the multitude lent their thoughts and energies more for legitimate mining than speculation.

In later years there was a marked change. An aggregation of interests and speculation caused vast bodies of ore to be extracted, which were rushed to the mills, that gave not over 70 per cent of the value in the average—and all for speculation, in the interest of the few and to the detriment of the many. The result of this great onslaught on a mine which should have lasted years, to the good of a large population by moving on a more moderate and legitimate scale, and receiving of its value from 85 to 90 per cent, was that the end soon came, and vast sums have already been expended in seeking other ore bodies, and in trying to drain a vast area of mining ground.

There is now proposed a greater combination, a company of all the twenty-seven companies, a grand organization for the few to control and the many to pay the bills. This Comstock combination, reaching as it does from Cedar hill to and including the Juscelino on the south, is a gigantic affair, both in its conception and for possible expense. As before expressed, I love grand operations. I would like to see the pumping machinery for keeping this vast area of ground dry, and the other mining appliances for penetrating the Comstock 5000 feet, and to examine the vein structure at this depth. But the question comes, in view of the large profitless expenditure as made in the combination shaft, will it pay? This is the all-important question. The next to consider is, would not one-half the amount of money that it will require to raise the valueless material alone, scattered over the many, many ranges of Nevada, produce 100 per cent more benefit to the investor, the multitude and the State? And this is the question in a nutshell. The Comstock has had its day of glory. Its career for profit to the multitude is ended; not that there may not be other ore bodies in the extreme depths; not that the skill of man cannot overcome every difficulty in attaining these depths, but the question still looms up, will it pay to go further?

When I first visited and examined the Comstock I saw a mountain range covered with sagebrush and rocks. I saw occasional outcroppings of a lode that reached from Cedar hill to below Silver City. I saw that some parts of these croppings were rich and some were poor. I saw a locality as dry and forlorn in general appearance as it was possible to have any mountain range. Even water was very scarce.

In the State of Nevada there are to-day many just such places, with just such looking lodes coursing the ranges; and may they not be other Comstocks? What made the Comstock? I will answer: DEVELOPMENT. The Comstock when I first saw it had not an opening 25 feet deep in its entire length, but it had at the Ophir some very rich croppings. At Gold Hill, nearly a mile away, some more rich rock was to be seen, and at Silver City it was said the Brosch Bros. had found some good ore, but at no other point were there any rich croppings until development showed it. And thus was the begin-

ning; but the little rich ore started the few, and the few started the many, and the many started the development, and the development brought forth the wealth, and the great wealth magnetized the multitude, and we held to it long after it gave no value received for the capital and energy expended. And now the serious question comes up again, shall we continue to cling to the "what has been" and barren present, or shall we seek to develop other Comstocks in the same State with the money it would take to unwear the lode as it is to-day? There is one idea that wants to be obliterated, and that is that the Comstock locality represents all the mineral wealth of the State, for it certainly does not. All Nevada is virtually a mineral area with development, comparatively. There are any number of mines that, had they one-tenth the money and energy bestowed upon them that has been wasted on the Comstock of late years, merely to keep up a speculation for the benefit of the few, and a misdirected stock board, would have possibly produced other Comstocks; and this scattered development is what the State of Nevada now wants, is worthy of and should have, and must have to multiply its population and maintain itself as a State.

It is the smaller streams of wealth that build up a State in population and prosperity, and no State has a greater reward for judicious ventures, if the mining public will be content with the smaller operations, whereby the many are benefited, and not the few at the expense of the many.

Let the evils of the Comstock go with its past record, but let the future free itself of them, for they were the great curse of the entire mining industry.

ALMARIN B. PAUL.

San Francisco, Sept. 27th, '98.

Welding of Metals.

F. V. McMULLIN.

There are two methods by which metals may be united, viz., fusion and welding; and it is a difficult matter to decide which is the more useful in the mechanical arts. For, important as is the method of fusion, commonly termed casting, which enables us to unite a large number of small pieces to form a large one, it is still doubtful whether it is of more utility than the method of welding.

In the manufacture of machinery dangerous sections are now made as far as possible of metal capable of being welded, as less time is consumed in repairing them than in casting new parts; and time is a valuable factor in all repair work. Not only is time saved in repairing a break itself, but in machining the piece only a few inches on each side of the weld are distorted, while in a casting the greater part must be worked upon. Our railroads, for instance, if unable to weld broken locomotive frames, would have their repair bills largely increased by having to replace the broken frames with new ones. This fact more than any other prevents the general introduction of cast steel for this use, and is an instance of the inferiority of the cast products.

As ordinarily understood, welding is only done with ferrous metals; and while this is by far the most important application, it is a somewhat narrow conception of the process. When the dentist fills our teeth with gold, the small particles are welded to form one solid piece. All metals in a state of powder can be welded by pressure without heat. When two pieces of glass are joined, as in attaching a handle to a pitcher, it is an example of welding. These cases are examples of welding in its strictest sense.

The welding which the engineer concerns himself with, however, is the uniting of metal by hammering or pressure while in a plastic state produced by heat. We know that most metals are unweldable, and the question of why this is so immediately presents itself.

Welding has to be done while the metal is in a plastic condition—that is, when it is passing from the solid to the liquid state. Now, most metals do this very quickly, being plastic so short a time that welding in the ordinary way is impossible. That they are weldable has been shown in the past few years by the process of electric welding. To show what is meant by rapid change from solid to liquid, we can compare the behavior of wrought iron and copper when placed in an ordinary forge. The iron gradually loses its outline on becoming hot, and finally melts off drop by drop. On the other hand, the copper loses its shape almost instantly upon attaining a certain temperature. This behavior is typical of all non-weldable metals, that is, their plastic condition extends over too short a range of temperature to permit them to be joined in the usual way. High-carbon steel behaves in a similar manner.

We thus see that for ordinary methods of welding iron is the only metal that fulfills the requirements of the process, as platinum may be disregarded on account of its scarcity. Still, with iron the ordinary weld is partly an amalgamation of the surface and partly a soldering together of the pieces by means of the slag. In proportion as there is more amalgamation and less soldering will the weld be efficient. Complete contact of the two surfaces is practically impossible.

The requirements for a good weld are as follows:

(1) Sufficient heat; (2) protection of metal by a flux; (3) scarfing in such a manner that the flux can escape under the action of the hammer. In the heating enough of the metal must be melted so that the fibers may interlace with those of the other piece. This heating should be done in a reducing flame, as the heat necessary to raise the metal to the required temperature is also sufficient to oxidize it, if oxygen is present. To get this flame in an ordinary forge, the bottom of the forge must be covered with a sufficient depth of coke, so that the air in passing through loses its oxygen, which combines with the carbon of the coke to form CO_2 . It is also necessary to keep the iron well covered, so as to exclude surrounding air, leaving only vent for the blast, which might otherwise be shut off completely. If we have too thin a layer of coals the blast will not be sufficiently oxidized, and a heavy coating of oxide will be found on the iron. Even if there is but a small hole in the bed this will happen, and in this case in the form of a hole in the iron. An oxide thus formed, unless subsequently removed, prevents an even heating of the iron, as it is a very poor conductor of heat. The same general methods of forge heating apply to furnace work.

Welding necessitates the use of a flux, but with most wrought iron there is enough silicon and other impurities present to form it without any addition. The common error in supposing that wrought iron needs no flux is therefore plain. The purpose of a flux is to keep the air from the metals, thereby preventing oxidation, and it also has the effect of raising the melting point of the metal, since a certain amount of heat is absorbed in keeping the flux running freely. The oxide of the metal is removed by means of the flux, which in the case of steel, iron and, in fact, any metal, would prevent welding. Copper is welded by using a flux that contains a fusible compound of the oxide of copper. This flux acts precisely as does an iron flux, as it keeps the slag soft and allows it to fall off under the blows of the hammer. In iron work something must be used which will stand the high heat to which we raise the iron without being volatilized. Sand and clay are good examples, and borax is commonly used for steel, as sand has too high a melting temperature. Copper can be fluxed with a compound of phosphate of soda and boric acid. Softer metals, like lead and zinc, termed unweldable, are fluxed by resin or tallow. In many cases it will be found that the difference between a good and a poor weld is the difference in the scarfing. The principles of scarfing can be illustrated by the three ways in which two straight pieces are welded together:

1. *The Butt Scarf.*—This form of welding consists simply of putting the ends of the pieces in contact and driving them together at a welding heat. This is a poor form of scarf, since if the ends are square they hold all the slag, preventing good contact of the surfaces. If the ends are convex the slag works out, but in reducing bars to the original sizes the slag is worked into the metal on the edge of the weld.

2. *The V Scarf.*—This is made by cutting the ends of the pieces so that they fit together in the form of a V. In this weld it is a very hard matter to work the slag out of the notch of the V. It is used where it is necessary to fasten the pieces together before heating, as in welding steel points into tools.

3. *The Lap Scarf* is the most common form, and undoubtedly the most efficient, as the slag is easily worked out of it. These forms of scarfs are the principal ones, and all others are combinations of them.

In order to weld metal we must use force. Two kinds are available—impact, or plain hammering, and pressure. The former, for ordinary work, is the best, as the inertia of the pieces is not sufficient to absorb the energy of the hammer blow, thus leaving it to be expended on the welding surfaces. Also the sharp impact of the hammer splashes the flux from between the pieces, making a better contact. Pressure welding includes rolling as well as direct pressure. This solders the pieces together by means of the molten slag instead of amalgamating them. The roll is unable to squeeze out the slag effectively, and, as it lacks the splashing action of a hammer, a large percentage remains in the joint. Perhaps the most serious objection to press welding is the flow of metal, which we do not meet with under a hammer, and which some claim is a great advantage. In the case of a bloom, where the piece is hot uniformly, the entire mass is brought under the action of the press. This is undoubtedly true, but where the piece is partly hot and partly cold the best results are obtained with the hammer.

Electric welding has of late come into extensive use, and possesses the advantage of saving time consumed by common methods in taking the iron from the fire. The actual welding takes place at the instant the metal softens, so that, no matter how short the range of temperature during which the metal is plastic, there is no difficulty in welding. By this method so-called non-weldable metals are welded with perfect facility. For this method only an alternating current can be used, as the direct current causes electrolysis in the weld, owing to impurity in the metal, thereby giving a non-homogeneous and consequently a poor weld. It follows that an

alternating current is therefore essential to a good weld, because in all pressure welding there is no means of driving out the slag. It was claimed by the promoters of this process that no knowledge of metal working was required in order to do successful welding; but only a short time served to show the fallacy of this assertion. The many failures which followed were due, almost without exception, to the uncleanness of the welding surfaces.

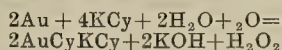
When two pieces of metal are accurately fitted together, a very slight movement will sometimes cause them to be as solidly welded as could be possibly done by any method. This occurs generally between such dissimilar metals as a cast wheel and wrought shaft. In dismantling old engines the fly-wheel will sometimes be found to be cold-welded to the shaft. An interesting case of cold welding occurred at the Washington Navy Yard a few years ago, in which a workman placed a breech pin in one of the large guns then under construction. Although the pin was put in with no force other than his hand, it was welded so tightly that a red heat failed to loosen it.

Improvements in Gold Extraction.

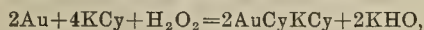
Dr. Loevy, the new President of the Chemical and Metallurgical Society of South Africa, on the occasion of his inaugural address at Johannesburg, South Africa, Aug. 22, said:

"One of the first things to which the attention of the chemists on these fields was directed when the cyanide process was started on a commercial scale about seven years ago was the atom of oxygen in Elsner's formula showing the solubility of gold by cyanide. Many hopes were founded on this oxygen atom, which opened a wide field to experimenting and research work. I think there is hardly any oxidizing agent which was not experimented with in the beginning of this decennary, and many a member present here to-night was, like myself, enthusiastic over the splendid results obtained in the laboratory with potassium permanganate, peroxide of hydrogen, ferri cyanide of potassium and other chemicals. Rarely has the great difference between laboratory experiments and commercial working been so conclusively shown as in this case. We know to-day that oxygen is indeed an important item in the gold extraction by cyanide, but we also know that the oxidizing agents available, including even Mr. Sulman's bromo cyanide, cannot—chiefly for economical reasons—successfully be applied on a large scale. The experience of the last four years has shown us that the only available natural source to be taken into consideration for supplying oxygen to our working solutions is the air and that the success merely depends on the manner in which such supplying is effected. Our society and the industry are greatly indebted to Messrs. Caldecott, Durant and Crosse, who by their work and valuable papers read before this society during the last year have done a great deal towards the solution of this question. I might here add that, as you know, also in Europe many experiments have been made with oxidizing agents in cyanide solutions, which, of course, although apparently successful in the laboratory, are of no practical importance.

It might further interest you to hear that Bodlaender, who has lately devoted much time to the study of the cyanide process from a scientific point of view, is of opinion that Elsner's formula does not actually illustrate the reaction which takes place in the solution of gold by cyanide. He maintains that in the first place peroxide of hydrogen is formed according to the following equation:



and that the peroxide of hydrogen thus formed acts upon another part of the gold not yet dissolved in the first reaction according to the equation



a theory which seems to me very acceptable.

Speaking on the eventual possible improvements of the cyanide process, I unhesitatingly give it as my opinion that we have arrived at the top as far as the chemical part of the process regarding the solution of gold by cyanide is concerned, and that any improvements which in this part possibly can and, I am sure, are going to be made, will be of a mechanical nature. The precipitation of the gold, however, from a cyanide solution has, in my opinion, not yet reached the highest state of development, and I think that even in the electrical precipitation, as now in use, we will see considerable change and improvements within the next few years.

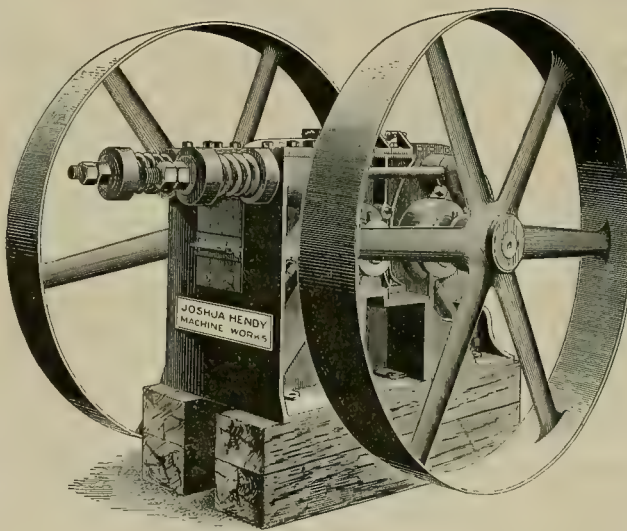
There is, however, one thing which has at various times been discussed at our meetings, and to which I shall like again to draw your attention, and that is the influence of the temperature in the solution of gold by cyanide. I am of opinion that this question deserves considerably more attention than has hitherto been paid to it, and that the temperature of the solution plays a much more important role than one generally realizes. I would refer to a statement

which I made before this society some years ago, which was confirmed by several members, that in treating pyritic ore containing about four ounces of gold per ton with a solution of cyanide of 40 degrees celsius the extraction obtained after four hours' leaching was 14 per cent higher than that obtained by leaching the same ore with a solution of the same strength for fifty hours in the cold.

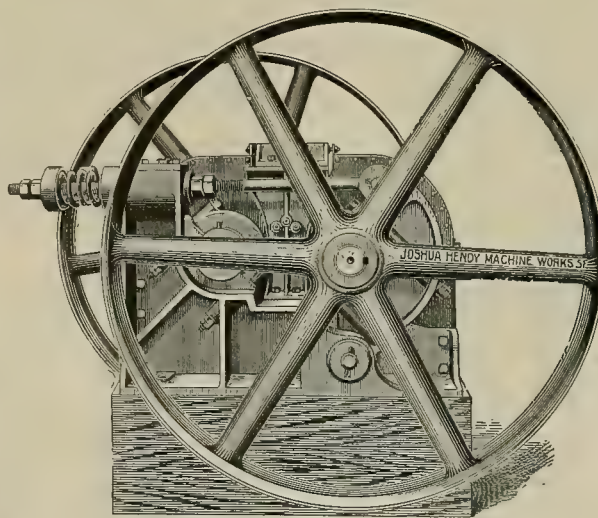
I have little doubt that there is a great difference in the extraction in summer and winter, and think it would be very interesting to get reliable data on this point. Possibly in many cases where a low extraction cannot be accounted for, it might be brought home to the influence of cold weather. As to the practical application of heat in the leaching process I do not consider myself competent to give an opinion as to its possibility; it is for the practical engineer to find out whether such application is possible on a commercial basis. I content myself with stating the fact that a temperature of 35 degrees to 40 degrees celsius both accelerates and increases the solution of gold, and, without wishing to place too much importance on the result of some laboratory experiments, I think I am justified in expressing the opinion that should the application of heat in the leaching process be made possible on a large scale, that would possibly mean an increase of 1 dwt. on the total extraction from tailings assaying 6 dwts. The treatment of concentrates by cyanide would, in addition, be improved both by decreasing the time of leaching and increasing the solution of the gold.

Crushing Rolls.

The accompanying cuts present the end and side views of a form of crushing rolls, for use in concentrating and cyanide plants, as built from designs and



CRUSHING ROLLS—END VIEW.



CRUSHING ROLLS—SIDE VIEW.

patterns of the Joshua Hendy Machine Works of San Francisco. These rolls are driven by a pulley fitted to each roll shaft, which method permits of great speed and crushing capacity. The adjustable roll is mounted on a swinging arm pivoted at the bottom; its top being held in place by a heavy tension rod on each side, fitted with heavy steel spiral springs and adjusting nuts. The journal boxes are of the ball-and-socket form, which precludes any unequal strain upon the bearings—an important feature in their design and construction. Each roll shaft carries a taper center, upon which are secured the shells made of chilled cast iron or cast or forged steel. The feed hoppers are lined with white iron

plates which can be easily replaced at small cost.

The capacities of crushing rolls depend upon their size, speeds, character of the ore and fineness to which it is to be crushed. When fine crushing is necessary, two sets are generally used. These rolls are built of the sizes and approximate capacities as set forth below:

TABLE OF DIMENSIONS.—BELT-DRIVEN ROLLS.

| Size of rolls. | Size of main driving pulley. | Size of small driving pulley. | Revolutions. | Weight. | Capacity in tons per hour. |
|----------------|------------------------------|-------------------------------|--------------|---------|----------------------------|
| 10x16 | 48 in. x 8 in. | 24 in. x 6 in. | 150 | 4,500 | 2 |
| 12x20 | 60 in. x 10 in. | 30 in. x 6 in. | 130 | 6,500 | 3 |
| 14x27 | 80 in. x 12 in. | 40 in. x 8 in. | 110 | 12,500 | 5 |
| 16x36 | 96 in. x 12 in. | 48 in. x 8 in. | 85 | 18,000 | 8 |

A New Incandescent Filament for Electric Lights.

What is perhaps the most important new topic in the science of illumination is an improved incandescent filament for electric lamps from osmium, one of the rare metals, which, besides being the densest of all metals, is the most refractory, being infusible at any except the highest attainable temperatures. Osmium is found native as an alloy in certain ores of platinum and iridium. It is a hard, bluish-gray metal, with an atomic weight of 191.1, and the enormous specific gravity of 22.477, the heaviest substance known. Its tetroxide has a strong odor of chlorine, from which circumstance its name was originally derived. The MINING AND SCIENTIFIC PRESS of August 6th, '98, described this rare metal, which is of commercial value, and worthy of search for by

northern California miners. Osmidium finds ready sale at the Selby Co.'s office in San Francisco. The property which must have suggested osmium as the material of the new electrical filament was its practical infusibility, its known resistance to temperature in which platinum and iridium volatilize and disappear. It is well known that the intensity of light emitted by an incandescent substance increases rapidly with its absolute temperature. By heating osmium in a vacuum with an electrical current strong enough to volatilize platinum, it attains a luminosity hitherto almost unknown, emitting a white light of agreeable quality and color, but of great intensity.

So far as can be inferred from what has been published, the experiments go beyond the employment of a naked osmium filament, and include coating the metal with a refractory oxide like thorium.

It has long been known that a platinum wire or filament, through which a sufficiently strong current is passed, attains a white heat and then suddenly melts. If, however, the filament be coated with a highly refractory oxide like thorium, the temperature required to melt it is greatly increased, for the reason that part of the electrical energy is withdrawn from the metal to its oxide coating and is radiated in the forms of light and heat. Precisely the same result happens when the filament coated with oxide is of osmium, instead of platinum, and the resistance of the filament is still further increased to the extent that osmium is in itself more infusible than platinum.

There is thus obtained a filament capable of sustaining a temperature and consequent intensity of illumination hitherto unachieved by such means, and it is this which forms the germ of the present invention. It has been noted in the experiments that osmium used for this purpose must be almost chemically pure, and that commercial forms of that rare and costly metal require, before using, to be cleansed as far as possible of all impurities except platinum, a small admixture of which renders the osmium more elastic without sensibly diminishing its infusibility. The whole effect of the invention, if practically

applied, will be to advance in an important degree the limit of electrical energy which may be used in incandescent lighting and thus reach a new standard of economy in the production of artificial light, which is cheapest at the intensity obtainable only at high temperatures.

ELECTRICITY is as old as life, as mysterious as death and as everlasting as eternity. It is as bright as the stars of heaven; it is as silent as the graves of men. It is as powerful as fate, as subtle as sympathy, as swift as thought, and it is developing as rapidly as belief in the necessity of retention of the Philippines.

Coast Industrial Notes.

—A railroad from Golconda to Tuscarora, Nev., is projected.

—The Dunsmuir mill will dispense with Chinese labor in and around the coal mines at Nainaimo, B. C.

—The shops of the Spokane Falls & Northern R. R. have been removed from Spokane, Wash., to Hilliard.

—The Los Angeles, Cal., Street Railway Co. has been formed to control the street railway system of that city.

—In '97 the Grays Harbor, Wash., Commercial Co. manufactured 40,586,260 shingles and 35,628 M. feet of lumber.

—There has been a generous fall of rain and snow in the mountains and valleys of California, giving great satisfaction.

—At Sanger, Cal., forty men weekly furnish two carloads of redwood for the American Lead Pencil Co. of New York.

—San Francisco's uncompleted city hall has cost to date \$5,677,208.54. The cornerstone was laid Feb. 22, '71, and it has been a good thing.

—The State Government of Hidalgo, Mexico, bought the Pachuca water works for \$250,000, payable in installments within ten years.

—Control of the Hawaiian Sugar Co. has passed from the Spreckels to a local syndicate of bankers and brokers. The transaction involved \$3,000,000.

—The largest single consignment of Alaska salt salmon received in San Francisco reached here last week. It consisted of 4000 barrels and was sold for \$32,000.

—Secretary of the Navy Long will award a contract for the building of the coast defense monitor Wyoming to the Union Iron Works of San Francisco for \$75,000.

—The Manufacturers' and Producers' Association favors the State Exposition of California products, to be held in Oakland, Cal., from Nov. 12th to Dec. 3rd.

—The Southern Pacific R. R. Co. will soon begin building in various parts of California twelve steel bridges, aggregating half a mile in length and costing \$300,000.

—The U. S. Treasury Department has raised the Everett, Wash., Reduction Works to the grade of a bonded smelter, which will henceforth do its own refining.

—The Canadian Pacific Railroad will establish a new transpacific line. The steamers Tartar and Athenian, of over 4500 tons, will run between Vancouver and Vladivostok.

—The Santa Fe Railroad will light its limited train running between Chicago and Los Angeles, Cal., 2245 miles, with electricity evolved from the friction of the car axles.

—The Bellingham Bay & British Columbia Railroad is to be extended into the Mount Baker mining region, probably with the ultimate intention of going on over the Cascades.

—Work has begun on the Utah & Pacific R. R., which, beginning at Salt Lake City, Utah, under the auspices of the Oregon Short Line, will ultimately connect with Los Angeles, Cal.

—The twentieth century battleship Ohio, to be built by the Union Iron Works at San Francisco, will be an improvement on the Wisconsin, now building at that company's works under Government plans.

—The Oregon Sugar Co.'s plant at La Grange, Oregon, started up this week. It is locally estimated that this year's crop will keep the factory busy day and night for three months, and that the product will be 30,000 tons of sugar.

—At Santa Cruz, Cal., the new powder works plant has begun operations. The daily output is now 6000 pounds. Enough orders for smokeless powder, at 80 cents per lb., have been received to keep the mills running day and night for two years.

—At Port Angeles, Wash., a bonus of \$15,000 has been raised for the Pittsburgh Glass Works to be located at that place. The Pittsburgh men agree to commence work inside of ninety days and must complete the works before demanding any of the bonus.

—"A mountain of Fuller's earth" has been discovered near Poso creek, in Kern county, Cal. A contract has been let by the Los Angeles men who are developing it to E. Salido to deliver fifteen tons. Heretofore its production has been limited to England.

—Surveyors are at work on a line from the eastern part of Washington through the Cascade mountains to connect with the Washington Central and Monte Christo roads into Everett. The statement has gained credence that the C., B. & Q. is interested in the enterprise.

—The Circuit Court has decided that the city of Santa Cruz, Cal., must pay \$306,000 and interest at 5 per cent for April 4th, '94, on bonds issued by the city for improvements. The bonds were placed in the hands of agents, who disposed of them to Eastern capitalists. Interest and costs increase the debt to nearly half a million dollars.

—Work in Santa Ana canyon for the Southern California Power Co. is about done. The wires have been strung through the city. It is intended to carry a current of 5000 volts and to deliver it in Los Angeles at a loss of 10 per cent. The one order for this wire was \$50,000. The cost of the insulators was over \$14,000. It is probable the wires will be in place and the machinery ready to turn on the current about Nov. 1st.

—The Gridley, Cal., Herald says that T. R. Fleming of Biggs is working up a plan to complete the ditch and irrigating outfit of the Feather River Canal Co. in Butte county. This company was organized in 1891, capitalized for \$1,000,000. Thirty thousand dollars have been spent on the ditch, and it is esti-

mated that \$15,000 more will be necessary to put water on the land. It is proposed to provide for irrigating but 4000 acres at present.

—The seals are being exterminated in northern waters. The Alaska Commercial Company's report shows that only twenty-eight British sealing vessels were in northern waters this year, and their aggregate catch was only 10,000 skins, against 50,000 in '95. The North American Commercial Company's catch this season is only 18,000 skins, against 100,000 for some previous years. The same falling off is noted in the Russian and Japanese rookeries. The Russian Sealskin Company, which has leased the Comandorski Island rookeries, has taken this year only 7000 skins, against 50,000 last year.

—Corporations are sometimes undecided about the advisability of advertising the dividends which they from time to time pay. It may be said that so long as they keep their own stockholders posted on their condition their duty has been discharged and it is, therefore, none of the public's business. This would seem to be a sound position, if the corporation did not derive its existence from the public and hence owe it a certain duty. Aside from this it is to the advantage of a corporation to advertise its affairs for the sake of sustaining its credit, if for nothing else. This enables it to conduct its affairs on a more economical basis and maintain an integrity before the public that cannot but be of great service and profit to it.

—The following letter was addressed by a manufacturer's agent in the City of Mexico to the National Association of Manufacturers: "It certainly does strike me as peculiar, the stand taken by American manufacturers toward opening trade relations with foreign countries or distant points. Without exception they seem ready to sell or give up their goods if the purchaser brandishes a club and takes them away by force; but as to dealing in any liberal manner, or endeavoring to conform to any system of doing business which is un-American, in order to properly introduce their varied products, seems to be against American manufacturers' policy. American manufacturers get up their junketing tours all over Latin America, with the purpose of studying needs of the countries, possibilities of augmenting their sales, finding new markets, etc. They return from these trips well satisfied with the universal courtesy, refinement, politeness they have experienced, and their notebooks filled with specially marked openings for this or that product which they manufacture, determined on their return to push the advantage. There it ends. On balancing their books at the end of the year the intended increase of exports is a great big nothing. The American is absolutely opposed to spending any money to have his employees or representatives learn the language, methods of doing business, packing, shipping or even seeing a sample (unless bought outright) of the goods he manufactures for augmenting his business with a foreign country. On inquiry for prices he will invariably quote 'terms net cash,' which is a byword all over Mexico and always read with a smile. In the meanwhile England, France and Germany send men out at much greater cost to stay two or three years and acquire necessary information as to the methods and requirements, protection of accounts, custom house and consular papers, and they take the cream of the trade. Americans are truly great business men in their own country, but failures outside. But the time is soon coming when an outside market must be found for over-productions, and the result will be the field thoroughly covered by their more diplomatic competitors and only to be won at many times present cost. Another thing which works seriously against American houses is the New York broker, who, getting an order for American machinery, finds out the prices and discounts for export of the various factories in that line, takes the cheapest, adds 5 to 10 per cent to price list, and pockets the entire thing, to the detriment of both seller and buyer. The latter, much dissatisfied, buys his next order on the other side. Agents of English and other foreign houses thoroughly protect their employers, and vice versa, so that, when a man has worked hard to build up a business for his house, the agency is not taken away to be given to some one else, without agreement on both sides."

New Books.

"Commercial Cuba," with eight maps, seven plans of cities, and forty full page illustrations; by William J. Clark, of the General Electric Company; with an introduction by E. Sherman Gould, M. Am. Soc. C. E.; one volume, large octavo, \$4.00; Charles Scribner's Sons, New York, publishers. The field for business enterprises which Cuba offers for U. S. capital gives this carefully prepared and authoritative work especial timeliness. Mr. Clark, who has been for many years at the head of the Railway Department of the General Electric Company, is recognized as a statistician of ability. The facts which he has packed into this book, the sources of his information being personal observation supplemented by official reports, give an exhaustive picture of the conditions and possibilities of every industry on the island, each town and each district being critically examined with a view to the outlook for American energy. The chapters deal with social and hygienic questions, legal procedure, political matters, public improvements, railways, both steam and electric, turnpikes and roads, harbor and dock facilities, telegraph, cable and telephone lines, contract labor, agriculture, mining and manufacturing in all of its branches, and a multitude of other subjects of interest to business men who are looking to Cuba as a field for investment or as a market for goods. The maps, plans and illustrations, together with the commercial directory of the island in the appendix, emphasize the encyclopedic and exhaustive character of the work.

Personal.

T. T. LANE is in San Francisco from Chihuahua, Mexico.

A. BUCKNER becomes Mgr. Sunshine mine, at Sunshine, Utah.

G. NORMAN becomes Supt. Alliance mine, Park City, Utah.

A. L. BEGIBIE is Supt. Mt. Pleasant mine, Grizzly Flats, Cal.

E. J. KENDALL becomes Supt. Three Star mine, Auburn, Cal.

G. SCHMITH, Supt. Nat. Con. mine, Redding, Cal., is in San Francisco.

GEO. BLAKE, Supt. Bell mine, Tuttletown, Cal., is in Seattle, Wash.

C. H. NAZRO has been appointed Supt. Sampson mine, Silverton, Colo.

O. ADAMS is Supt. Adams Quartz & Gravel M. Co., Nevada City, Cal.

C. JOHNSON, Mgr. Mt. Gaines mine, Horntos, Cal., is in San Francisco.

JOS. LADUE, the discredited Dawson dust king, has returned to New York.

D. B. GILLIS succeeds E. McCormick as Supt. Parrot mines, Butte, Mont.

R. D. SUTTON succeeds E. Hoffman as Supt. Galena mine, Fish Springs, Utah.

J. B. HASTINGS has been appointed Supt. Center Star mine, Rossland, B. C.

C. A. BROCKINGTON has resigned as Supt. Orleans M. Co., Grass Valley, Cal.

F. DULMAINE, owner Golden Treasure mine, Grass Valley, Cal., is in San Francisco.

M. B. HARRIMAN, managing owner Harriman mine, Sonora, Cal., is in San Francisco.

A. J. DOYLE, Supt. Alameda mine, Jamestown, Cal., has returned from San Francisco.

J. L. GREEN, Mgr. Gabilan mine, Hermosillo, Mexico, is on a business trip to New York city.

CLARENCE BERRY of Fresno, Cal., returned last week from the Klondike with \$125,000 in gold nuggets.

H. WILSON managing owner Chloride and Bailey mines, Dedrick, Cal., has returned to San Francisco.

O. O. HOWARD JR. has returned to San Francisco from a visit to the Mt. Shasta mine, near Shasta, Cal.

HUGH McDONNELL, San Francisco, who is developing a copper property at Stillwater, Cal., is in Chicago.

E. IMHAUS succeeds P. Berthon as Mgr. Grande Ronde M. Co. and the Flick Bar M. Co. at Baker City, Or.

PH. DEIDESHEIMER who has been examining mining properties at Jackson, Cal., has returned to San Francisco.

C. A. BROCKINGTON has resigned as Supt. Orleans mine, Grass Valley, Cal. He is succeeded by C. R. Corning.

J. EDWARDS, a mining man from Brooklyn, New York, arrived in San Francisco yesterday on his way to Mexico.

W. H. NEWELL of the Selby Smelting and Lead Co., has returned to San Francisco from El Dorado and Nevada counties, Cal.

WM. VAN SLOOTEN, who has been exploiting an extensive gravel property in Sierra county, Cal., is on his way to New York City.

W. MCQUEEN, Supt. Great Northern mine, Canyon City, Oregon, is attending a meeting of his company at Salt Lake City, Utah.

I. ROSENTHAL and D. McKAY of San Francisco have returned from a visit to their El Ubarbo mining properties at Torres, Sonora, Mexico.

J. F. PARKS, Supt. Kennedy mine, Jackson, Cal., who sustained serious injuries some months ago has sufficiently recovered to visit the mine.

DR. WM. B. PHILLIPS, Birmingham, Ala., assumed the editorship of the *American Manufacturer and Iron World*, Pittsburg, Pa., on the 1st inst.

G. KARTSCHOKI, Pres. Champion M. Co., Nevada City, Cal., and Vice Pres. of the Con. St. Gothard M. Co., Columbia Hill, Cal., has returned to the city from a visit to the mines.

DR. J. B. PORTER, teacher of mining and metallurgy, McGill University, Montreal, is making an extended trip through British Columbia in the study of its mining industries.

PROF. RADTH, who recently returned to the United States from the Broken Hill properties, New South Wales, after a brief sojourn in Salt Lake City, Utah, has gone to New York.

C. D. LANE arrived in San Francisco this week from the Ketzabue Sound country. He has placed a number of prospectors at various points in that section to carry on exploiting for a year.

CAPT. J. J. MCKINNON, formerly of the Northwest mounted police at Lake Bennett, has been appointed gold commissioner by the Canadian Government for the newly created Atlin Lake mining district, N. W. T.

MR. STEPHEN RICKARD, formerly connected with the Tombstone M. & M. Co., Arizona, the Anaconda Copper Co., Montana, and for ten years with the Argo smelter, Colorado, has opened in connection with Mr. Oscar J. Frost, formerly of the Argo smelter, Colorado, an assay office at Denver, Colo.

Recent California Mining Incorporations.

McKinley Spartan Co., Sonora; capital stock \$50,000; subscribed \$42,975; P. Miller, J. W. Empfield, W. B. Schuyler, J. W. V. Meseroll, E. L. Rehm.

The Homestake M. & M. Co.; capital stock, \$300,000, subscribed \$107,000; B. E. Schl, A. Johnson, A. Edlund, G. Olson.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MOLD-BOARD ATTACHMENT FOR PLOWS.—Frank Borge and Joseph E. Clary, Newman, Cal. No. 611,349. Dated Sept. 27, 1898. This invention relates to a means for attaching mold-boards to plow standards so that they can be readily reversed. It consists essentially in forming or fixing upon the back of mold-board a slotted lug or projection which is adapted to pass through the lug of the standard and be locked thereto by a key passing through the slot, the projection being so placed with reference to the top and bottom of the mold-board and the latter so shaped that it can be reversed by simply reversing it and then again securing it in place.

FINGER RING TWINE CUTTER.—Jacob Crandall, Westport, Cal. No. 611,313. Dated Sept. 27, 1898. The object of this invention is to provide an attachment to a finger ring so that it can be worn by the user and by which he is enabled to readily cut twine and strings which are used for doing up packages. It is especially useful for those who are working in stores and who have to make up and tie packages and afterwards cut the string. The invention consists of a ring having a head projecting on one side with arms which form curved channels underneath and a V-shaped knife is fitted into the slot through this head so that its edges project into each of the channels and either side can be used by simply drawing the twine into one of the channels and against the edge of the cutter. Upon the part of the ring which comes inside of the hand are two curved lugs projecting each way and fitting against the fingers adjacent to the one wearing the ring. These act as braces and prevent the ring from turning when the pressure is brought upon the cutting blade.

CAN SOLDERING MACHINE.—Erik Manula, Astoria, Or. No. 611,330. Dated Sept. 27, 1898. This invention comprises an apparatus for continuously soldering and especially to solder the ends upon cans of all descriptions and of different lengths. It consists essentially in the employment of a spiral carrier so arranged with relation to the solder bath that the cans are caused to traverse from one end to the other with the angle to be soldered dipping into the melted solder of the bath. In conjunction with this is a device or devices by which a square can after being moved with one edge in the solder for a short distance will be turned over to bring another edge, and so on until all four edges have been soldered. At the end of the apparatus is a carrier upon which the can is delivered outside of the spiral and at the entering end is a similar feed device so that the cans can be passed continuously through the solder bath.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING SEPTEMBER 27, 1898.

611,311.—HOISTING MACHINE—H. C. Behr, S. F.

611,373.—WRAPPING PAPER—Blackman, Cone & Neill, S. F.

611,349.—PLOWS—Borge & Clary, Newman, Cal.

611,370.—COOKING UTENSIL SUPPORTER—L. D. Craig, S. F.

611,313.—RING TWINE CUTTER—J. Crandall, Westport, Cal.

611,564.—SPOKE GRIP—J. M. Crump, South Prairie, Wash.

611,427.—HAME TUG FASTENER—S. B. Davis, Stockton, Cal.

611,487.—CHAIN PROPELLER—W. Dodge, Monterey, Cal.

611,407.—STEAM BOILER—P. F. Dunder, S. F.

611,409.—CARBON FILM—C. Gitcheil, S. F.

611,350.—GLOVE—H. Heath, S. F.

611,379.—TYPE WRITER—M. Higuchi, Sacramento, Cal.

611,593.—CLOSING SHOT HOLES IN SHIPS—I. MacDonald, S. F.

611,380.—CAN SOLDERING MACHINE—E. Manula, Astoria, Or.

611,399.—SCISSOR SHARPENER—J. S. Shaffer, Tuttletown, Cal.

611,339.—TIRE INFLATOR—C. A. Shoplough, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates. And in the shortest possible time.

Catalogues Received.

CATALOGUE No. 11, Hercules gas engine, S. F., 48 pp., embossed cover; finely illustrated treatise on gas, gasoline and oil engines; descriptions, testimonials, etc., with tables of friction of water in pipes, power transmission, etc., sent to any address on request by the Hercules Gas Engine Works, 405-407 Sansome St., San Francisco, Cal.

CATALOGUE No. 24, Fraser & Chalmers, Chicago, pp. 170; discussion of economy of high-pressure, multiple-expansion steam engine; description of Riedler pump valve, water wheel tables, tables for measurement of water, reports of results, testimonials, etc. Sent anywhere upon request by Fraser & Chalmers, Fulton and Union Sts., Chicago, Ill.

Recently Declared Mining Dividends.

South Swansea, Utah, \$7500; Oct. 4.

Swansea, Utah, \$5000; payable Oct. 10.

Grand Central, Utah, \$31,250; payable Oct. 10.

Silver King, Utah, \$37,500; payable Oct. 10.

"Softening" Water.

TO THE EDITOR:—What may be done to "soften" water which is strongly impregnated with lime?—E. B. B., Shermanton, Cal.

Answer by Prof. E. W. Hilgard of the University of California.—Since waters possessing an inconvenient degree of hardness are very common, owing to the almost universal prevalence of calcareous soils and geological deposits, it is of interest to have some simple means of doing away with this property, so as to render such waters more convenient for domestic uses. This is the more important, as in some cases the presence of a large proportion of magnesia tends to cause serious, even though only temporary, gastric disturbance with persons unused to such waters, whereby quite frequently an unfounded prejudice against the general health conditions of perfectly healthful localities is created.

When, as is most commonly the case, this hardness is due to the presence of large proportions of the carbonates of lime and magnesia, it can be recognized by the extent to which the water becomes turbid, or forms whitish scum or incrustations, when boiled.

Boiling, then, is one of the means for softening waters that are hard and "curdle the soap" from this cause; but owing to the inconvenience of the application of this remedy, it is rarely resorted to except for drinking water. For this purpose, boiling has the special and additional advantage of insuring the destruction of any minute germs of disease that might contaminate the water.

The Use of Soda.—To soften water, a common and very good remedy is the use of carbonate of soda in sufficient quantity to bring down the lime and magnesia.

That it is undesirable to use soda for softening water to be used for drinking hardly needs more than mention. The natural hard waters usually contain quite as much of saline matters as is desirable in drinking water.

Soda, however, does not in any manner correct the sanitary condition of a water; on the contrary, it aids in keeping vegetable and animal matters in solution, and unless added in very large excess does not interfere with the vitality of fungous or other germs.

The Use of Lime.—By far the most convenient and effective mode of purifying larger quantities of hard water for domestic use, is the introduction of a definite amount of *quicklime*, proportioned to the requirements of each particular water; a point that can be readily ascertained by any one having an ordinary capacity for observation.

How Lime Acts.—The principle upon which this apparently paradoxical process is based is this: The lime and magnesia in hard waters are contained in the form of carbonates, dissolved in the water by the aid of free carbonic acid. Whatever drives off or takes possession of this free acid will bring down the earthy substances in an insoluble form, and thereon depends the efficacy of boiling as well as of the addition of "washing soda" ("cooking soda" or bi-carbonate will not produce the effect.) Lime in the caustic condition (as lime water, or "milk-of-lime," freshly prepared) will most effectually take possession of any free carbonic acid, and will form with it the same insoluble compound that, when hard water is boiled, settles to the bottom or incrusts the boiler. Hence, when an amount of clear lime water, just sufficient to absorb all the carbonic acid in a water, is added to it, both the lime added, and the lime and magnesia originally contained, are brought down in the insoluble form, and the mineral contents of the water are diminished very materially, sometimes to less than one-half of the original amount. With the sediments thus brought down there also usually comes a large proportion of the vegetable or animal matters contained in the water; so that instead of perhaps becoming putrid in a tank serving for domestic supply, water so treated will remain clear and odorless for a long time, if

protected from insects, falling leaves, dust, etc.

Suggestions on the Use of Lime.—The only practical difficulty in carrying out this purification is the ascertainment of the proper proportion of lime or lime water to be used, so that the water shall neither retain too much of its original hardness nor acquire an unpleasant taste and astringent action from an excess of lime.

For the waters of wells, springs, and smaller streams, as well as catchment reservoirs, the best effect is produced by the addition of from one-tenth to one-twentieth of clear lime water.

One part by weight of pure, unslaked lime requires seven hundred parts of water for its solution; the above proportion corresponds to from five to eight grains of lime per gallon, or about three-quarters to one pound per thousand gallons.

In the practical working of this process, it is best to have, for small tanks up to one or two hundred gallons, a supply barrel in which clear lime water of full strength can always be kept on hand ready for use. A few pounds of lime, slaked into a creamy mass, may be put in the barrel, the sediment being stirred up from time to time as the clear water standing over it is replaced. Of course, in order to preserve the proper proportion, once determined, only clear water must be used, otherwise more lime than is called for will be introduced into the water. The lime-water barrel should be kept closely covered.

For Use in Steam Boilers.—For larger tanks it will be more convenient either to take a weighed amount of unslaked lime for each one thousand gallons, slack it into "milk-of-lime" and stir it in, or else to prepare a large quantity of "milk-of-lime" which, when thoroughly stirred, will for each measure (bucketful) contain a known amount of lime. This would be the best way to handle cases in which the feeding water of boilers requires to be corrected. The lime treatment is efficacious against the frothing produced in boilers by waters containing a large amount of vegetable matter.

The sediment that accumulates in tanks used for this treatment is usually of a sandy nature, and not readily stirred up; it therefore causes little inconvenience, and can be removed at leisure, from time to time, as it becomes too large.

Nickel and Cobalt.

Several former sources of nickel supply are almost mined out. Nevada is the latest source of supply of nickel and cobalt. By the use of magnesium, nickel is drawn into wire, rolled into plates, beaten, raised or welded.

Cobalt is used chiefly as an anode in plating and for some parts of scientific instruments. It does not whiten copper to the same extent as nickel. The oxides of copper are of value in coloring china, earthenware and glass, and form the basis of the pigment known as cobalt blue. The present-day tendency is to replace brass and electro-plate by white alloys, which have nickel for their basis. These alloys are known as silveroid, argentoid, navoline, nickeline, etc., but they are all varieties of German silver, mixed either with tin, lead, or cadmium, according to the requirements of the metal.

SOMETHING has been heard from time to time of a gigantic terrestrial globe, the largest representation of the earth's surface ever designed, that was to be one of the chief attractions of the Paris exhibition of 1900. The project was that of M. Elisee Reclus. It seems that the enthusiasm of M. Reclus for geographical science is not shared by any considerable number of persons who have money to spare. The consequence is that reluctantly the distinguished French savant has had to announce that he abandons the idea on account of the financial difficulties of the project.

A GOOD average is generally a creditable performance; but too tight at one end, and too slack at the other, will not do for a machine fit.

Is Darwinism True?

W. S. PROSSER.

NUMBER VII.

As to the alleged correspondence of the embryo with the early animal forms, as invertebrate, then fish, etc., it simply amounts to this: that embryos, like everything else, must have a beginning, and grow from simple to complex. It is not conceivable how they could begin as other than invertebrate; or how the heart could begin except with one cavity, or how it would be possible to increase that number except by dividing the one and making two, and so on. Instead of a far-fetched and unreal connection with fishes, snakes, tadpoles, monkeys, etc., the human embryo simply exhibits a mode of growth proper and the best under the circumstances.

The argument from "vestigial remains," if it proves anything, proves too much. The vermiform appendix is said to be large in the human embryo, because it is a remainder from our "mammalian ancestors." Most mammals have one large blind caecum, as the horse, ruminants, etc. But man's ancestry cannot run through both horse and monkey, and Darwinists say it runs through neither. The two lines were at the Eocene and before widely separate. Birds and some early mammals had two such caeca. The human caecum, if ancestral, ought to be double or ought to resemble lemurs, which, according to Darwinism, were, of all forms they knew, nearest our ancestry. Instead, it is single and is at first large, as in horses, and afterwards becomes "spirally twisted," as in most carnivora; yet neither horses nor carnivora are in the line of ancestry. Such is Darwinian logic. If the human caecum remains merely because it was used millions of years ago, merely because it is "indelible" and cannot be dropped, then, by equality of reasoning, every other device ever used in prior animal forms ought to be retained—the insect's four wings, six legs, 1000 eyes, the bee's sting, the alligator's scales, bird's beak, feathers, monkey's prehensile tail, the turtle's outside skeleton, etc. We are asked to believe that nature did, with great ease, drop these and thousands of other devices, but quite failed after a million years of straining effort to get rid of others hastily alleged to be useless. Is the human embryonic caecum useless? I would recall that the office of so large an organ as the spleen is very little understood. It may be cut out, and the man lives and can run better without it, but dies at about 40. If some early birds and mammals had two caeca, we must believe either that nature began with one, worked up to two, then dropped one, but, from some marvelous imbecility, could not, in the case of man, drop the other; or begun with complex two, simplified to one, and there stuck—could not get rid of it, even if useless.

It has been usual to suppose that monkeys are next to man, "primates," highest among animals. There is no greater authority than Wallace, who ranks monkeys below many of the higher animals and inclines to put the elephant first. The enormous gap between man and monkey does not depend on such comparative ranking, but is certainly emphasized by it.

The present theory possesses an elasticity that Darwinism does not. If an outside power controls the steps between species, by forcing in new devices, those steps can as well be long as short. Many in the past seem very long. When so many new ideas were to be introduced at one time, as in the making of many, it is not impossible, but very probable, that, as natural generation had been commonly used in these short steps for economy of labor, so it may have been dispensed with occasionally for the same reason. Man probably had a special creation, to avoid filling the long gap between him and the animals with undesirable forms.

Darwinists claim that the difference between human speech and the cries and other intercommunications of animals is one of degree, not of kind, and

that "no line can be drawn." On the contrary, it can be made plain that the two things differ in kind, and widely so; in the following particulars, among others: First.—Animal cries are fixed and invariable for each species. Human language is by arbitrary sounds. Many things have a thousand names in a thousand languages. Second.—Animals at birth know these cries as perfectly as ever after. Humans must learn them slowly. Third.—Animals have one sound for one feeling, as hunger. Humans, out of a few sounds—twenty to forty—construct infinite combinations, words and sentences. Fourth.—Animal sounds are, practically, only vowel sounds, while humans modify these by lips, tongue and teeth, and, hence: Fifth.—Men articulate, while animals do not. Sixth.—Men whisper, while animals do not. Seventh.—Animals express only feeling or immediate desire. Humans communicate past and future actions, hope, etc., entirely dissociated from present action. Eighth.—Human language is largely based on specific names for natural objects—something entirely unknown to animals. Even domestic animals never learn their own names; they associate vowel sounds with certain events, but never consonants. Ninth.—The use of the negative, reversing accompanying words, is unknown to animals.

Parrots have a sound-producing apparatus which is only slightly inferior to the human larynx. Darwinism must claim that this arose through long use, and, thereby, gradual improvement. As a fact, parrots (wild) have only a few harsh cries and make little use of the vocal cords and muscles. It is a striking example of unused natural capacity and defies Darwinian explanation.

(To be Continued.)

THE *Meteorologische Zeitschrift* contains a treatise by Dr. F. Maurer on the regular periodical repetition of cold and warm years. During certain intervals of time, extending as a rule to about fifteen years, there is a recognized change of warm and cold periods. The warm periods, Dr. Maurer says, do not simply include a series of summers of extraordinary warmth, but also a series of mild winters. Similarly, during the cycle of a cold period, not only are the winters more than ordinarily severe, but the summers are far below the average heat. Dr. Maurer affirms that we can predict with tolerable accuracy the time when the next cycle of warm periods will occur. It is due, he calculates, somewhere about the turning point between the two centuries; and he thinks it probable, from the data obtainable, that the early years of the next century will be distinguished by a series of hot, or, rather, extremely hot, summers and a series of exceptionally mild winters.

In Switzerland they have begun making phonographic clocks and watches. By merely pressing the button of the new timepiece, it pronounces the hour distinctly. The alarms call to the sleeper: "Six o'clock; get up." There are some which even add the words: "Now, don't go to sleep again." The form can be changed to suit the buyer, and make the warning more or less emphatic. The maker introduces into clocks and watches little slabs of vulcanized rubber, on which the desired words are traced in grooves corresponding to the hours and fractions of hours.

THE discovery of a new element—polonium—is announced. The fact that the salts of uranium had the property of emitting a radiation having properties similar to the X ray led to chemical investigation, and M. Curie has succeeded in isolating this body in the form of a sulphide. From a chemical point of view the new element resembles bismuth, but its radiating powers are said to be 400 times those of uranium.

THE largest tin plate establishment in the world is about to be moved from Wales to the United States. Importations of tin plate have declined from \$22,000,000 to \$4,000,000 last year.

Mining Summary.

ALASKA.

J. O. Carlisle, formerly of the Carlisle mine at Forbestown, Cal., who left San Francisco on May 15th, '98, for the Kotzebue Sound country, returned to San Francisco last Tuesday. Mr. Carlisle was one of a party of eight interested people. In an interview with the MINING AND SCIENTIFIC PRESS last Thursday, Mr. Carlisle said that they landed after thirty-two days voyage at St. Lawrence Island, Northwest cape, stayed three days, and the only indications they found of quartz was float which carried a little galena.

From there they went to Port Clarence, the Teller relander station, about 300 miles north of St. Lawrence. There they launched their small steamer. When inland about sixty miles they struck the base of high mountains—a rough, rocky range bearing no name so far as they could learn—where they prospected in a desultory manner for three days for a distance of thirty miles. The ground was frozen hard after getting down 12 inches. This was opposite Fish river, in Gullfin bay, probably thirty miles distant. One of the party, who had promised to show gold-bearing gravel and quartz ledges, was accompanied to Fish river over a sixteen-mile portage, but he failed to show what he had promised, though some gold was found there.

The party then abandoned this section, which has absolutely no timber in the Port Clarence country. The natives depend for fuel entirely upon driftwood. They returned to their ship at Port Clarence and continued on to Kotzebue. A day's journey out, they landed and prospected the bluffs amid dangerous climbing, no brush to cling to, advancing with the aid of a pick. Here they found a large ledge of white spar, but it carried no mineral.

They continued through the straits up to Cape Cruzenstein, a trip of about three days. There they boarded the launch and followed the low, flat shores off the mouth of Notark river, where there was nothing to prospect. Ships of over 5 feet draft cannot get within forty miles of the mouth of Kowark river, thirty miles above the Notark. They continued across the neck of Kotzebue to the east shore; they found some colors in the sands of the beach. These waters were shallow and are dangerous for inexperienced boatmen. The waters are treacherous and many men lost their outfits, some launches were wrecked and quite a few men were killed.

On the 19th of July they took their launch and three boats, with two months' provisions, and started for the Kowark river. They followed the Hotham inlet to the Selewick lake, where they entered the southeasterly mouth of the Kowark. This river has about fifteen mouths, only a few of which are large enough for a boat of 4-foot draft. The bars are shallow. They got up the river with the launch about 150 miles, where they divided into two parties, J. O. Carlisle and G. W. Price continuing up the river in a small boat to Fort Cosmos, about 160 miles. Here they met men returning from Pick and Monalok rivers with discouraging reports, and they consequently changed their route into the Cosmos creek in a range of mountains. They found gravel everywhere and flour gold in exceedingly small quantities. Some twenty miles up the creek, which they were obliged to make on foot, packing their supplies, they came into a canyon at the junction of two small streams where they found favorable bedrock. At places it was a slate bedrock, at others a diorite, and at one place they found serpentine. It was a locality in which a miner would expect a favorable place to find gold, but they found absolutely nothing. In these mountains they found not even black sand, much less a color of gold.

Upon their return to Fort Cosmos they met a second boat with seven men who had been up above Selby lake and about 170 miles above Cosmos. Selby lake shown on the maps is no longer in existence. It was broken last winter by ice gorges, whose marks are still plain. These seven men had found nothing after they left the main rivers and lost the black sand. From Cosmos they went down the Kowark to the mouth of the Ambler river, a distance of 60 miles, where they met over 100 men returning from up the Ambler river to its head, about 100 miles, who had prospected across the divide on the Notark and 15 miles beyond, and the only piece of gold they found was about half the size of a pin head.

They changed their course, returning to Kotzebue camp, 135 miles below the mouth of the Ambler, occupying three days in drifting down the stream. The Kotzebue camp is about 135 miles up the Kowark from Kotzebue sound, and about 135 miles below the mouth of the Ambler river.

They made a portage of 25 miles into a range of mountains to the south. Here they found a conglomerate formation of cemented gravel, in which the flour gold again appeared. This flour gold, which they found in several places, Mr. Carlisle thinks is simply a product of the gradual wear or decay of this conglomerated matter.

Mr. Carlisle on his return to Kotzebue sound met men who had been to the head of the Notark, the Kowark (a stream 600 miles long), the Selewick and the Buckland rivers. These rivers comprise the entire watershed of the Kotzebue sound country. The men whom he met thoroughly understood mining and made careful investigations all along their trips. Their whole year's work and their costly outfitting were absolutely fruitless. Everywhere the ice and frost are found after getting down 20 inches, and in some places that at first sight would be considered favorable the ice and frost begin on the very top, in the mosses that overlie it.

It is Mr. Carlisle's opinion that, ordinarily speaking, the country is such that if gold were found in quantities that would return \$100 a day per man in California, the same kind of

ground could not be worked there at a profit.

Mr. Carlisle estimates that from 1200 to 1500 men landed in Kotzebue Sound, at a cost of \$1000 per man. There are about 700 men camping up the river, who expect during the winter months to make the portage over Zane Pass from the head of Par river to the Keokuk, and from there make their way to the Yukon by the time the season opens next year. He is of the opinion that in this venture, because of the severity of the climate, and the difficulty of packing provisions, attended by many other hardships, many lives will be lost. Whilst these men have supplies for a year, most of them have no money, and rely upon finding gold to carry them along in their needs, which he thinks highly improbable; that next year the provisions will give out, and, unless the Government comes to their aid, there will be starvation and death without fail. He says this without fear of successful contradiction.

Reports from American creek are to the effect that for the season of 1898 has practically ended, the result being \$75,000 gold taken from the gravel banks of that creek. This came from 181 of the 200 claims on the creek. A few claims changed owners. In one case a miner sold a claim for \$1000 before representation. A few weeks later on seeing the gold shoveled into sluice boxes he paid \$10,000 for a third interest. The mines are easily reached from Eagle City, a new town on the Yukon.

The U. S. Navy Department has a report from Commander Seebree of the gunboat Wheeling, dated Orica, Sept. 9th, giving a general outline of the conditions at Valdez and Orica, in the neighborhood of the gold deposits on Copper river, with information valuable to miners because of its authentic and official character. The commander says that he found 500 people at Valdez on the 6th of September, about 300 of whom were keeping stores, restaurants, etc. There were about 200 returning miners, and they were coming back every day at the rate of from two to fifteen. About 3000 people went in over the glacier and up the Copper river, and there are probably about 1200 people now in the interior, many of whom are building log houses and arranging to stay in all winter.

In the interior provisions are plentiful. Men returning sell their outfits, so that provisions, clothing, etc., over the glaciers are selling at less than half what they cost. At Valdez about sixty-five of the returning miners were being fed by the Government. These men say they have no money. They are required to work about two hours a day on the government reservation. At the hotel kept by the agent of the Steam Whaling Co. about fifty men were being fed and lodged for 75 cents a day. Before the winter sets in from 200 to 500 miners were expected to return from the coast to the interior. Some of these have no money and are asking if the Government is about to send a ship to take them out. Miners are crossing the glaciers in from twelve to fifteen hours.

In conclusion, Commander Seebree says that possibly 50 per cent of the miners on the coast have no money. Judging by the prices of provisions at Valdez, and from information given by the miners, there are at Valdez and in the interior plenty of provisions for all the winter for all the miners in the Copper River country, so there is no danger of starvation.

U. S. Consul McCook sends a report from Dawson in which he says Dawson City now contains a shifting population numbering about 20,000. "Forty thousand prospectors have passed through here from the White and Chilkooot passes. Most of them had a year's provisions. Hundreds are going away daily, not being able to stay long on account of the cost of living. A dinner costs \$2.50, and breakfast and lunch \$1.50. Lodging is \$1.50 per night in a bunk, and a hotel charges \$6.50 for a bed per night. The price of property in the business locality is enormous. A lot of convenient size upon the main street cannot be had under \$40,000. Lots in a bog off Main street bring from \$5000 to \$10,000. To rent a log cabin costs \$200 per month. With the exception of the warehouses, the theaters, dance halls, saloons and gambling houses are about the only establishments which can afford these terms. Along the river, ground leased from the authorities brings \$10 per front foot per month. This, with the 10 per cent royalty charged on the gross output, yields a very large revenue. The prevailing price of labor is \$1 per hour, but there are so many idle hands waiting for employment that the supply exceeds the demand, and may bring the price down. Still, there is the greatest activity in the erection of large buildings and warehouses. Most of the prospectors who are coming to Dawson City leave for camps in United States territory, since, apart from the country in the immediate vicinity of Dawson, which has all been staked off, this is the most promising field. But even here, out of more than 5000 placer claims and 2000 bench claims, only 200 have thus far paid to work. A great many have not been prospected and will have to be given up to the Crown, because one condition of the grant is that every person having a claim must work it continuously for three months each year. Ninety days' labor, at \$10 a day, is a great deal to risk upon one claim, and a good many who cannot afford it will surrender them. The creek claims have been reduced in size from 500 to 250 feet. Estimates of last year's output range from \$8,000,000 to \$12,000,000. Work has been largely confined to Bonanza and Eureka creeks will be opened up next winter, as they promise good results. One cannot prospect in summer, as the pits which are dug then fill with water. It is by the merest chance that one may strike a rich claim. No poor man should sell out and come here. Organized companies with capital will do much better, as they can hire work much more cheaply than individuals."

Consul McCook further emphasizes the distress among the prospectors in and around

Dawson City, and strongly advises no one to join in the hunt for gold unless he has at least enough provisions to last over winter, and enough money in bank to take him home if he is unsuccessful. The Consul says he is appealed to daily by men who have no money and cannot get work.

ARIZONA.

At the Azurite Co.'s claims in Pima county a good supply of water has been obtained, which was wanting to make the mines a success. Enough water has been developed to supply a thirty-ton smelter.—The largest hoist shipped to northern Arizona is being erected at the McCabe mine in Yavapai county. It weighs 23,000 pounds and has a hoisting capacity of 2000 feet.

Arizona Kicker: The Old Dominion Copper M. & S. Co. at Tombstone resumed smelting last week after being closed down seventeen months.—At the Copper King mines at Barrett the company intend starting their smelter soon and turn out copper bullion.

Mojave County Miner: Five men are at work on the Maguire mine near Kingman, making a test of the property. H. J. Delamer holds the property under bond.—The Temple Bar Con. M. Co.'s hydraulic plant on the Colorado river will probably be ready to start up November 1st. The company has bought the interests of Redman and associates for \$15,000 cash.

Yuma Sentinel: Senator Dorsey has returned to New York with his Harrisburg mining enterprise. Work on the 40-stamp mill will begin at once. He expects also to have his Picacho property in operation within a few months.

CALIFORNIA.

Amador.

(Special Correspondence).—The Centennial mine at Plymouth has been bonded to Johnson & Gross of San Francisco. They have begun to unwater the shaft, which is 350 feet deep. They will sink an additional 200 feet. The property has a 20-foot ledge of fair grade free-milling ore.

The 10-stamp mill on the Pocahontas at Drytown is completed and will begin crushing ore so soon as the concentrators, now on the way, are in place. The Pocahontas shaft has reached 800 feet depth.

Plymouth, Oct. 3d, '98.
At the Argonaut the mill is running to its full capacity.—The Kennedy people are taking precautions against a further shortage of water. They have installed a steam hoist at the north shaft in addition to that at the south shaft, and in a few weeks will be equipped to run the entire property by steam.—The Anita mine continues development work. It is locally said that a depth of 1000 feet will be attained before any considerable crosscutting will be done.—The Zeila mill is crushing ore from the Oneida mine, but in the Zeila sinking and repairing continues.

Record: At Sutter Creek the Balio mine has started work after one week's shut down.—The Wildman mine is running twenty stamps.—It is reported that the Mahoney mill will start soon.—In cleaning out the shaft the Lincoln Co. has passed through some good rock. They now have on the dumps 200 tons, which Supt. Voorhies states will soon be crushed. They struck this rock at 230 feet depth.

Republican: At Jackson good rock is coming from the Oneida mine. The mill being erected will be 60-stamp; the shaft is being sunk to the 2000 level.—The Keystone mine of Amador City has not been idle during the scarcity of water; about thirty-five men are employed at the mine, twenty in the shaft.—Linus & Co., developers of the Klondike property at French Camp, have closed down, pending an extension of their lease.—Work continues at the Amelia mine. The 800-foot level will soon be reached.

Butte.

Fifty men at Powelton are repairing and cleaning out the Cherokee ditch. This canal has a capacity above 10,000 inches and is nearly forty miles long and supplies a number of mines with power.—Last week the hull of the Paris and Ditzler dredger was launched in Feather river near Oroville.—Work in the Magalla mine near Dogtown was resumed last week.

Calaveras.

Steam has been inaugurated at the Esperanza mine, Mokelumne Hill, and everything works well.—Last week a strike was made at the Big Bonanza mine near Angels at 200 feet of a 10-foot ledge of good rock.

H. Blood bonded the Baumhagger mine near San Andreas for \$40,000 to L. Meyers, representing the Drake M. Co. Work has begun on the property.—The old Gunter claim at Washington Ranch has been sold to Oakland people for \$3000.

El Dorado.

The Selby mine near Diamond Springs is being unwatered.—The Larkin mine has a new air compressor and will soon have five additional stamps.—The Greenstone mine at Shingle Springs has been unwatered and re-timbered.

Humboldt.

Bitumen is reported discovered in the southern part of the county, in Mattole valley, twelve miles from the coast. Petroleum has long been apparent in that locality.

Kern.

F. C. Rader has bonded the Pioneer, St. Michael and Garfield claims near Randsburg to Dennison & Campbell for \$5000 for one year and a tunnel to be run in that time 300 feet long.—The cleanup at the cyanide works was a gold brick worth \$1200, the result of 120 tons of tailings.—A good find has been made by Brady & Parsons of a ledge about 10 inches wide.

The Red Dog mill, Johannesburg, cleaned up \$3000 worth of bullion last week from 100 tons of Butte mine ore.—The Butte, Val Verde, and other claims, are shipping low-grade ore to Barstow.—The Johannesburg and Eureka mills have been running steadily.—In the

Stringer district the Napoleon and Winnie groups are working full time.—The Wedge continues sinking through good ore.—The Little Butte is taking out ore; the cleanup last week being \$700.

Mariposa.

The ore from the Alice lode near Mariposa crushed at the Yellowstone mill averaged \$12 a ton.

Merced.

It is locally reported that the Slate Quarry Co. at Hornitos will erect buildings to accommodate forty men to work the quarries this winter.—The Mt. Gaines mine has given a contract for 1100 cords of wood.

Mono.

The 20-stamp mill of the Standard M. Co. at Bodie was totally destroyed by fire on the 5th inst. The new cyanide plant and the offices adjoining were saved. It is supposed that the fire was due to spontaneous combustion. The insurance is about \$15,000.

Nevada.

(Special Correspondence).—At no time during the water famine of the past summer has Nevada county suffered to the extent of other mountain counties. In some cases operations had ceased in a measure, but the larger mills throughout the county have all been running. Electricity has, of course, been a factor in the power question. The recent snowfall in the mountains gives encouragement to gravel miners, many of whom have done considerable work all the summer, awaiting rains.

The Champion M. Co. at Nevada City have come upon good ore in their new workings of the Merrifield mine. The ore is of fair grade and carries a good percentage of sulphurets. The ore body is growing as work advances and it is fair to say that the company is coming into another of their proverbial rich finds.

The Consolidated St. Gothard M. Co., operating at Columbia Hill, composed principally of the larger holders in the Champion Co., are mining and mill building on their newly acquired property with a business system and mining method that show they are not novices in the work. The great body of low-grade ore in the St. Gothard will be a study, and every effort will be applied to make it a commercial success.

C. A. Brockington, for many years connected with the mining industries of Grass Valley, has resigned his position as Supt. of the Orleans M. Co., though retaining large holdings in the property. The mine has been making improvements in the power line within the last year, and since it has cut through the hardpan at 400 feet depth, upon which former companies abandoned work, developments have been encouraging. Since February last New York capital has been carrying on prospect work and still continues so under an option on a portion of the stock. C. R. Corning represents the New York interest.

At the Brunswick mine the new pumps work successfully and the straightening of 500 feet of the 900-foot shaft is receiving attention.

The power drill installed at the Malakoff mine of North Bloomfield makes good progress in the tunnel, though the rock is very hard. The drill is operated by an air compressor. The company hopes to progress more rapidly toward the channel with their new mode of operation.

Nevada City, Oct. 3d, '98.

The Adams Q. and Gravel M. Co. has secured the Banuerridge mine near Nevada City and is continuing the tunnel.

Martin & Treddinick in the New Eureka mine near Nevada City struck a ledge 2 feet thick.

Union: At the Milliken gravel mine near Nevada City, from which the pumps had been pulled for some unknown reason, work was resumed this week.

Placer.

Colfax Sentinel: The main tunnel at the Red Point gravel mine at Damascus is in 12,000 feet. Supt. Ferguson has sixty-five men on the roll; 130 cars of gravel per day is taken out. The power for running the blower is supplied by 40 inches of water from the mine. This water is conveyed from an upper tunnel and is taken up 4000 feet, giving a pressure at the mouth of the main tunnel of 90 feet. The gravel is free washing and the flow from the mine furnishes ample water.—Good progress is made on the tunnel of the Blue Canyon & D. Co., near Blue canyon. A machine is used and 23 feet was made last week. The tunnel is in 1050 feet. An installment of 1 cent per share is collected each month, giving \$400 per month for development work. There are 130 stockholders and assessments are paid promptly.

Herald: E. B. Quigle is prospecting the Ferrier gravel mine, near Todd's valley. His tunnel is in about 100 feet. He employs eight men.

San Bernardino.

Nearly a month ago J. J. Arbios started his stamp mill at Dale and has been working about four tons of rock a day. He is making a 200-ton run for Ellerman & St. Germin, the rock milling about \$18.

San Diego.

The Ramona Sentinel says that Bennett & Isham had their cleanup at the Helvetia mine at Julian recently and left for parts unknown with the bullion.—The Cincinnati Belle mine laid off quite a number of men, but will soon begin operations.

Shasta.

L. M. Ludovici has sold to O. H. Simons a half interest in the Snow Storm, Day Dawn and Golden Jubilee mines near Muletown.—R. P. Gibson has sold to S. Gibson the Big Digger placer mine near Redding.—Calvin & Blakeley bought from E. Holden five claims in the Stillwater mining district.

Searchlight: Davis & Sexton at Whiskeytown are building an arrastra to work the Flagstaff and Good Luck mines.—The Niagara mill, near French gulch, is running on leaser's

rock. Foley & McCurry have seventy tons of rich ore to be milled. The ore assays over \$500 a ton free milling.

Sierra.

The Oriental mine of Alleghany has men employed clearing away the debris preparatory to starting general work.—There are forty men working at the Mountain mine and the 40-stamp mill started last week.

Siskiyou.

The Yreka Journal says that the Schroeder quartz mines on Deadwood have been sold to a Chicago company for \$100,000, to be paid in four installments. The new company will increase the 10-stamp mill to 20 stamps.

Journal: The Hollister Co., working the old Spencer mine on Humboldt, now known as the Golden Star mine, find good prospects. The pump has been pulled and the tunnel is to be continued. The quartz yields from \$14 to \$18 a ton.—The company prospecting Yreka creek from Shasta river to Yreka will prospect the Butler and Burgess places near Yreka, and will soon complete testing all the ground along the creek in Yreka basin. The company has to the 20th of October to decide upon accepting the ground, and should it be accepted, extensive operations will immediately begin by the dredger system.—McCaw & Co. are getting good ore on Patterson creek.—Barton is at work in his river claim at Oak Bar.—There are more men employed than ever before along the river.

Reporter: At the Gum Boot quartz mine near Scott Bar, owned by Simon & Co. a ledge 4 feet wide was struck that will average \$30 a ton. This is the third ledge discovered in the mine.—Work at the Crocker & Bennett mine continues with success.—Nesbitt & Hunt of the Montezuma drift mine continue prospect work.—Thomas & Son have been working their drift mine at French Bar all summer and it has paid well.—The Quartz Hill mine remains idle pending litigation.

Trinity.

McDonald Bros., who recently bought the Bloss & McClary hydraulic property at Trinity Center, have bought an adjoining 155 acres with ditches and water rights from the Quong Sing Co.

At the Lappin mine, near Deadwood, six men are employed and the ore taken out is high grade. Next spring a 5-stamp mill will be built. Heretofore the ore has been crushed in an arrastra and has netted from \$150 to \$400 a ton. The property is owned by J. Tourtelotte & Co.

The Brown Bear mine at Deadwood has a good ledge 4 feet wide. A 3800-foot tunnel, which will take two years to complete, is soon to be started.

Tuolumne.

The Tuolumne G. M. Co. has entered suit at Washington, D. C., to break E. Duchow's timber patent to the placer mines at Springfield Flat.

Storms & Co. will place a steam hoist on the Agnes. The mine is reported looking good.—In the Grizzley they are drifting to connect with the old workings. The mill is waiting for water.

Magnet: The force at the Rawhide mine has been cut down to a minimum. The mill is closed down and the furnaces will cease operations until the rains set in. In the mean time overhauling the machinery will be carried on.—At the Black Oak mine, near Soulsbyville, the 20-stamp mill is being run by steam, the 10-inch Cornish pumps supplying the water for battery and other purposes from the mine.—Sinking has resumed in the Mazeppa. The new hoisting plant, a double engine of 48 H. P. and a 60 H. P. boiler is finished and with three eight-hour shifts the shaft will be pushed.—The Shawmut 40-stamp mill is running by steam power; it has a 100 H. P. engine and employs 160 men.

Democrat: The Hazel Dell mine near Soulsbyville is being operated under a bond by Moore & Co., who are driving a crosscut tunnel at 300 feet depth. The ore body is from 3 to 4 feet wide, and carries a heavy percentage of sulphurets.—The Duleep & Dewey mine in the Groveland district has a vein 8 feet wide. The property has been bonded to people who will soon begin work.—The Lumbo has a 3-foot ledge on which sinking is progressing.

Yuba.

J. C. White, by his attorney, has commenced suit against the Good Title M. Co. at Dobbin, a corporation, to recover \$3111.12, due on twenty different claims.

Near Brownsville Supt. Darwin is opening up a quartz mine. The rock looks fair.—The gravel mines near Strawberry are being worked by men from La Porte and Scales.—On the Mooreville ridge prospectors are opening up gravel claims.—The New York M. Co. have sixteen men building a ditch.

COLORADO.

CHAFFEE COUNTY.

The Belle of Granite mine, at Granite, which has been a producer for the last twenty years, shipped a carload of ore last week that runs \$80 in gold per ton.

C. F. Palmer is building a 60-ton concentrating and matting plant at Winfield.

CLARK COUNTY.

The strike made in the Perkins tunnel, Cascade district, at 700 feet is a vein 20 feet wide. The ore is streaked with seams of gray copper and runs high in gold values.

Two shipments from the Betsy Belle in Silver Creek returned 227 ounces silver and 32 per cent lead and 282 ounces silver and 34 per cent lead.—The Gold Anchor, near Yankee, is said to have struck \$300 ore.—The King Solomon shipped another carload of \$60 ore last week. This mine has been a producer since last April.

DOLORES COUNTY.

The ore shipments from Rico for the third week in September were sixteen carloads. The gain over the shipments from Jan. 1st to

Sept. 30th, '98, over the same period in '97 was 229 cars, the total shipment being 582 cars.

EL PASO COUNTY.

The Amazon Co. has leased the Providence at Victor to Colorado Springs people, who began work last week for two years for \$100,000.—The gross value of the ore taken from the Hull City placer since February last is given at \$400,432. The Independence Town Co. received in royalties during that period \$76,993. All the ore has been produced by lessees. The company is sinking a shaft and will work the ground after the expiration of the leases on the last of the year.—It is estimated that the gross value of the Cripple Creek output for September will not fall below that of August. The total tonnage for the month was 35,740 tons, with a bullion value of \$1,405,200. This is an increase of nearly \$100,000 over July. The cyanide and chlorination plants extracted \$669,200 in gold from 25,240 tons. The record of the different plants was as follows:

| Plants. | Tons. | Value. |
|-----------------------|-------|----------|
| Gillett | 2,600 | \$78,000 |
| Brodie | 1,840 | 55,200 |
| Arequa | 2,100 | 73,500 |
| Colorado-Philadelphia | 7,000 | 210,000 |
| Metallic | 8,000 | 160,000 |
| El Paso | 3,700 | 92,500 |

The tonnage treated at the smelters was 10,500 and the bullion value was \$735,000.

In the Moon-Anchor mine, Cripple Creek, drifts are being run in good ore at the 600 level. The output is forty tons per day of smelting ore which runs from \$70 to \$80 per ton.

GILPIN COUNTY.

In August there were 400 stamps dropping in the Black Hawk mills and seventy in Nevada. The greater part of the work was done on Gilpin county ore. Some company mills were added to the list in September. Considerable new ground is being opened.—Ore is being sacked at the East Notaway mine that carries 344 ounces of gold per ton, of which they have saved about three and one-half tons. They shipped last week four tons worth \$440 per ton.

HINSDALE COUNTY.

The Bon Homme mine in Burrow's park again shipped a carload of good ore. The property is well developed.—The test made on the new strike on Engineer mountain gave \$110 in gold and nine ounces in silver per ton. The vein is 10 inches wide and the ore can be taken out rapidly. A carload is being hoisted for shipment.

LAKE COUNTY.

Shipments from the Mahala mine, Leadville, have been increased from 50 to 100 tons daily.—The Resurrection mine continues its output of 150 tons daily and is working 110 men. This does not include the work and output from the company leases.

The placer company at Lake creek are placing two derricks that cost \$3000. They are running two giants and have ordered two more. They have 2000 feet of pipe laid and expect to put down as much more. They employ forty men, and next year will employ from 75 to 100 men, they have a large number of acres.

The Little Jonny mine is increasing the production of ore. The August output was over 7000 tons, but September shows 8000, with 460 men on the payroll. There are four shafts working in ore, while the No. 5 shaft is sinking.

Thirteen sets of lessees are operating the Lillian property on Printer Boy hill. The work is being done through a tunnel from which the entire development of 175 acres is carried on. Forty men are employed.

PITKIN COUNTY.

The underground electric railway between the Argonaut-Juniata and the Mollie Gibson shaft No. 2 at Aspen has been completed, and the output of the Argonaut-Juniata will be steadily increased. The property has been practically shut down during the construction of this railway, although the Argonaut-Juniata portion of the new joint mill has been kept in operation on dump ore. Hereafter the mill will operate on ore direct from the mine and will give employment to sixty miners.

SAGUACHE COUNTY.

Last week the ore shipments from Creede were 89 cars, or 1615 tons. For the month of September the shipments were 493 cars, or 8679 tons.—The Nelson tunnel is in nearly 500 feet on New York Chance ground, and is being driven at the rate of 250 feet a month.

SAN JUAN COUNTY.

C. C. Koennecker shipped from Silverton two carloads of ore from the Ridgway mine, which netted nearly \$5000.—The Sunnyside mine is making weekly two carload shipments.

SAN MIGUEL COUNTY.

The Tombay mine at Telluride is working between 200 and 300 men in mine and mill, and dividends of \$54,000 a month are being paid.

Twenty-seven cars of ore were shipped from Ophir last week.

The ore shipments from Ophir last week were twenty-seven carloads.

IDAHO.

(Special Correspondence).—Among some of the achievements of modern deep mining and drainage, the Helena-Frisco mine of this place offers an instance of some note. The mine has a tunnel that runs 600 feet below the surface, and from which a shaft has been sunk 1000 feet deep. At this depth a station is being cut for the purpose of placing a pump that will raise the water 1000 feet at a lift. The pump and machinery, together with the pipe, are all of unusual size and strength.

Gem, Oct. 1st, '98.
The new dredge of the Basic Co. at Placerville began operations last week and is working successfully.—The Mammoth M. Co. at Wallace has begun on its new tunnel and ex-

pects to continue until the lead is cut, which will be in 3500 feet. It will cut the vein 1800 feet below the surface and will be 1100 feet below any work that has yet been done in that neighborhood.

The Peacock mine, in Seven Devils, has a contract, running three years, with the American M. Co., for the extraction of 50,000 tons of ore, which will be smelted at the mine. A 50-ton smelter will be in Weiser within twenty days. Men were put at work on the Peacock last week.—Near Pine Grove a quartz mill is being erected by Supt. Tustin to reduce the ore from an old mine at Smoky.

The President mine made another carload shipment of gold ore to the Salt Lake smelter. The fifteen tons sent to Salt Lake two weeks ago yielded \$55 per ton.

The following is a synopsis of the report of the DeLamar M. Co. for August, '98. During the month 5120 tons were leached:

| | |
|--|----------|
| Bullion produced from cyanide treatment | \$34,875 |
| Cleanup | 2,085 |
| Estimated value of ore shipped to smelters | 550 |
| Miscellaneous revenue | 50 |

Total product.....\$37,560
Total expenses.....32,150

Profit for month.....\$ 5,410

In the United States Court of Appeals at San Francisco on the 3rd, in the case of the Tyler M. Co. against the Last Chance M. Co., it was ordered remanded to the lower court and judgment for damages modified. The present action was over certain amounts allowed for damages to the Last Chance M. Co., the Tyler Co. having filed a bond pending the hearing of an injunction suit to restrain the Last Chance from continuing work on the mine.

MICHIGAN.

"Never before in the history of Lake Superior copper mining," says a Houghton, Mich., dispatch, "has there been a time when so many men were employed, such large profits earned, and so much new work under way. On Sept. 1st, '94, a few over 6000 men were employed by the Houghton county mines. On Sept. 1 four years ago the market value of the Houghton county mines was approximately \$46,000,000, while at the present time it is almost exactly \$90,000,000, having practically doubled in four years. The population of the copper district is increasing by leaps and bounds, until Calumet, the most populous town, now has nearly 40,000 souls, making it the third largest mining camp in the world and the second largest in the United States."

MONTANA.

The report of the Anaconda Copper M. Co. for the year ending June 30th, '98, says: "During the year 124,417,471 pounds of fine copper were shipped from Anaconda in the form of electrolytic cathodes and converter bars. The shipments of silver, partly in bullion and partly in converter bars, amounted to about 5,300,000 fine ounces, and the shipments of gold aggregated 16,610 fine ounces. The sales in the same period amounted to 135,002,147 pounds of fine copper, 5,706,377 ounces of fine silver and 19,930 ounces of fine gold."

| | 1898. | 1897. | 1896. |
|----------------|--------------|--------------|--------------|
| Total receipts | \$22,387,104 | \$22,940,393 | \$16,945,697 |
| Expenses | 18,835,758 | 17,804,345 | 12,687,182 |
| Profit | \$ 3,551,346 | \$ 5,136,048 | \$ 4,258,515 |
| Dividends | 3,000,000 | 3,000,000 | 750,000 |
| Surplus | \$ 551,346 | \$ 2,136,048 | \$ 3,508,515 |

The Montana O. P. Co. are operating the Big Bonanza near Walkerville and some very rich silver ore is being taken out.—The buildings at the Burkley mine in Meaderville are nearly completed. Ore is being hoisted from the 200 level at the rate of 200 tons daily. Work is being pushed on the drift at the 400 level.—Near Missoula the Montana & Kentucky mine has passed to G. E. Boose. It is lead and silver, but owing to low prices no shipments have been made of late. Mr. Boose has started the concentrators and 1000 tons of ore now on the dump will be immediately reduced.—The Anaconda Co. will put in eight pumping engines, each having a capacity of 500 gallons per minute against a 600-foot head. The engines will be driven by compressed air, which will be heated before entering the cylinder and reheated between the cylinders.—The Montana Co. near Sheridan started their mill last week on a 50-ton test run.

The Intermountain hears that the Washoe Co. will soon open general offices in Butte and that they will put a large number of men to work on a property in that neighborhood. In connection with this the talk of building a large smelter has been resurrected.

Tribune: The silver smelter at Great Falls, which has not been in operation for two months, has started up again, and to an extent greater than for several years past, one furnace being operated that has not been fired since the great slump in silver. About 175 men are employed. The ore which has accumulated since work was suspended is large. The mines which the company is operating are producing well.

NEVADA.

Remodeling the Navajo mill, near Tuscarora, has been completed; and the old mill, which has turned out tons of silver bullion, began the first of the month on gold ore from the Eira.

At Cherry Creek the Eagan mine is in ore running \$60 to the ton in gold and \$110 in silver. Preparations have begun to build the new mill at the Starr mine. The camp generally is in a prosperous condition.—About 340 tons of ore from the Bounce mine at Douglas yielded \$19.10 per ton. They are down 350 feet and the ore is fair grade.

The price asked for the April Fool mine at De Lamar, Lincoln county, is \$500,000.—Machinery for a water jacket furnace has arrived for the copper properties near Mineral Hill. The mines are sold to California men,

who begin development at once. The furnace has a daily capacity of sixty tons.

NEW MEXICO.

J. W. Fleming, United States mine inspector for the Territory of New Mexico, has made his annual report for the year ending June 30, which shows the coal production to have been 858,583 tons, an increase of 125,044 tons over the previous year. There were seven fatal accidents.

OREGON.

(Special Correspondence).—The amount of gold found recently by two professional pocket hunters, Brown & Angle, on Sterling mountain near Coles is about \$9000. They report the ledge to be in a porphyry formation, the pay streak running 4 inches to 2 feet in width. The ledge has been uncovered about 150 feet, but no depth of any consequence has been reached. Whether there is anything in this find aside from the hand-mortal process of operation will be ascertained by future developments, which however, can not be carried to any great extent because of the winter storms that will soon make their appearance in that section, which is at an elevation of 7000 feet.

Medford, Oct. 2nd, '98.
(Special Correspondence).—A. J. Jackley has milled twenty tons of ore at the Union Companion mill here, and received \$750 in bullion and \$550 in sulphurets from an incline less than 20 feet deep.

Cornucopia, Oct. 1st, '98.

The Robbins mine, near Baker City, owned by Pennsylvania men, is being developed by drifting.—The Beaver M. Co., operating the Denny group, is employing twenty miners.—The E. & E. Co.'s properties at Bourne are being put in shape; new ore bodies are being uncovered.

The Gold Standard M. Co., near Jacksonville, have their mine in good order and began crushing quartz on the 4th inst. They have a large quantity of ore on the dump.—Operations have been resumed at the Sterling mine and the cleanup of last season's work will be completed.

SOUTH DAKOTA.

The annual report of the Homestake M. Co. for the year ended May 31st, '98, shows that during the year the company's three mills treated 548,390 tons of ore. The returns from this ore were bullion bars valued at \$2,483,375, of which \$2,467,998 was in gold and \$15,377 silver. From this there are to be deducted bullion charges amounting to \$12,866, leaving a net balance of \$2,470,519. The net proceeds of concentrates saved from the mill tailings was \$34,651, bringing the returns up to \$2,505,170, which gives an average of \$4.56 per ton. The expenses were \$1,855,790, or \$3.38 per ton, leaving a profit of \$651,380, or \$1.18 per ton, from which dividends amounting to \$500,000 were paid. The report of Supt. Grier says: "No greater depth has been attained than was reported four years ago. The older workings continue to furnish a large supply of the ore milled, while a goodly share is being drawn from the newer openings at greater depth. Preparing the new hoisting works for business progresses slowly. Several months will elapse before it is ready for the heavy traffic that it will be capable of. Everything at the mills, repair shops, hoisting works, etc., is in good condition and running smoothly. On May 1st the mine began furnishing ore to 140 additional stamps, making 540 in all, now dropping on Homestake ore."

The Hawkeye M. Co. has bought the six claims and mill of the Pluma Con. G. M. Co. at Lead for \$36,110.36 cash.—Supt. Dalby of the Big Four M. Co. has started work upon his company's property at Garden City.—E. May of Lead bought the Hulst & Price property, comprising three claims.

UTAH.

The new cyanide mill of the Star G. & S. M. Co. in Pine canyon, Tooele county, has started work. The mill will handle fifty tons of ore daily.—Work has begun on the Mercury mill at Mercur to enlarge its daily capacity to 400 tons.—At the Ophir Hill 1400 tons of concentrates were turned out in September from 4200 tons of ore. The mill will be closed during the winter.—The Midas mine is making a test of its ore at the Mercur mill. It has a ledge 3 feet thick which carries \$32 gold, and samples have been treated showing a recovery of 90 per cent.

At the Bullion-Beck, Eureka, shipments are not so extensive as they have been, because a great deal of drifting has been done since the shaft was extended to the 1300 level. Within a week, however, such dead work will be finished and the heavy shipments will be resumed.

At the Highland mine, Bingham, a crosscut has been put into the ore body 170 feet, and the hanging wall has not been reached. An upraise has been made from No. 6 to No. 5 tunnel, 106 feet, all in ore, showing the continuity of the vein to the apex.

On White river, near Vernal, gilsonite deposits are being worked by Collett and others. The product is sent by team to Fruita, Colo., whence it goes to Chicago or St. Louis. The output runs from ten to twenty tons per day.

The Victoria copper property was sold for \$65,000 to Massachusetts people, who are represented in Utah by J. F. Gates, and it is said that active work will soon begin.

The Park City Record says it is locally reported that the old Empire mine, comprising twelve claims, is about to be reopened by a Montana company.—Last week's ore shipments from Park City were 1,744,450 pounds.

Work at the Alliance has resumed. Three shifts were put on and will be kept at work all winter.—The new hoist at the Cumberland is in place and sinking has resumed.

WASHINGTON.

At Republic the electro-cyanide plant of the Republic Co. is saving a high percentage of the gold. The saving for August was 91 per cent.—The Blaine-Republic tunnel is in

960 feet and the rate of 10 feet per day is being maintained.—At Bossburg the Bonanza mine, which has been shipping from two to three cars of high-grade galena a day for a year, has developed a large body of ore at a depth of 475 feet. Heretofore no ore has been taken out below the 400 level.—At Meyers Falls the Silver Queen has been sold to a B. C. company for \$30,000. It has been developed by shafts and surface cuts.—C. D. Beach has made a strike in the Thistle claim near Cascade of high-grade copper ore which assays 24 per cent copper.

FOREIGN.

BRITISH COLUMBIA.

A welcome order has just been issued by F. J. Humes, Minister of Mines for British Columbia, to the effect that gold commissioners, mining recorders and their employees are barred from holding or dealing in mineral claims of any sort or for any purpose in British Columbia. The only condition upon which an exception will be allowed is in the case of mineral properties already owned by the officials to be affected by the new rule. A statement of all such holdings must be filed at once with the Minister. The officials affected by the new rule will not be allowed to hold miners' licenses except to protect the property they already had at the time the ruling went into effect. Gold commissioners in British Columbia in the future will not be allowed to act on the affairs of any company in which they or any of their employees hold shares.

A Silverton report says that work has started on the first concentrator up the Four Mile Creek—a 100-ton mill which is being erected for the Comstock mine.—From the Stewinwind mine, Fairview, 200 tons of ore has been put through the Tin Horn mill and the result is a gold brick worth \$750 and \$750 in the tailings.—American capitalists bought from Henry and others a copper property across the Inlet for \$20,000 and let a contract for a 300-foot tunnel.

The largest dividend payer in the Slovan is the Payne mine near Soodon. In 1896 a half interest in the Payne was bought for \$87,000 by the owners of the other half interest and since then it holds first place as a dividend payer. The mine is connected with the C. P. R. by a tramway, and with the K. & S. R. R. by a gravity tram 6000 feet long, with a vertical drop of 2500 feet; steel cable $\frac{1}{4}$ inch; load per car five tons; average time of descent eight minutes; 125 men are employed and sixty tons of ore are shipped daily. The average smelter returns give 105 ounces of silver and 55 per cent lead per ton.—At the Noble Five thirty men are employed and the owners are trying to recover themselves from the financial difficulties into which the large expenditure for the construction of the tramway and the mill plunged the mine.

At the Center Star, Rossland, within a week operations will be under way, with 100 men employed. A new shaft is to be sunk, three-compartment, with two skip ways and a man way. A gallow-frame the same as that building at the War Eagle will be erected and fitted with electrical hoisting apparatus.—The North Star Co., East Kootenay, will soon start up with a large force. Contracts have been made for 100 M. feet of lumber and a hoisting plant has been ordered.

"An increased percentage of copper and a slight increase in the silicious character of the ore are the only changes in the character of the Le Roi ore that have been demonstrated by increased depth," says N. Tregear, the superintendent of the property. "In the way of gold and silver values, they have been practically the same from the surface down to the 700-foot level. At this level, where at present are the deepest workings in ore, the silicious ores and the iron ores have given way to a solid body of clean smelting ore 28 feet wide. We are now working seven machines side by side on the 700-foot level, and the showing is unsurpassed anywhere in the mine."

On the Miocene Company's works, on the Horsefly, Cariboo, the shaft is down 400 feet, and Supt. Campbell is now driving out from the bottom of the incline to tap the bottom of the channel.

The Ashcroft Mining Journal states that hydraulic mining on the Quesnelle river is successful this year. The Bleson dredge working on that stream is bringing up gravel averaging 75 cents to \$1.50 per cubic yard.

LOWER CALIFORNIA.

Recently a waterspout struck Kaimalli and washed away 1500 tons of tailings from the Ibarra G. M. Co.'s mill. There were about 3000 tons in the pile and they were being worked by the cyanide process by Supt. Swayne on a private contract. The tailings averaged about \$12 per ton.

The Californian says that representatives of the Rose Cyanide Co., who operate an extensive plant on the Rose mine, Victor, Cal., are at Alamo examining the tailings accumulated at the various mines in that district and also the refractory ores in that section, particularly in the Jacalitos district, which may find a solution by their process.

MEXICO.

In his annual message to the Mexican Congress, Pres. Diaz says: "In the development of national industries, mining plays the chief part. The number of grants issued in the period of time that has elapsed since the date of my last report is 837, covering an area of 7820 pertenencias of one hectare each. The total number of grants issued under the existing law of June, '92, is 8313, covering an area of 63,353 pertenencias of one hectare each, showing that the number of mining properties located in six years is almost four times the number of those held when the law in question was promulgated. The development of the mining industry is further evidenced by the increase in the exportation of ore that has been observable for some time past. According to data published by the Finance Department with respect to the last fiscal year, the

total value of the mineral products of all kinds passing through the custom houses was \$91,350,000 in round numbers, showing an increase of \$10,500,000 over the value of similar products exported in the previous year. Silver figures among said products to the value of \$47,000,000; gold to the value of \$16,000,000, silver valuation; copper, \$4,700,000; lead, \$3,000,000; and, on a smaller scale, antimony, zinc, plumbago, coal, sulphur, asphalt, chalk and some other building materials."

Consul-General Pollard writes from Monterey: "There are two smelters in operation in the vicinity of this city, the larger having a daily capacity of 500 tons, which, in 1897, resulted in producing 7,076,544 ounces of silver, 23,830 ounces of gold (both Troy weight) and 22,912 tons of lead. The smaller smelter has a capacity of ninety tons daily. The larger has ten blast furnaces, together with the necessary appurtenances for their operation, while the smaller has six water-jacket furnaces of a capacity of ninety tons daily and three revolving furnaces of forty tons per day in the aggregate, with the necessary apparatus to operate them. The entire annual output of ore and constituents amounts to 112,000 tons."

"Assay offices are connected with each of these establishments. Twenty thousand tons of coke and 5000 tons of coal are annually consumed at the smaller smelter, and a proportionate amount at the larger. Of lead, 13,944,000 kilograms (30,740,942 pounds) were produced in the smaller smelter from May 1 to April 30, 1897-98, and 18,000 kilograms (39,683 pounds) of silver and 300 kilograms (661 pounds) of gold during the same period. From 400 to 500 men are annually employed at the smaller and about 700 at the larger smelter, the daily payroll of the latter being about \$1000 in Mexican money (\$452 in United States currency). Laborers at the smaller smelter receive from \$1 to \$5 daily in Mexican money (45 cents to \$2.26), and are paid weekly. Skilled labor is paid monthly. Salaried officers receive from \$100 to \$600 in Mexican money (\$45 to \$271) monthly."

"Both establishments do a large business with the United States, the products being shipped, and practically all supplies being obtained therefrom—the larger importing over 30,000 tons of coke during the year 1897. Smelting commenced here about 1891. It has increased each year since, and in view of the apparently inexhaustible supply of minerals in Mexico, it is only in its incipency."

"The names of the respective smelting establishments are La Gran Fundicion Nacional Mexicana and Cia. Minera Fundidora y Aguadora Monterey."

Near Cucurpe, Sonora, large veins of gold and silver ores are being developed by Americans, who are mining in the Magdalena, Arispe and Montezuma districts.

The San Ygnacio group of mines, near Ahumada, Chihuahua, yield good ores and will soon become shippers. They employ 100 men.—What are believed to be valuable deposits of copper ore have been discovered near Samalayuca, thirty miles from Juarez.

Commercial Paragraphs.

The Sullivan Machinery Co. of Chicago is now represented in Denver, Colo., by E. D. Hunter, at 332 Seventeenth St.

The American Stoker Co., through its Denver office, reports among its recent sales a full equipment of stokers for the ten boilers of the Portland mine, at Victor, Colo.

A NOVEL and improved form of miners' gold pan, recently patented, presents certain advantageous features which will be appreciated by miners. The first invoice of this new pan has been received by the Joshua Hendy Machine Works, No. 43 Fremont St., San Francisco, who have them for sale at \$1.50 each.

The Denver branch of the Jeansville Iron Works Co. has sold to the Moon-Anchor M. Co. of Cripple Creek, Colo., an electric pump, 600-foot lift, which is the initiative of electric power pumping in that district. Mgr. Middlebrook writes that he has an order from the Colorado Fuel & Iron Co. for a large electric pump for their mine.

FOR SALE CHEAP.

Heavily Timbered Scow, 150x60x8 Ft. S. G. HINDES, 22 California St., S. F., Cal.

For Sale: in San Francisco,

COMPLETE ASSAY AND LABORATORY OUTFIT.

Office furnishings, including Hoskins furnaces, certifying balances, chemicals, glass and earthenware apparatus, roll-top desk, bookcases, etc., etc. At a bargain. Address ASSAYER, Mining and Scientific Press Office, San Francisco, Cal.

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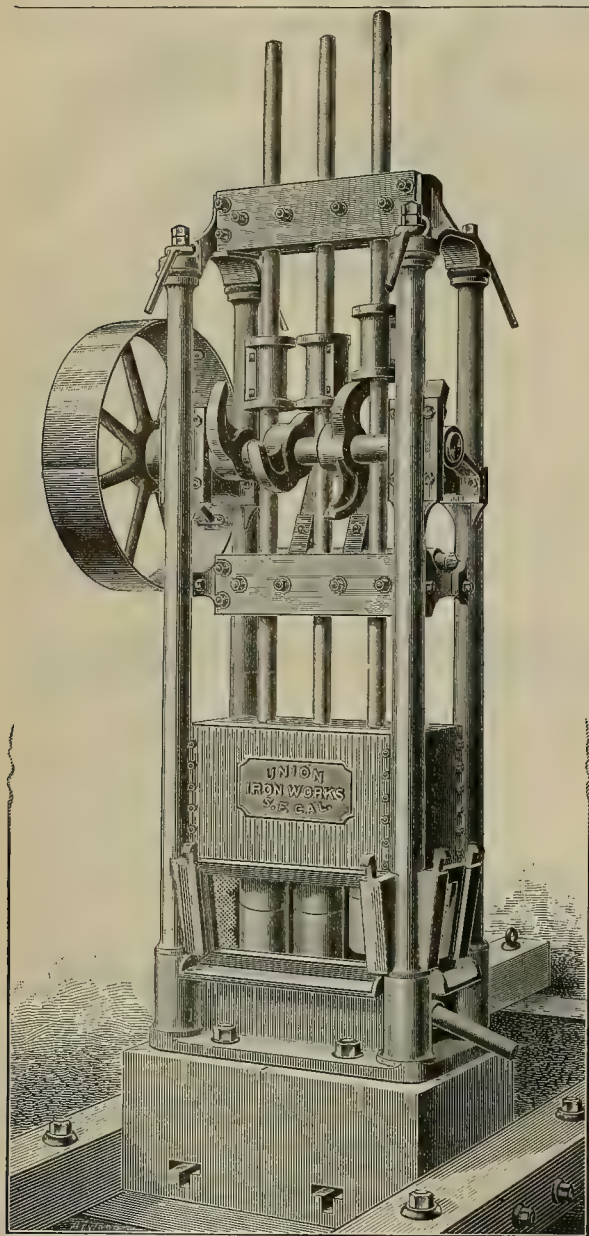
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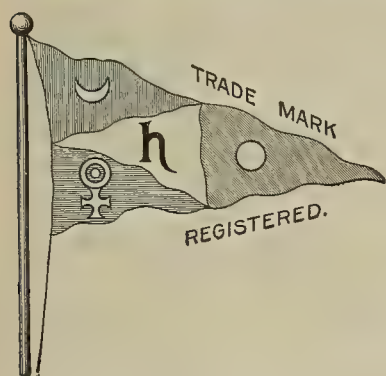


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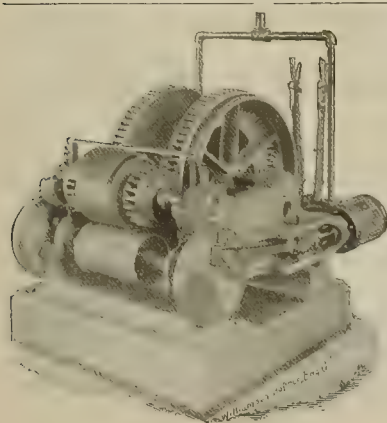


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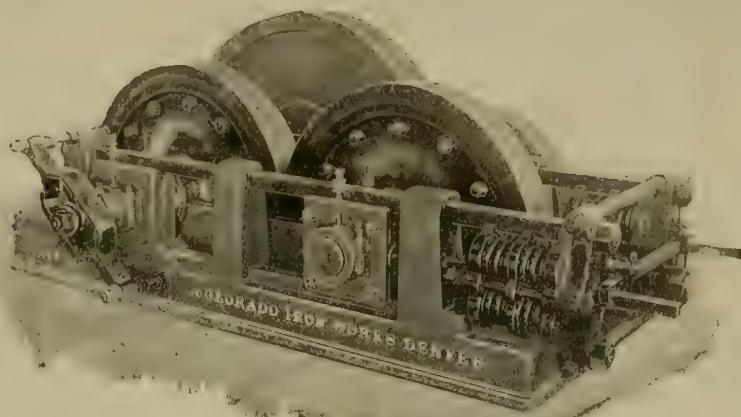
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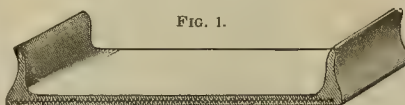


FIG. 1.

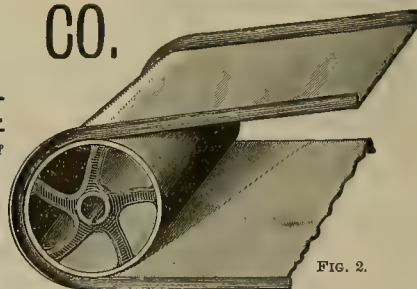


FIG. 2.

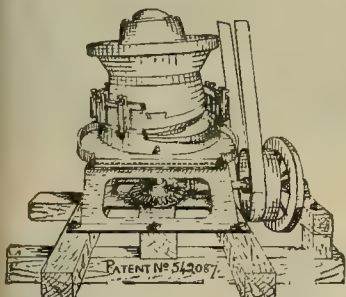
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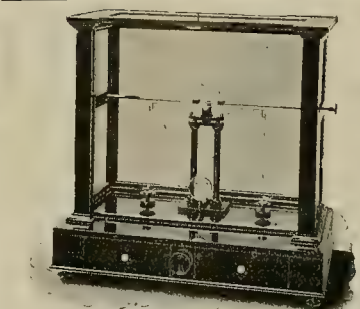
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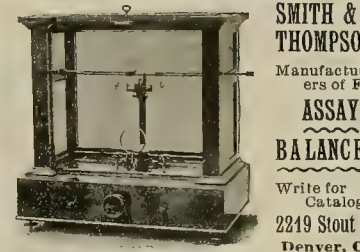
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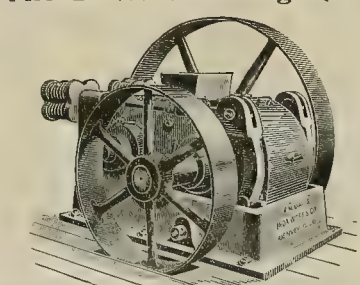
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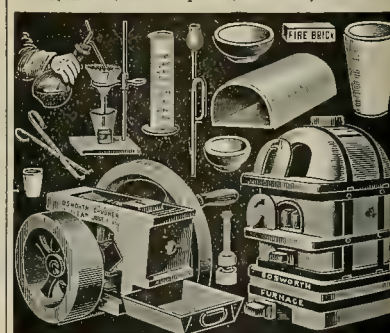
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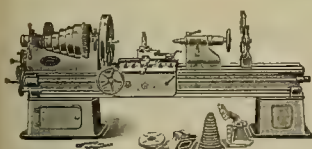
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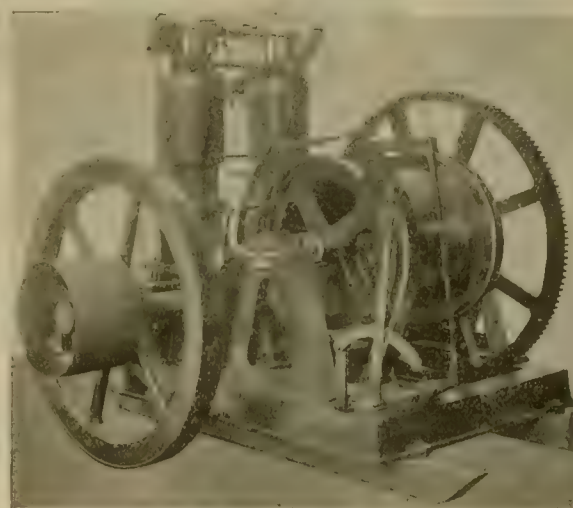
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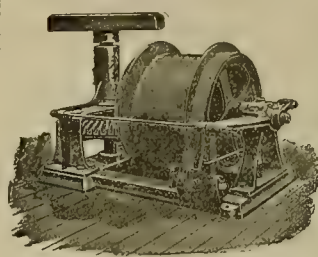
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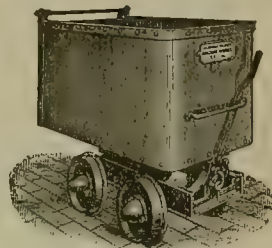
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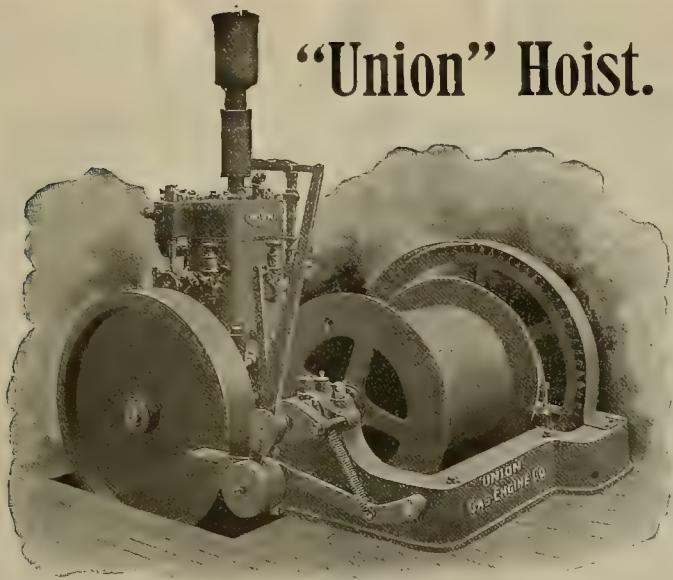
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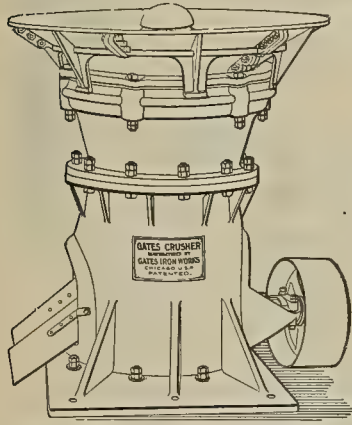
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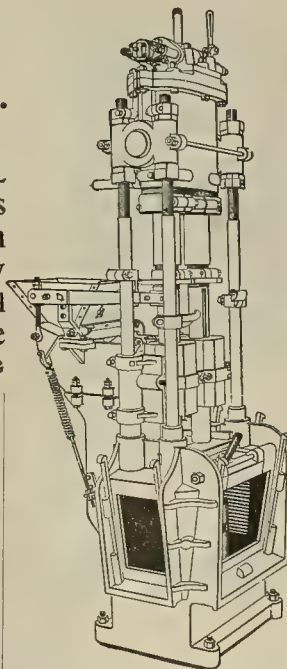
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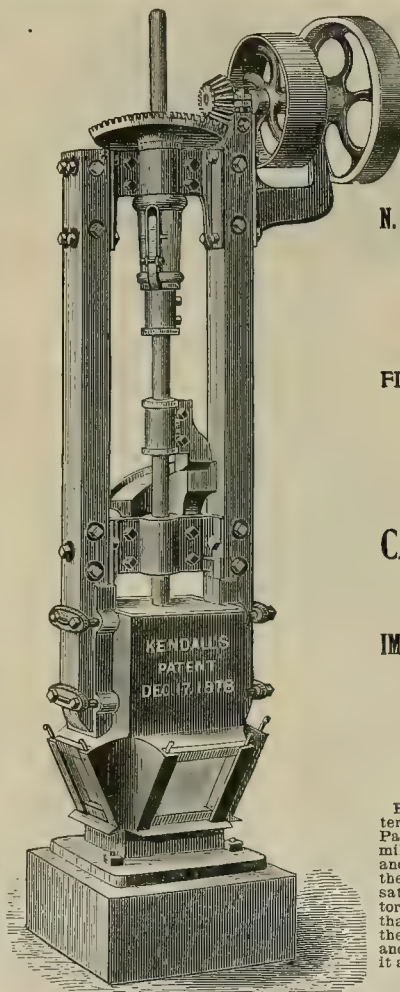
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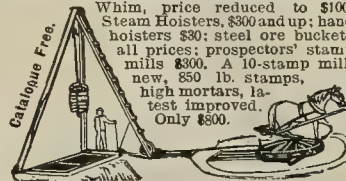
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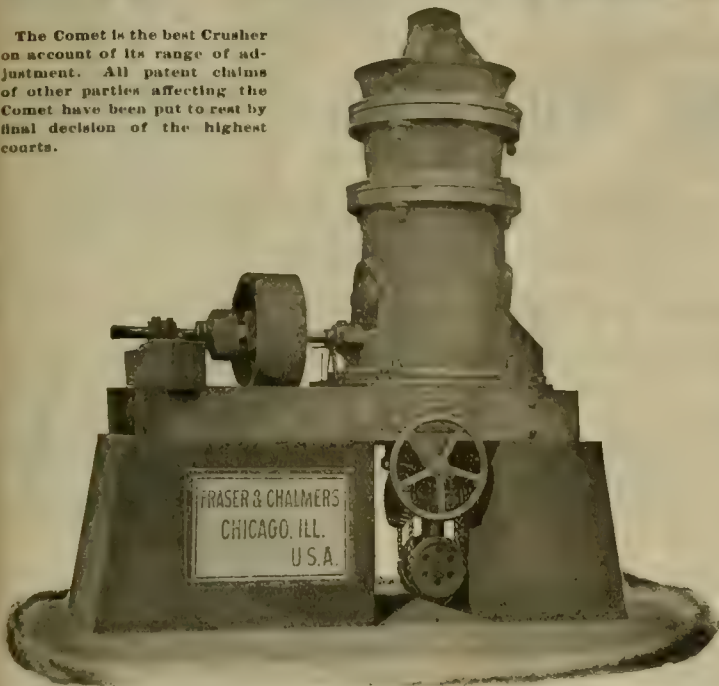
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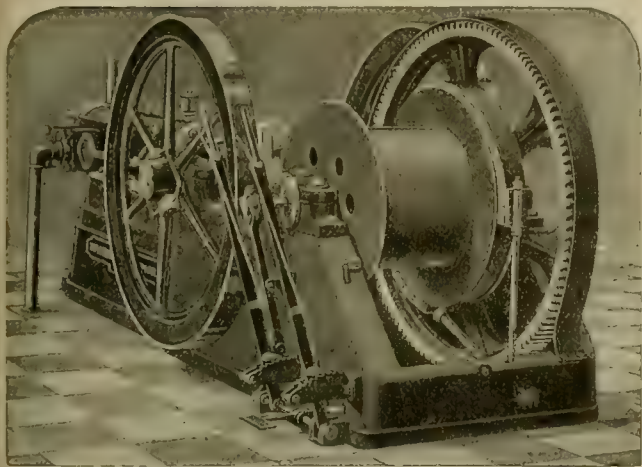
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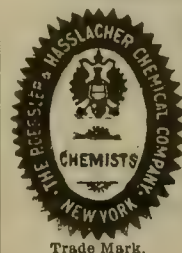
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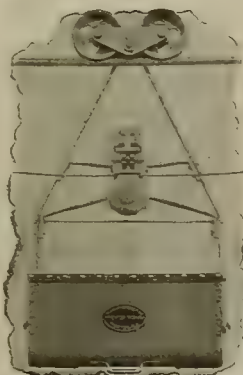
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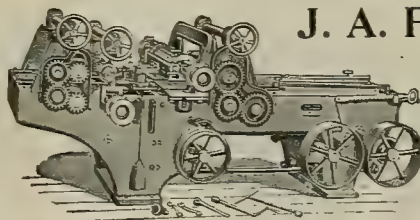
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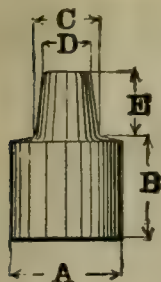
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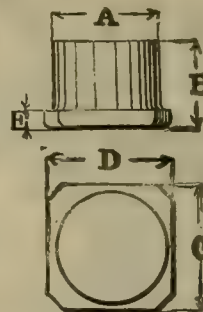
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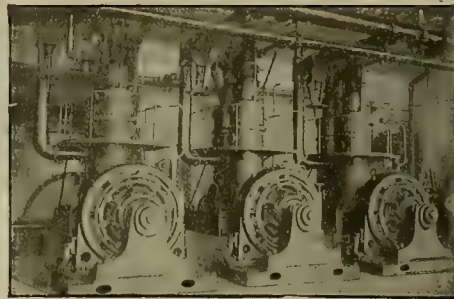
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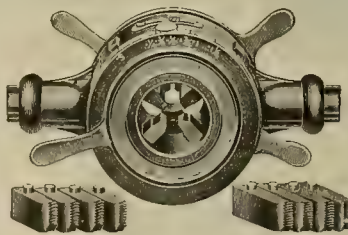
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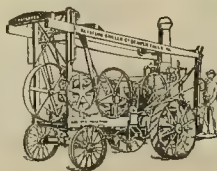
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AGENCIES IN SEATTLE, PORTLAND, LOS ANGELES, BUTTE, DENVER, SALT LAKE.

— SEND FOR CIRCULARS. —

TURBINE AND CASCADE WATER WHEEL

Adapted to all Heads from

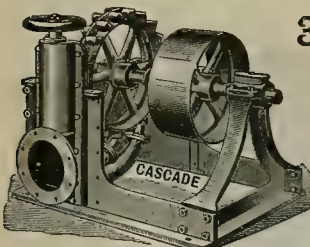
3 Feet to 2000 Feet.

Our experience of 33 YEARS building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

Send for a Pamphlet of either Wheel and write full particulars.

JAMES LEFFEL & CO.

SPRINGFIELD, OHIO, U. S. A.



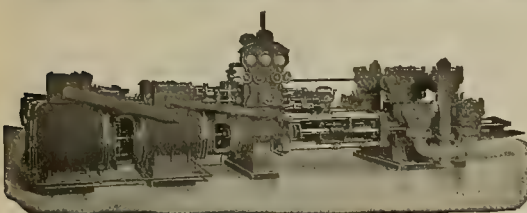
THE BEST (MINE PUMPS) IN THE WORLD.

We carry in our Denver store a stock of Cameron Pattern Siders and Duplex Station Pumps.

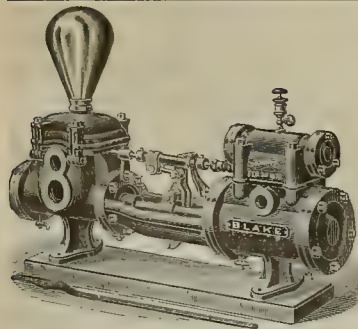
Write for Catalogue and Estimates.

Jeansville Iron Works Co.,
JEANSVILLE, PA.

Western Office,
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Denver, Colo.
A. MIDDLEBROOK, Manager.



TRIPLE EXPANSION.



GEO. F. BLAKE M'F'G CO.
NEW YORK, N. Y.

Boiler Feed Pumps,
Tank or Light Service Pumps,
Combined Air and Circulating Pumps,
Drainage and Irrigating Pumps,
Special Fire Pumps,
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Water Works and Power Pumps.

HENSHAW, BULKLEY & CO., San Francisco,
AGENTS.

FOR REMOVING SLIMES

BROMINE
CYANIDE
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And Other Aqueous Chemical Solutions. OUR FILTER PRESS Removes all Slims and Hastens the Deposition of the Metals.

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RISDON IRON & LOCOMOTIVE WORKS, San Francisco, Cal., } Sales Agents.
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Mining Machinery.

Stamp Mills

Of the Latest Improved Design for

Gold Milling.

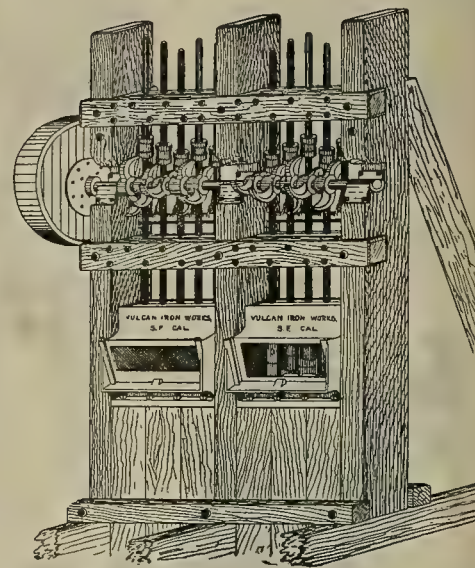
VULCAN

WIRE ROPEWAYS

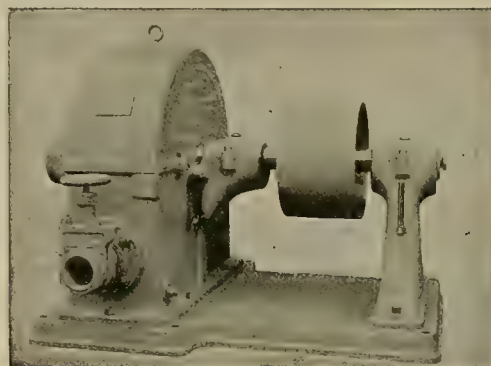
For Conveying Ore, Etc.

Vulcan Iron Works,

Office: 505 Mission Street,
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The Pelton Water Wheel Company



Gives exclusive attention to the development and utilization of water powers by the most modern, economic and improved methods.

An experience of more than fifteen years, involving both the theory and practice of hydraulic engineering as relates to power development in its widest range of application, is at the service of its customers.

Nine Thousand
Wheels

Now Running,

Aggregating some 700,000 H. P.

ELECTRIC POWER TRANSMISSION.

Pelton wheels afford the most reliable and efficient power for such service and are running the majority of stations of this character in the United States, as well as most foreign countries.

Highest efficiency and absolute regulation guaranteed under the most extreme variations of load.

The Pelton Water Wheel Company,

121 AND 123 MAIN STREET, SAN FRANCISCO, CAL.

ADAMANTINE SHOES AND DIES

—AND—

***** CHROME CAST STEEL *****

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.

STAMP DIES.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

MORRIS & TREGLOAN,

141 and 143 First Street, San Francisco, Cal.

Pacific Coast Sales Agents.



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RAND DRILL CO.

Rock Drilling, Air Compressing, Mining
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100 Broadway, - - New York, U. S. A.

BRANCH OFFICES IN UNITED STATES AND CANADA:

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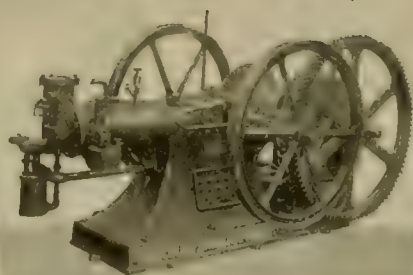
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THE M^AN^DE CO., LOS ANGELES, CAL.

**Mining Hoists,
ORE BUCKETS,
Ore Cars,
CRUSHERS,
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CYANIDE AND SMELTING PLANTS.**



HERCULES GASOLINE HOIST.

**Oil City Boilers and Engines,
Snow Steam Pumps,
Bates Corliss Engine,
Pulleys, Shafting Boxes, Etc.**

ELECTRICAL SUPPLIES AND APPARATUS.

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WRITE FOR PRICES.

THE MACHINERY & ELECTRICAL CO, 351-353 North Main Street, Los Angeles, Cal.

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— AGENTS FOR —

**Judson Dynamite and Powder Co.,
Dynamite and Black Powder,
Caps and Fuse,
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Wheelbarrows, Belting,
Wrought Iron Screw Pipe and Casing,
Corrugated Iron Roofing.**

**153-155 NORTH LOS ANGELES ST. Los Angeles, Cal.
152-154 NORTH MAIN ST.**

Mining and Irrigation PUMPS,

Suction or Deep Well, that throw a STRAIGHT STREAM. No cranks. No air chamber. Water travels a uniform speed. Shows no pulsation. Can be direct connected to engine shaft, geared to motor, or driven by belt. Suction pumps are packed without removing any part. A piston pump with valves. It has no equal for gasoline engines and hoists.

S. W. LUITWIELER CO.,

200-202 NORTH LOS ANGELES ST., LOS ANGELES, CAL.

Mining Timber

WRITE TO-DAY



The L. W. BLINN LUMBER CO.,

Main Office, 348 E. Second St. = LOS ANGELES, CAL.

and let us make an estimate on your next order for LUMBER, SHINGLES, SHAKES and R. R. TIES. We make a specialty of MINING TIMBER and PLANK for Arizona and Mexico shipment.

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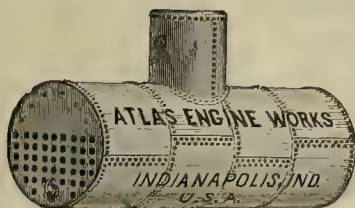
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**ATLAS ENGINES AND
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Work
And All Kinds of
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Forgings.**

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**MINING AND MILLING
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PIPE!

We manufacture Water
Pipe for



**Hydraulic Mining
and Irrigation.**

IRRIGATION SUPPLIES OF ALL KINDS.

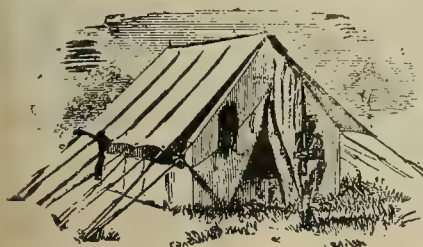
WELL CASING, OIL TANKS,

General Sheet Iron Work.

Write to us for an estimate on your next job.

Lacy Manufacturing Co., LOS ANGELES.

Office, Room 4, Baker Block,



WM. H. HOEGEE,

MANUFACTURER OF

Awnings, TENTS, TARPAULINS, Sails, WAGON COVERS, ORE BAGS, RUBBER BOOTS, RUBBER, LEATHER and CANVAS CLOTHING, Sporting Goods.
Tents and Canvas Floor Covers for Rent. Fancy Awnings for Residences. Camp Furniture.
JOBBERS IN COTTON DUCK.

Write for Price List.

136 South Main Street, = LOS ANGELES, CAL.

Market Reports.

The Markets.

SAN FRANCISCO, Oct. 6, 1898.

SILVER.—London, 28½d; New York, 60; San Francisco, 60½; Mexican Dollars, 47½@47¾. New York exchange, sight, 17½; telegraphic, 20.

LEAD.—New York reports "easy;" exchange, \$3.90; brokers', \$3.80. Local, pipe, 66½¢; sheet, 67½¢; pig, 5¼¢; bar, 6¢.

COPPER.—New York reports Lake, \$12.25 @12.37½. The U. S. Government is reported as bidding 12½¢ for large lots of Lake copper, future deliveries, and to have purchased nearly a million pounds of electrolytic at a shade under 12¢ deliverable in Washington during the next sixty days.

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—Unchanged, 5¼@5½.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18¢; Bar, 19¢.

ANTIMONY.—9½, 10.

BABBIT METAL.—10-12-14—best 16¢.

QUICKSILVER.—Domestic, \$41; export, \$37.00@37.50; carload lots, special rates.

London advices are that the Rothschilds will loan Spain \$4,000,000 or \$5,000,000 on the security of the Almaden quicksilver mines when the treaty of peace shall have been signed.

POWDER.—F. o. b., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15¼¢; less than one ton, 17¼¢. No. 1* 60%, carload lots, 13¼¢; less than one ton, 15¼¢. No. 1** 50%, carload lots, 11¼¢; less than one ton, 13¼¢. No. 2, 40%, carload lots, 10¢; less than one ton, 12¢. No. 2* 35%, carload lots, 9¼¢; less than one ton, 11¼¢. No. 2** 30%, carload lots, 9¢; less than one ton, 11¢. Black blasting powder in carload lots, minimum car 725 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8.00; Coos Bay, \$5.00; Seattle, \$6.00; Southfield, \$7.50.

Cargo lots, Eastern and foreign:

Wallsend, \$7.50; Cumberland, \$9.00; Brymbo, \$7.50; Cannel, \$9.50; Pennsylvania, hd., 14.50; Welsh Anthracite, 12.50; Scotch, \$8.00; Rock Springs, \$7.00.

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.12 per gal.; bbl., \$1.07; pure No. 2, cs., 85¢; bbl., 80¢; Baker's AA Castor Oil, in case lots of 200

gals. and upward, \$1.11; less than 200 gals., \$1.20; in bbls., 4¢ per gal. less than case; Baker's Crystal, \$1.50; China Nut, 52¢; Linseed, strictly pure, boiled, bbl., 43¢; cs., 48¢; raw, bbl., 41¢; cs., 46¢; lots of 5 bbls., 1¢ less; Lucol, boiled, bbl., 38¢; cs., 43¢; raw, bbl., 36¢; cs., 41¢; lots of 5 bbls., 1¢ less. Kerosene—Pearl, cs., per gal., 17¢; Astral, 17¢; Star, 17¢; Eocene, 19¢; Extra Star, 21¢; Elaine, 22¢; Water White, bulk, in tanks, 11¼¢; Mineral Seal, iron bbls., 21¢; wooden bbls., 23¼¢; cs., 26¢; Mineral Sperm, 27¢; Deodorized Stove Gasoline, bulk, 12¼¢; do., cs., 18¢; 86 deg. Gasoline, bulk, 20¢; do., cs., 25¢; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11¼¢; do., in cs., 16¼¢; Lard Oil, Extra Winter Strained, bbl., 56¢; cs., 61¢; No. 1 bbl., 46¢; cs., 51¢; Neatsfoot Oil, bbl., 65¢; cs., 70¢; No. 1 bbl., 55¢; cs., 60¢; Sperm, crude, 60¢; Natural White, 65¢; Bleached do., 70¢; Whale Oil, Natural White, 40¢; Bleached do., 45¢; Cocoa, cs., 55¢; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31¢ per lb.; carloads, 29¢; in 10-lb. tins 37¢; sulphuric acid, 2¼¢ per lb. 66% B.; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2¼¢ per lb.; blue vitriol, 4¼¢ per lb.; borax, refined, 5@6¢ per lb.; chlorate of potash, 9¼@10¢; roll sulphur, 2¼¢; alum, \$1.90@2.00; flour sulphur, French, 2¼@2½¢; California refined, 1¼@1½¢; nitric acid, in carboys 8¢ per lb.; caustic soda, in 10-lb. tins 15¢ per lb.; Cal. s. soda, bbls., 65¢; sks., 60¢ @ 100 lbs; chloride of lime, spot, 2.10 @2.25¢; saltpeter, 15¢; chlorate of potash, 25¢; caustic potash, 12¢.

CORDAGE.—Manila Rope, 10¼¢; Sisal Rope, 9¼¢; Duplex Rope, 8¼¢.

CANDLES.—Electric Light Candles—6s, 16 oz., 7¼¢; 6s, 14 oz., 6¼¢; 6s, 12 oz., 5¼¢; 6s, 10 oz., 4¼¢; Granite (Mining) Candles—6s, 16 oz., 8¼¢; 6s, 14 oz., 7¼¢; 6s, 12 oz., 7¼¢; 6s, 10 oz., 6¼¢. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8¢; colored, 9¢.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.35; cut, \$2.25; 10 to 20d, wire, \$2.40; cut, \$2.30; 8d, wire, \$2.45; cut, \$2.35; 6 and 7d, wire, \$2.55; cut, \$2.30; 4 and 5d, wire, \$2.65; cut, \$2.40; 3d, wire, \$2.80; cut, \$2.55; 2d, wire, \$3.05; cut, \$2.95. In carload lots, 10¢ per keg less.

San Francisco Stock Board Sales.

SAN FRANCISCO, Oct. 6, 1898.

9:30 A. M. SESSION.

| | |
|----------------------------|---------------------------|
| 100 Best & Belcher.....25c | 700 Ophir.....57c |
| 300 Chollar.....18c | 300 Savage.....10c |
| 250 C. Cal. & Va.....78c | 200 Yellow Jacket.....22c |
| 50 Confidence.....50c | |

2:30 P. M. SESSION.

| | |
|----------------------------|---------------------------|
| 300 Ophir.....58c | 200 Sierra Nevada.....82c |
| 50 Mexican.....23c | 200 Union Con.....27c |
| 300 Best & Belcher.....87c | 200 Caledonia.....39c |
| 250 Con. Cal. & Va.....81c | 100 Andes.....10c |
| 600 Savage.....11c | |

Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.

For Sale.---A Bargain.

35 H. P. HERCULES GASOLINE HOIST.

New and first-class in every particular; geared to 700 feet per minute; all latest improvements; made in sections weighing not over 1000 pounds each.

Outfit built to order; has never been used; price very low; builders will give full guarantee.

Address MINER.

P. O. Box 2684, S. F.

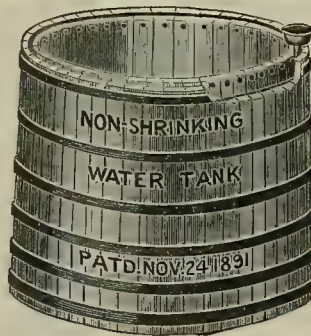
WEST COAST OF MEXICO.

WÖHLER, BARTNING Suc's, Mazatlan (Sinaloa), Mex.

Bankers, Importers, Exporters and Commission Merchants.

Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco.

ORE BUYERS AND EXPORTERS. - MINING SUPPLIES.



Tanks

OF EVERY DESCRIPTION Mines and Cyanide Plants.

Patent NON-SHRINKING TANKS FOR Water or Oil.

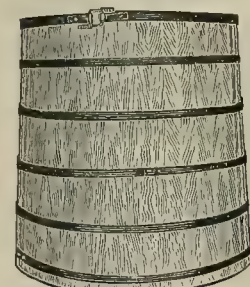
The only Tank that will stand the Desert and Hot Climate.

Write for Catalogue and Estimate on any kind of Tank Work.

PACIFIC TANK CO.

33 BEALE ST., SAN FRANCISCO.

348 East 2nd St.....Los Angeles.



Fulda's Planing Mills and Tank Manufactory,

30-40 SPEAR STREET, SAN FRANCISCO, CAL.

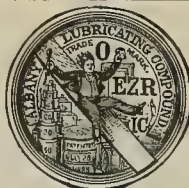
—MANUFACTURERS OF—

RAILROAD MINING WATER WINE

TANKS.

Chemical and Cyanide Vats a Specialty.

WRITE FOR PRICE LIST.



MINING HOISTS.

Engines, Boilers, Saw Mills, Hoe Saws, Mill Supplies.

TATUM & BOWEN,

34-36 Fremont Street, San Francisco, Cal.

29-35 First Street, Portland, Or.

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage. MONEY loaned, mines, MINING companies organized, their property experted, financed and managed. MINES, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated. EXAMINE mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

EDW. N. BREITUNG, Marquette, Mich. Cable address Edbee. Codes, Lieber's U. S. A. Bedford, McNeill's, A & C Universal Commercial.

J. D. BETHUNE, (Late Associate Justice Supreme Court.) Attorney at Law, Mining Law,

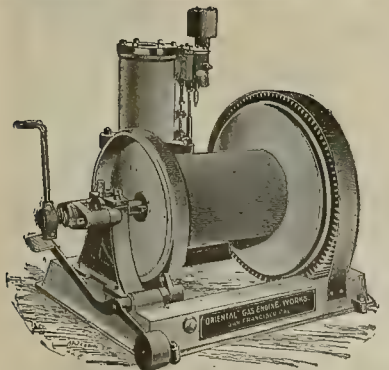
PRESCOTT, ARIZONA. A Valuable Gold Property for Sale.

W. & P. INSULATING COATING. No poisonous gases. Acid and Alkali proof.

For Electrical, Mining and Reduction Works, Cyanide Tanks, Etc.

PACIFIC REFINING & ROOFING CO. 113 New Montgomery St., S. F.

Correspondence solicited.



This cut illustrates our 4 H. P. to 8 H. P. HOISTING PLANT. Larger sizes built to suit the demands of our customers.

It is strong and exceedingly simple and durable, being entirely under the control of the operator, by the use of a single hand lever for hoisting, while the lowering is governed by a foot lever and brake. No better device has been designed for this purpose. For prices and further information address the builders.

Oriental Gas Engine Co., 105 Beale St., S. F.



STAR PATTERN for Heavy Pressure.

U. S. PATTERN for Ordinary Pressure.

We warrant them for all service where a quick, reliable action is required. It will pay you to investigate. Full particulars from any jobbing supply house, or direct from the manufacturers.

THE WM. POWELL CO., CINCINNATI, O.

AMERICAN AND FOREIGN PATENTS. CAVEATS, TRADE MARKS. DEWEY, STRONG & CO. 330 MARKET ST. S. F.

QUICKSILVER!

—FOR SALE BY—

The Eureka Company, OF SAN FRANCISCO.

ROOM 1, 426 CALIFORNIA STREET, SAN FRANCISCO.

Skeleton Mining Report.

NEEDED BY EVERY MINING MAN.

FIFTY CENTS POSTPAID.

Mining and Scientific Press, 330 Market St., S. F.

Assessment Notices.

EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Forest Hill, Placer County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 12th day of September, 1898, an assessment (No. 13) of one-half cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Nos. 1209-11 Claus Spreckels building, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 10th day of October, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 1st day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
J. J. CRAWFORD, Secretary.
Office—Nos. 1209-11 Claus Spreckels building, San Francisco, California.

MARINA MARISCANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of September, 1898, an assessment (No. 15) of 2 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 31st day of October, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 21st day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
CHARLES BOYNE, Secretary.
Office—217 Sacramento street, San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of October, 1898, an assessment (No. 21) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 7th day of November, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 28th day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
CALVERT MEADE, Secretary.
Office—106 Leidesdorff street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of October, 1898, an assessment (No. 11) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 237 12th street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 7th day of November, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 5th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
F. METTMANN, Secretary.
Office—237 12th street, San Francisco, California. The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

DELINQUENT SALE NOTICE.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Riverside County, California.
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 10th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------------|-----------|-------------|---------|
| W. H. Bailey, Trustee..... | 249 | 2,000 | \$30 00 |
| W. H. Bailey, Trustee..... | 261 | 2,000 | 30 00 |
| W. H. Bailey, Trustee..... | 262 | 10,000 | 150 00 |
| C. A. Bailey..... | 133 | 1,000 | 15 00 |
| C. A. Bailey..... | 135 | 1,000 | 15 00 |
| C. A. Bailey..... | 136 | 1,000 | 15 00 |
| C. A. Bailey..... | 138 | 500 | 7 50 |
| C. A. Bailey..... | 169 | 2,000 | 30 00 |
| C. A. Bailey..... | 210 | 4,532 | 67 98 |
| E. L. Cheney, Trustee..... | 245 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 246 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 247 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 248 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 249 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 250 | 250 | 3 75 |
| R. L. Cheney, Trustee..... | 251 | 2,500 | 37 50 |
| R. L. Cheney, Trustee..... | 252 | 1,000 | 15 00 |
| W. H. Bailey, Trustee..... | 256 | 3,300 | 49 50 |
| W. H. Bailey, Trustee..... | 259 | 7,300 | 109 50 |
| W. H. Bailey, Jr..... | 147 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 148 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 149 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 150 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 151 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 188 | 2,500 | 37 50 |
| W. H. Bailey, Jr..... | 208 | 4,000 | 60 00 |
| W. H. Bailey, Jr..... | 209 | 532 | 7 98 |

And in accordance with law, and order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 508 Safe Deposit building, San Francisco, California, on TUESDAY, the 1st day of November, 1898, at the hour of 10 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
R. L. CHENEY, Secretary.
Office—Room 508 Safe Deposit building, San Francisco, California.

To Our Customers and Friends on the Pacific Coast :

Through frequent complaints made to us, we have learned that unprincipled and dishonest dealers on the Pacific coast have counterfeited our trademark numbers and substituted inferior, spurious goods as ours, when ours were distinctly ordered, thus defrauding the customers and injuring our trade and reputation.

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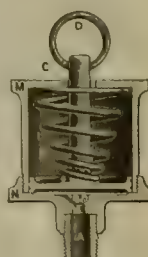
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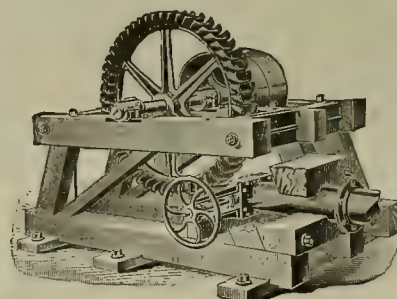
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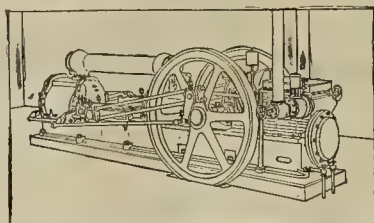
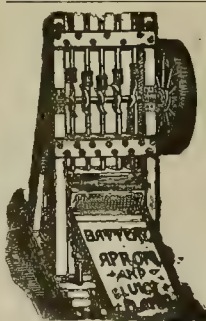
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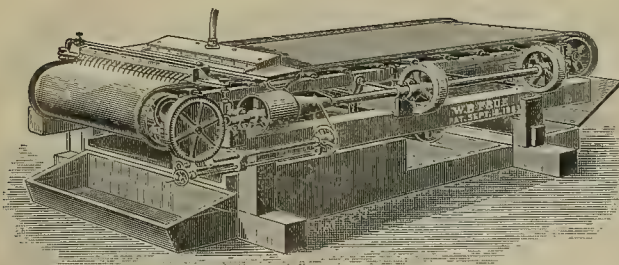
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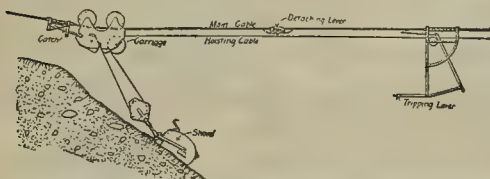
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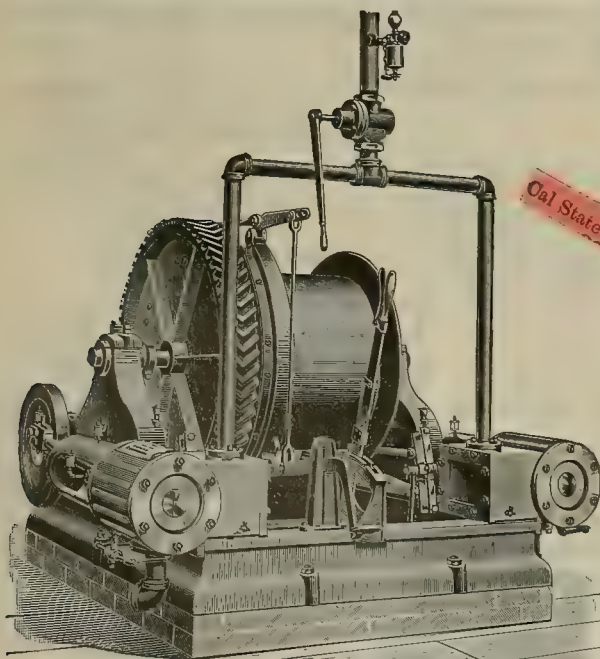
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No. 1997.—VOLUME LXXVII.
Number 16.

SAN FRANCISCO, SATURDAY, OCTOBER 15, 1898.

THREE DOLLARS PER ANNUM.
Single Copies, Ten Cents.

Southern California Petroleum.

Written for the MINING AND SCIENTIFIC PRESS by A. S. COOPER,
State Mineralogist of California.

In Santa Barbara Co., Cal., the Summerland oil-bearing strata consists of a fine-grained sand encased in strata of clay or clay slate. When near the oil-bearing strata the clay or slate is of a bluish color owing to its being slightly impregnated with bitumen. The sands and shales form an elongated dune, the longest axis of the dune being from east to west, running nearly parallel with the coast and parallel with the trend of the Santa Ynez mountains. Near the eastern end of the dune the formation dips about S. 20° E. at an angle of about 50°, whereas on the western end the sand dips about S. 10° W. at an angle of about 60°. The general dip of the sand is southerly at an angle of about 40° or 50°. Nearly all the oil found in California is in dunes.

The first discovery of the hydrocarbons in this field was made on the south slope of the anticline. At this place there was a fumarole from which warm carburetted and sulphuretted hydrogen gas escaped. No vegetation grew on this place owing to the sulphur fumes; it was some 20 feet in diameter. The Spaniards had a legend that a man was killed there, which according to them accounted for the fact that nothing grew upon it. A pipe was sunk in the fumarole and capped and a 2-inch pipe inserted in the cap when the gas was permitted to flow through the pipe. It did so with considerable pressure, and when lighted gave a flame 10 feet in length. On a line nearly east and west with this fumarole other wells have been bored which have yielded gas. The

line are a line of oil wells; they are from 130 to 250 feet deep. The first oil obtained in the field was from a well dug 90 feet in depth which produced three or four barrels daily. The oil is black or dark green and

passages it must ascend through permeable strata to the surface, or, hidden, find its way to the sea. As the Summerland anticline forms a barrier between the Santa Ynez mountains and the sea to the pass-



PUMPING PETROLEUM FROM UNDER THE SEA ON THE SANTA BARBARA COAST, CAL.*



SUBMARINE OIL WELLS AT SUMMERLAND, SANTA BARBARA CO., CAL.*

gas has been employed for domestic purposes.
South of the gas wells on a nearly east and west

*The engravings portray an unusual scene in the petroleum industry. On the sides of wharves or platforms extending 300 feet from shore are wells, from which is raised oil from strata beneath the bed of the ocean, 350 feet below the surface of the water. To Mr. F. M. Selover, editor of the Santa Barbara, Cal., Press, this paper is indebted for the photographs from which the accompanying views were engraved. Since the photos were taken, one of the wharves has been extended 200 feet farther into the sea, and more wells bored with increasing flow of oil therefrom.—EDITOR.

is of a very heavy gravity, being 11° to 16° Beaume. Judging from other oil fields, the northern dip of the sands of this anticline will be barren. Meteoric water falling on the higher ground of the Santa Ynez mountains, which at places reach an altitude of 3600 feet, penetrates the earth through inclined and porous strata, or through fissures, cracks, seams and joints. After flowing through subterranean

age of the water, it is forced by hydrostatic pressure to ascend through the north dip of the sand of this anticline. Owing to its inferior gravity the petroleum oil is floated upwards by the water and is lost on the surface of the earth or carried over to the south dip of this anticline. With the southern dip of this anticline it is different; the flow of water is downwards, the oil remaining on top of the water by its buoyancy.

Owing to the large amount of organic matter in the shales underlying the Summerland oil field, if any iron was present during their deposition it must have been in the form of ferrous carbonate. The carbonate of iron imparts a bluish or greenish color to the deposit. When the shales in which carbonate of iron exist are turned red, it is caused by chemical heat. The presence of red shales below the Summerland oil strata, as is shown by a well drilled to the depth of 1000 feet, and the high temperature of the natural gas, shows that chemical changes are in active operation at present beneath this field. It is probable that sulphur compounds, liberated by chemical heat in the shales, have resinified the petroleum oils of Summerland, which will account for their great gravity.†

Through wells it has been determined that the oil sand lies but a short distance north of the shores of the Santa Barbara channel, and that the dip of the formation, being 40° or 50° towards the south, will carry the sand below the surface of the ocean.

Recently a wharf has been extended into the ocean, from which wells have been sunk and are productive, the oil being of a lighter gravity than that obtained in the upper portion of the oleiferous strata. As a general rule, in California the further the oil is removed from atmospheric influences the lighter its gravity.

† Resins or asphaltum can be formed from California oils by the addition of sulphur.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....Publisher

San Francisco, October 15, 1898.

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CALIFORNIA petroleum is the subject of considerable present investment. The supply and demand constantly increase, both in crude oil for fuel and refined for finer purposes. The temporary diminution of the Los Angeles product is more than made up by developments in adjoining counties. An unusual method of securing this natural product is illustrated on the preceding page, 373—viz: by pumping from under the sea, the submarine oil strata being found at a depth of 250 feet. In connection with this matter the suggestions of the State Mineralogist regarding surface formations may prove of practical value to the oil prospector and investor.

COAST industries are interested in the action of the joint international commission, now in session in Quebec, as to the removal of the present 67 cents per ton duty on coal imported from British Columbia. Oregon and Washington coal producers naturally desire the retention of the tariff; British Columbia producers and California consumers favor its abolition. Washington coal mine owners argue that San Francisco cannot expect to get coal any cheaper if the duty were removed, as British Columbia mine owners would still have a monopoly, and assert that in the greater development of coast coal in American territory lies the most satisfactory local solution of the question. So far as San Francisco is concerned anything tending to reduce the present price of coal would be welcomed by local manufacturing and industrial interests.

FOR nearly five months have been appearing portraits of the successful naval heroes of the late war and eulogies of their gallantry, skill and courage, all of which is deserved. It is right and proper that such patriotic effort, energetic skill and daring courage should be given full recognition and grateful prominence. But the officers of the line are not the only ones in the late war that deserve well of their country. Fully equal to them in point of bravery, skill and courage were the naval engineers. To these latter, no less than the former, is due whatever gratitude and admiration the country sees fit to bestow. None the less than the officers of the line did the engineers exhibit genius, skill and devotion, and it is but a simple record of a plain fact to note that it was the heroic ability of the engineering staff of the U. S. navy that made victory assured.

FROM the U. S. Geological Survey, Washington, D. C., is received the latest in the series of contour, topographical, and geological maps constituting a geologic atlas of the United States, the one receiving present notice being the Bidwell Bar, Cal., folio, comprising portions of Butte, Plumas, Sierra and Yuba counties, Cal. The characteristics and practical value, their manner of production and their fidelity to detail, have been heretofore noted on the

receipt of other members of the series, and the favorable comment hitherto made can only be repeated regarding the present one which is uniform with its predecessors in completeness and value. The ability and intelligent economy of effort exhibited by the director of the U. S. Geological Survey and his subordinates is sufficiently exemplified in this great work to need no more than passing recognition.

A QUESTION of constant interest to miners is discussed and illustrated on page 378, regarding "ore in sight," and "estimated ore." Nothing in the way of "ore in sight" can be given value approximating any degree of correctness, that can not be measured on three sides, "the fourth dimension" having no place therein. The prospective value of the mine can be inferred from this "ore in sight," from the nature and method of occurrence of the ledge or deposit, from the indications and character of the ore and the general reputation of the district. And "prospective value" is still a prominent factor in the transfer of mining property. It is borne in mind, however, by most mining engineers and "experts," that while "ore in sight" can often be closely figured as to bulk and tonnage, the question of value per ton can never be accurately answered prior to treatment. How to correctly figure the value of a mining property is not a perfect art. In this much depends on the artist. More reputations have been won and lost in the mining world by figuring or guessing the net yield of "ore in sight," or "estimated ore" than in any other way, and, incidentally, considerable cash has been likewise lost in that way.

THE 800-page report of the U. S. Commissioner of Patents for 1897 is illustrative of the progressive genius of the American people. During the last year there were 23,729 patents issued; of these 21,508 were to citizens of the United States and 2,221 to citizens of foreign countries. Perusal of a list of the subjects of invention shows it as a great sea that washes every shore of human thought. This annual record of ingenuity is one of the creation of new industries and the employment of old ones, making life safer and more convenient, alleviating distress, advancing every department of science and industry, and improving every condition of humanity. Old things are improved, new ideas made practical, and nothing is too mighty or too insignificant to be ignored. In some cases it is difficult to see how homely things of constant universal use could be improved, as, for instance, where last year 74 new and distinct devices in improvement on the wrench were patented, or in the case of the horse-shoe, which was the subject of 66 new patents in 1897. Valves, which are always a subject for study, occasioned the issuance of 200 patents, the steam boiler 52, and the gas engine 58. Of course, the usual phalanx of car coupling inventions were in evidence, and the ubiquitous bicycle, though a cursory glance along the pressing demands of the times would hardly show the existence of a void that justified last year 38 patents on pumps, and 21 on rivets. Probably no publication is more practically suggestive of the progress and mental activity of the country.

In the issues of Aug. 13 and Sept. 24, '98, reference was made to the substitution of aluminum for copper in carrying electrical current and other industrial uses, and the belief expressed that the output and price of the former metal would preclude commercial competition with copper. In connection with this subject, A. E. Hunt, who is identified with the development of the aluminum industry, presents some arguments in favor of the substitution of aluminum in place of copper for electrical conductors, for telegraph, telephone and railway services. He cites the fact that, while the electric conductivity of aluminum is 63 per cent. that of copper, the weight of the latter metal is 3.33 times that of an equal volume of aluminum, and that though the cross-section of an aluminum conductor were increased sufficiently to give it equal conducting with copper, the weight of the larger aluminum conductor would be only 48% of that of the copper conductor. Regarding cost, Mr. Hunt says: "To obtain, therefore, a conductor of aluminum at the same cost of metal per mile, the cost per pound of the aluminum may be 2.1 times greater than that of copper. Assuming the cost of the copper at 14 cents a pound, it is evident

that aluminum at 29 cents a pound is slightly cheaper than copper." It is further argued in favor of the light metal that aluminum wire can be supplied at about the same tensile strength per unit of area as that of annealed copper—32,000 pounds per square inch; but, as the aluminum conductor will have a larger area to make up for its deficient conductivity, it will be stronger. Regarding the use of alloys of aluminum for this purpose, Mr. Hunt holds that while a number of such alloys can be made which are much stronger than the pure metal, they appear as a class to reduce the electric conductivity. One of these alloys which he refers to appears to be well adapted for the production of electric conductors, having a tensile strength of 65,000 pounds per square inch, and an electric conductivity of 50. As to the difficulty of soldering or brazing aluminum he suggests that mechanical joints might be tried. The experimental tests now being made will aid in determining the economic aspect of the matter. It is believed, however, the lowest limit of cost at which aluminum can be produced will not permit of its supplanting copper in the electrical field, as a matter of economy.

THE most recent industrial advance that gives great promise of economical result is the utilization as a motive power of what has been a waste product in blast furnaces. It comes in line with the increased use of the gas engine, and is a long step ahead in shop economics. It has long been known that for every ton of pig iron produced by a blast furnace there is sent out from its top an average of 150,000 cubic feet of combustible gas. This has hitherto been a waste. It is now commercially feasible to use this blast-furnace gas in the cylinder of a gas motor, thus supplanting the gas-fired boiler. This discovery of a new source of motive power has passed from the problematic to the practical phase, and is soon to be considered a settled fact. For some time gas engine makers have been successfully increasing the sizes of their motors, and blast-furnace men have been experimenting with the waste gas from the tops of their furnaces, and the efforts have now been combined. In Europe and in the United States two years' experimental work has resolved the question into a commercial success. In the works of the Cockerill Co. a 200 H. P. gas engine is entirely supplied with gas from the blast furnace, hitherto wasted in the atmosphere, but now used in generating power.

In accordance with its usual custom, when the Klondike fever broke out in '97 the MINING AND SCIENTIFIC PRESS was first to secure and publish authentic scientific data for the use of prospectors, miners and gold seekers, written by men on the ground, old experienced miners. That this was of value was evinced by subsequent events. Later occurrences also showed that inasmuch as false and misleading statements were being made by many interested in inciting travel, that an even more detailed statement of the gold regions of the extreme Northwest was necessary. Accordingly the services of a man in every way qualified for the work was secured, and beginning with the issue of the 22nd inst. will appear what is believed to be the best treatise on this important subject so far published. While strictly scientific, it is as strictly practical, giving information of great value to the gold seeker, just the kind of information he most needs, and for the first time this whole subject is treated in detail from a scientific mining standpoint by a practical placer gold miner, who knows just what he is talking about. A perusal of this forthcoming article will be the means of saving many a miner fruitless expenditure of time and money, and, probably, life itself, should he propose a journey in those dreary northern wilds. Few men are content with being told that a thing is so without having the reasons coupled with the statement, so that they can judge of the correctness of the assertion by the proofs adduced. In the article under discussion is clearly discussed in detail the "glacial theory," and as clearly shown why placer gold is and can be found in parts of that region, and why it is not and cannot be found in other sections. The article will be read with interest by every one in any way connected with gold mining in every part of the world.

Concentrates.

The United Verde mine at Jerome, Ariz., employs 700 men. The reserve fund of the Portland M. Co., Cripple Creek, Colo., amounts to \$700,000.

The quartz and placer mines of Lemhi Co., Idaho, produced 15,000 ounces of gold in '97.

Supt. Kinkadee has begun working the tailings at the Homes mine, Candelaria, Nev.

A technical description of the Fauvel gold recovery process appeared in the issue of Jan. 4, 1896.

W. J. HAYTER was killed recently in the Le Roi mine, Rossland, B. C., by a rock falling from a slope.

In the Rand, S. A., district the average cost of sinking a timbered shaft, $5\frac{1}{2} \times 18$ feet, is \$125 per foot.

The Montana School of Mines at Butte, Montana, will not be opened this fall because of a lack of funds.

An agent who makes a contract in his own name, without disclosing his agency, is liable thereon as principal.

Geologically speaking, "serpentine" is ordinarily decomposed granular intrusive rock, either peridotite or pyroxene.

In the Lake Superior iron mines ore is mined 600 feet below the surface and delivered on the cars at a total cost of 67 cents per ton.

A "chispa" is a small bright fragment or spangle of gold, worth from 10 to 50 cents—an old Spanish term for a miniature nugget.

There are still several glaciers in the California Sierras. The best living authority on that subject is John Muir, Martinez, Cal.

In '97 Norway produced 1035 tons of copper ores with 20 per cent of copper, some 1000 tons of poorer copper ores, and 90,000 tons of iron pyrites.

The amount of dividends declared by the Bullion-Beck mine at Eureka, Utah, is \$2,187,000. Those of the Mercur mine amount to \$1,191,000.

There is a pumice deposit in Sonoma Co., Cal., that would be worked if demand warranted it. In Utah are also deposits of pumice stone of considerable extent.

In a single hand drilling match at Boise, Idaho, Oct. 6th, H. Andrea made 13 inches in fifteen minutes. The block was blue granite, full of mica schist, and flinty.

The aggregate California gold yield for '98 will be the smallest for several recent years, because of the drouth, which curtailed every product of the State.

The largest number of stamps under one roof in California is at the Golden Cross group, San Diego, Cal. In the hands of the receiver the mine has proved profitable.

The only quicksilver mine that "Concentrates" knows of where concentration is practiced is the Manzanita, Lake Co., Cal. The cinabar ore there also carries gold.

The price of quicksilver, like every other commercial product, is regulated by the laws of supply and demand. The present duty on imported is 7 cents per pound.

The Wedge mine, near Randsburg, Cal., since its incorporation in April, 1897, has paid \$42,500 in dividends. The total investment in the mine and mill property was \$6500.

Since the war tax went into effect incorporation of million-dollar corporations is more expensive and infrequent. As at present, such incorporation costs several hundred dollars.

About this time "souvenirs," "official programmes" and "special editions" that nobody sees (except the contributors thereto) are being projected upon an overburdened community.

The Star mine, Cherry Creek, Nev., is now marketing smelter ore carrying nearly 3000 ounces silver per ton. A plant with a daily 150-ton capacity will be in operation Jan. 1st, '99.

The Graves and Graeter dredges near Bannack, Mont., operating steadily since last April, are said to be netting from \$1200 to \$1800 a day. They have a crew of sixteen men to each boat.

D. BEEMAN and C. Zeuckwert, ascending the shaft in the Martha Washington mine, Silver City, Utah, when within 100 feet of the top, the skip overturned, they fell 300 feet and were killed.

OWNERS of unpatented mining claims have until Jan. 31st, '99, to file the necessary affidavit that \$100 in work or improvements was put on the claim during the year ending Dec. 31st, '98.

The average cost per ton of ore produced last year by the Anaconda Copper Co. was \$3.77 net. The total cost of mining and treatment was \$7.98 per ton. The average yield was \$11.22 per ton, a profit of \$3.33.

In the American M. Co.'s mill at El Oro, Mexico, J. Bevro was watching another adjust some belting; the belt dropped, and, looping itself about Bevro's neck, switched him against the machinery, killing him instantly.

One member of a firm makes and delivers a note signed by him in the name of the firm, to secure his individual debt, and this with the knowledge of the one to whom the debt is to be paid, the firm is not liable on the note.

The Australian record for shaft sinking in '98 has been made in the Brilliant Deep Lead, Charters Towers—1053 feet through hard grey granite in eleven months. The shaft is a three-compartment, 12 feet by 4 feet in the clear.

The monthly payroll of the Le Roi mine at Rossland, B. C., to its employees the 10th inst. was \$28,000; the monthly account for supplies was \$14,000 additional. The mine has 285 men on its payroll and operates twenty-seven drills.

In the administration of the public lands the decision of the Land Department upon questions of fact is conclusive, when brought to notice in a collateral proceeding, and it is only questions of law that are reviewable by the courts.

Bismuth is again reported discovered near Grant's Pass, Or. It is not an uncommon find, the largest deposit, so far as known, being at Golden, Colo. The ore is reduced in Saxony and London. Its present worth is about \$1.75 per pound.

The New Zealand government is still offering a bonus of 4d per pound for the production of the first 100,000 pounds weight of good marketable quicksilver from any mine in New Zealand. One-third of the quantity must be produced before the 31st of March, 1900, and the remaining two-thirds before the 31st of March, 1901.

In the Morning mine at Wallace, Idaho, while thirty men were at work, an accidental explosion of 350 pounds of dynamite occurred. The cause of the explosion is unknown. When

the smoke and gas had passed sufficiently to permit rescuers to enter, they found nobody seriously hurt, the only casualty being the killing of a horse.

The first message over the Canadian Pacific Railway Co.'s new transcontinental copper telegraph line was flashed from Montreal, Canada, to Vancouver, B. C., last week, a distance of 2900 miles. This is claimed to be the longest land circuit in the world. In passing over this long distance the message occupied one-fifth of a second.

The Standard Oil Co. is credited with intent to control the Butte, Montana, copper companies, consolidation of the Anaconda, Boston & Montana, Butte & Boston and Montana Ore Purchasing Co. being locally but mistakenly foreshadowed. The four mentioned companies to the 1st inst. had declared dividends aggregating \$13,755,000.

This paper knows nothing of any "renewed development in the Mariposa grant." The usual statements that the owners have got together and propose to develop it are about due. The 49,000-acre grant has for forty years been in the way of working Mariposa Co., Cal., mines, and, for aught "Concentrates" knows, may be for forty more.

"I SEND 6 miles for my paper every week, and would send 16 if necessary," writes a Shasta Co., Cal., subscriber. "The MINING AND SCIENTIFIC PRESS is the most welcome of all the papers I get," says a Boulder, Colorado, man. "I notice a constant intent to be reliable in all statements," is the comment of a Prescott, Arizona, mining engineer.

The Canadian Geological Survey places the mineral output of the Dominion last year at \$28,000,000, an increase of \$6,000,000 over the previous year. The output is divided as follows among the principal mining provinces: British Columbia, \$10,455,268; Nova Scotia, \$6,000,000; Ontario, \$5,000,000; Quebec, \$2,063,266; Northwest Territories and Yukon, \$3,000,000.

COLORADO and California have lost millions by forest fires in the past ninety days. The annual report of the Commissioner of the General Land Office estimates that over 11,000,000,000 feet of public timber have been destroyed by fire in the past thirty-five years. The report says forest fires form the main subject for the attention of the Land Office now.

ORDINARY commercial nitric acid is worth 5 cents per pound; extra, 12 to 15 cents, approximately free from chlorine. The kind used by the San Francisco Mint is 9 cents per pound. When nitric acid is pure only the silver dissolves, but if not pure some of the gold dissolves; in the processes used in the mint, if the gold is not thoroughly sweetened, a small percentage of the gold will pass off in the acid.

An alloy closely resembling gold is composed of copper 94 parts, antimony 6. The antimony is added after the copper is melted; subsequently sufficient magnesium carbonate and calcium are added to increase the specific gravity. The alloy looks like gold, can be hammered and soldered, and is unaffected by nitric acid. It appears to be particularly well adapted to the manufacture of "gold bricks."

TWO MINERS recently found a large gold nugget in Kizir creek, in the Minusinsk district of Siberia. It was found in a prospecting shaft 66 feet below the surface. Its weight is 850 ounces and its value \$15,500. This is one of the largest nuggets found in Russian territory, the largest one yet found having weighed nearly 1300 ounces. The Kizir nugget is 8 inches long, 5 inches wide and $2\frac{1}{2}$ inches thick.

AT MONTREAL, Canada, McGill University recently completed chemical and metallurgical laboratories at a cost of \$350,000. The mining department is equipped with three rock breakers, Cornish rolls, screens of all sizes, a battery of 1000 and another of 600-pound stamps, and a Huntington mill, each with its complement of plates and concentrators. It has also a set of amalgamation pans, a chlorination and cyaniding plant.

OF the fifteen electrolytic copper refineries in the United States, all are east of Chicago, except three. One-half of the output of the Anaconda is refined in Baltimore, and the United Verde Copper Co.'s output of Arizona is refined near New York City. The copper matte from the Mountain Co. of Shasta Co., Cal., is refined in New Jersey. It is said that that company contemplates the erection of a refinery at the Keswick smelting works.

A SAN FRANCISCO BANK has effected an arrangement with the United States Government which will render unnecessary the recently contemplated shipment of \$10,000,000 in silver bullion from Philadelphia to the mint in San Francisco. The bank which is the heaviest dealer in silver bullion on the Pacific coast will deposit silver at the San Francisco mint and receive certificates therefor, which will be available for use in New York, thus saving the cost of transportation across the continent.

THE "last spike" in the C. P.-U. P. railway connection was driven May 8th, '69, at Promontory Point, Utah. Sacramento was then the California terminus, river steamers carrying San Francisco passengers. During the twenty-five years ending May 8th, '94, the overland arrivals via the Pacific Railway at San Francisco were 1,573,700; the departures for that period were 1,036,600. The population of California in '70 was 560,247; in '80, 804,336; in '90, 1,208,130; at present it is probably 1,750,000.

LAST August a gold nugget was found in Western Australia weighing between 95 and 100 pounds. The discoverers confided the secret of the location of the find to their local clergyman, who, according to agreement, announced that on the 11th he would divulge the locality. At the hour named 6000 men were present and before the clergyman had finished telling where the nugget was found there was a stampede for the locality named equal to a rush on the Colville reservation, everyone hoping to at least make a location that he could sell on the strength of its proximity to the place where the big nugget had been found at a depth of 16 feet.

THE annual report of the Commissioner of the General Land Office makes official reference to the Benson land surveys in California. He says July 1, 1898, was the date fixed as the limit for new surveys to be made and notes filed with the Surveyor General of California. He reports now that no field notes were filed on the date mentioned, but he has received assurances from deputies that the work of field correction is in progress and that field notes of the work on each contract will be filed as fast as they can be prepared, and the returns of all these suspended surveys will be in the hands of the Surveyor General of California in proper form before Dec. 1st, '98.

WHEREAS any one or more of the co-owners of an unpatented claim fails to contribute his or their due share of the required annual expenditure thereon, those of the owners who want to hold the claim, and have complied with the requirements for

annual assessment work, may give notice to such delinquent at the close of the calendar year for and in which the work was done. This notice must be in writing or by publication in a suitable newspaper once each week for ninety days—thirteen insertions. The delinquent so notified has ninety days from the date of the written notice mailed to his last address, or ninety days from the last publication of the published notice. If he fails or refuses to contribute his just proportion his interest in the claim becomes the property of those complying with the requirements of section 2334 U. S. Revised Statutes. This subject is most exhaustively discussed editorially in the issue of Sept. 3rd, '98.

THE steamer Al-Ki brings a United States Geological Survey party that has been working in the Cook Inlet country, Alaska. They left on the gunboat Wheeling last April and proceeded to Cook Inlet, where they spent the summer. Their work was principally in the vicinity of Tyonik, the correct spelling of which, they say, is Tyonak. Thence they went almost the entire length of the Beluga river, up to Mount Shushitna and down to Lake Clark and Redoubt volcano, besides penetrating the interior a considerable distance. Extensive maps were made, showing the streams, lakes, soil and rock formation, altitudes and other topographical and geological information. They found many indications of placer gold, although they did not go on a prospecting expedition. There are few people left at Sunrise City of the 2000 who were there six months ago, and there are plenty of provisions there to last during the winter. Valdes, on Prince William sound, has 600 or 800 prospectors, who are said to be destitute. Most of them are from the Copper river, where they spent from six months to two years in fruitless prospecting.

"HOW TO BUY A MINE" is a question not easily answered. Much depends on the amount of money to be invested and the knowledge the intended investor has of mines and mining. If he has little or no knowledge of the business the better plan would be to commission some one who has. If, however, the would-be purchaser knows enough about the business to sample a mine, then he might get the opinion of as many as possible of the prospectors and miners who are familiar with the mine and its value, and carefully note what each says, making due allowance for the disparaging remarks always made by disappointed men. He might also have his samples assayed by several local as well as outside assayers, always giving the assayer samples in pulp, retaining a sufficient quantity of each sample for other assays, and have assays made by an assayer who is exclusively in that business, bearing in mind that he wants quantity, grade and title. Make all investigations as to title through a reputable abstractor or attorney, or both, and buy no property with a clouded title. If not satisfied with the quantity or grade of ore, secure a limited bond and make further developments, as well as mill runs.

In cyanide treatment of slimes W. B. Gray holds that, as between precipitation by charcoal or zinc, the former is the cheapest and best. Talking from a South African standpoint, he says: "If you allow the cyanide of gold to flow through charcoal at the rate of 300 gallons per hour, you will get at the rate of nine ounces of gold in your top filter. The cost of charcoal in each filter is about 2s, or for each ounce of gold saved in the filter the cost is £2 3s 4d. By zinc precipitation, under the most favorable circumstances, 1 pound of zinc at 6d per pound will be consumed for each ounce of gold. This is a cost of 6d for each ounce of gold obtained, independent of all other treatments, against £2 3s 4d by charcoal. There are also other considerations. The gold from charcoal precipitation is worth from £4 to £4 2s per ounce, while the gold from zinc precipitation is seldom worth more than from £3 to £3 15s per ounce. Another point in favor of charcoal is that it will precipitate the gold from the weakest solution of cyanide, while the zinc will not satisfactorily precipitate unless the solutions are kept up to their working strength. With charcoal, where it is used, the solutions are constantly pure and clean, while there is so much zinc destroyed by the zinc process that the solutions must of necessity become heavily charged with zinc and have to be renewed in course of time."

ANOTHER batch of inquiries is received regarding annual assessment work, some implying disbelief in the announcement in the issue of Sept. 24, that "in the case of a mining claim located any time after Jan. 1st, '98, the locator or locators have till Dec. 31st, '99, to do the \$100 worth of work required by the Federal statutes." That is a precise statement of the exact fact, the article in question being a sufficient answer to a multitude of such queries annually received. Three write that they "have bets up." Those who bet on the accuracy of the statement will win. One miner writes from Republic, Wash., that a man bet \$50 with him that a claim located Jan. 1st, '98, and not worked was "jumpable" Jan. 1st, '99. Our correspondent is \$50 ahead on that proposition, so far as Federal statutes apply. This paragraph has no application to State or local laws. For the last time this whole question is referred to for final answer. It does seem singular that a mining claim located say Jan. 1st, '98, can be held without a lick of work till Dec. 31st, '99, but such is the strict legal interpretation of the statute. On this subject, Sec. 624, "Lindley on Mines" says:

The requirement as to the performance of annual labor is imperative. While a timely resumption of work may save a forfeiture, the contractor must be diligent in his ingenuity in attempting to avoid this plain and wholesome requirement. The courts are disposed to deal with these drones in the hive with much more leniency than they deserve. The statute is too frequently applied on sentimental lines. Forfeitures, say these tribunals, are odious, and in many cases the reluctance with which they enforce the law encourages, rather than deters, the systematic evasion of it.

The statute is extremely liberal as to the time in which the specified amount of work shall be performed. A location made on Jan. 1, 1897, may, in the absence of State laws or local rules requiring development work to be performed as an act of location, be held without a stroke of labor until Dec. 31, 1898, and in no case is the period less than a full year. It would seem that a more rigid enforcement of the rule would not only command more respect for the law, but would, in a great degree, tend to promote the general object and intent of the mining statutes—the development of the mining resources of the country. As was said by the Supreme Court of the United States, speaking through Justice Miller: "Clearly, the purpose was * * * to require every person who asserted an exclusive right to his discovery or claim to expend something of labor or value on it as evidence of his good faith, and to show that he was not acting on the principle of the dog in the manger." As it was in the days when mining privileges upon the public domain were governed by local rules, so it is now the invariable rule, that the locator's only right to possession depends upon the performance annually of the specified labor. The grant flowing from a perfected valid location is only perpetuated by "representation."

The San Juan, Colorado, as Seen From Telluride.

With Red Mountain as a center, draw a circle having a radius of thirty-six miles, and you encompass the mining districts of the San Juan. Within this circle will be Ouray, Telluride, Red Mountain, Silverton, La Plata, Rico, Ophir, Eureka, Bear Creek and Lake City. In the aggregate these districts possess about sixty-five producing mines and thirty operating mills, at which about 5000 men are employed. By means of better roads, more capital and an increasing population, these San Juan districts are getting to be close neighbors. Fairly good trails now traverse the mountains within the circle described, and during the summer and autumn the short cuts from one place to another are in constant use. I speak of this to illustrate how the San Juan, as a distinctive section of Colorado, is carrying on business to a large degree within itself. All these principal points are connected by rail, the Denver & Rio Grande reaching Lake City, Ouray, Silverton and Eureka, and the Rio Grande Southern taking in Telluride, Ophir, Rico and passing near

this is shipped in the crude, the bulk of it being concentrated in the ratio of about five tons of ore into one ton of concentrates. The large mill, thus handling about 190 tons per day, is at Pandora, two miles above Telluride, at the terminus of the Smuggler tramway line, which makes an ascent of 4000 feet in the distance of two and one-half miles to its upper terminus in Marshall basin. The Smuggler workings extend along the trend of the vein for more than a mile, from below Smuggler postoffice to the Sheridan and Mendota, near the great divide. According to the survey maps this mammoth vein extends to the Ouray side of the range, paralleling the Virginus lode. The Smuggler ores vary considerably at different depths and different locations. Generally they are a sulphide, the values being in silver, lead and gold. Tailings from the Smuggler-Union mill to the amount of 200 tons a day are handled by a canvas-plate tailing plant owned by A. E. Hampson and J. L. Wells. They assert that they ship ten cars per month of concentrates as a product.

The gulch, which extends northward from the valley near Pandora, divides, just below the crest of the range, into three amphitheaters, called Savage, Marshall and Middle basins. Going to the ridge

mine, worked under lease by F. G. Wilson. This property is equipped with a mill which is concentrating about 60 tons of ore per day. The product is silver and lead.

The Valley View mill, in the same locality, is treating about 30 tons per day of gold ore.

In Middle basin is the Montana. At the foot of the same basin is the Ophir tunnel. Both properties are being worked by the parties interested in the Revenue tunnel on the Ouray side. It is claimed the Ophir tunnel and the Revenue are on the same level and that the purpose is to connect the workings on both sides of the divide.

Scotch capitalists are interested in the Meldrum tunnel, which starts above Pandora, near Bridal Veil falls, takes a course toward Red Mountain, the idea being to cut under the mines in Savage basin, to cut blind leads and form a transportation passage way for electric cars from Red Mountain to Pandora, thus making a connection between the railroad at Red Mountain and the Rio Grande Southern at Pandora.

On the Telluride side 1000 feet have been driven and some work is in progress at the Red Mountain end.

At this writing the mountains in the San Juan



JAPAN MINE AND MILL, SAN JUAN DISTRICT, COLORADO.

La Plata. The Silverton & Red Mountain Railroad connects the two points indicated.

In previous correspondence some special attention was given to Ouray, Red Mountain, Silverton, Ophir and the La Platas. It is the purpose here to write briefly of operations in the vicinity of Telluride.

In Cornette basin, two miles north of Telluride, is the Liberty Bell group of mines, the promotion of the U. S. & B. C. M. Co. of Kansas City, Mo. This company develops mines in various sections of the West. To operate this particular property the Liberty Bell G. M. Co. was organized, Arthur Winslow being manager and J. W. Mercer being superintendent. The mine is developed through three levels, which are on the vein. Levels and tunnels aggregate 2000 feet. The ore is a quartz, partially free milling, the values being gold and silver. It is understood to be rather low grade. At the mine are ore bins and crushers. From this point a new wire rope tramway, two miles long, carries the crushed ore to the new mill in the valley near Telluride, making a descent of 2300 feet in that distance. The mill is being equipped with twenty stamps, amalgam plates and concentrators, and will operate by electric power. The mill will be operating within a month.

The Smuggler-Union, which has been for years one of the camp's great standbys, is producing about 200 tons of ore per day. Only about ten tons per day of

above Marshall basin, you look down upon the Revenue and Virginus on the Ouray side. Ascending from Savage basin to the divide, you look over upon Red Mountain and down upon Camp Bird in Imogene basin.

In Savage basin is the Tom Boy mine and mill, the Japan mine and mill and the Columbia. The Tom Boy mill is treating 150 to 175 tons of ore per day, the greater values being in gold and 90 per cent of which are saved on the amalgam plates. This is primarily a gold property, there being only a small saving of silver. The ores consist of an oxidized quartz, accompanied by talc and lime. At greater depth lead values of importance are found. The concentrates run from 11 to 20 per cent lead. The ores of the Tom Boy and those of Camp Bird are similar, and they are supposed to be parallel veins. Except for the air compressors, the Tom Boy Co. utilize electricity for power.

The Japan mill, which has crushers, rolls, jigs and concentrators, is handling 75 tons of ore per day. This is purely a concentration proposition, the product being of about equal values in gold, silver and lead. This property ships about 60 cars a month of concentrates and assorted ore. The Japan workings are mainly through a crosscut 1850 feet long, which cuts the first vein at 250 feet. It cuts parallel veins at greater depth.

In the gulch below the Smuggler is the Cimarron

region are almost devoid of snow and a scarcity of water is felt among the mill operators.

Telluride, Colo., Sept. 22d, '98. WASCOTT.

Battery Amalgamation, Etc.

TO THE EDITOR:—The article from the superintendent of the Bald Eagle M. Co. in your issue of Sept. 24th is interesting and of value, but seems to call for further explanation of the amalgamation test noted in your issue of Aug. 30th.

It would perhaps have been better to have called it a "loss of quicksilver test," as that was the primary object in making it. All the stamps, however, ran with the same speed, drop and discharge, with the same mesh and equal surface of screen throughout, and all the batteries were fed from the same bin, so that there was not much chance for the difference in the value of the ore or quantity crushed by the two sets of batteries to make all the difference in the amalgam won. As noted before, the test was for two weeks, all plates, riffles, etc., being cleaned and product weighed up. The loss of quick would not have been greatly affected had the one lot of ore varied in value from the other. The former loss of 3 pounds of quick to the 700 tons of ore crushed has been reduced to 1½ pounds as a maximum, and to 1 pound to 200 tons in the last 1000 tons crushed. This includes all loss—handling, retorting, etc. The

thin amalgam noted previously resulted from change of temperature after cleaning and squeezing. A pound of this amalgam, thoroughly cleaned and squeezed hard in hot water, goes \$40 to \$50.

This being the first full season the company has used stamps, the mill work has included many tests, etc., not expected or required after the best methods are once definitely settled.

E. L. BALLOU.

Pony, Mont., Sept. 30th, '98.

Electric Transmission in California.

In no part of the country is long distance electric transmission being given so much present practical operation as in California. The Sacramento-Folsom plant, and those at Bodie and Fresno have been the subjects of universal interest. At Redlands, Cal.,

special designed pocket and centrifugal apparatus to prevent water from leaking upon the shaft. The bearings are of the ball socket, self-oiling type. The governing is done by a device that swings in front of the nozzle, shutting the water off and turning it on as may be desired. The capacity of these wheels is 550 H. P. each pair, making 2200 for the total installation. Each pair is coupled direct to a Westinghouse two-phase generator. The water is conveyed through 700 feet of 36 inch steel pipe to a 48 inch receiver, where each pair of wheels has an 18-inch branch pipe at right angle, each wheel having a separate gate tapped to this 18-inch branch so that it can be used independently. The regulation is accomplished by a Tutthill patent water wheel governor, direct acting, having a cylinder with weighted piston links attached to piston weight and connected to hooding device, so that when the pis-

Yukon pioneer deserves unlimited praise for what he has done and his method of working.

To mine in the Yukon district under prevailing climatic conditions at all future time will be severe. A miner with an outfit and good health, having had some past experience, requires neither outside education nor knowledge to make a success on the Klondike, and his individuality and ability to take care of himself on the verge of the Arctic Circle and determination to stay there until it melts or he comes out a king (as the lucky ones are locally termed) is commendable.

The Yukoner scorns sympathy and judges every newcomer by his ability to undergo hardships. He never complains nor wants to hear the complaints of others. If he takes a lay on a claim belonging to another, he agrees to give you one-half of all he takes out after the wash-up. You have no further bother. He builds his cabin on your claim, hauls all his supplies there, cuts all the wood for mining and domestic purposes, extracts the gravel and washes it, during which time he is his own baker, cook and laundress. He stands all and every expense, and works from daylight till dark besides.

When the water prevents him extracting any more gravel he builds the dam and provides the sluice-boxes and washes the dirt. You get one-half the gross yield. Of his half he never bothers so long as he has enough to buy an outfit for the coming season and to have a "hot time in the old town" for a day or two. Hence the business men of the town, who all own claims, have a rather fat thing with the Yukoner, who asks no commiseration and is not afraid to work.

ALF. TREGIDGO.

Aids to the Cyanider.

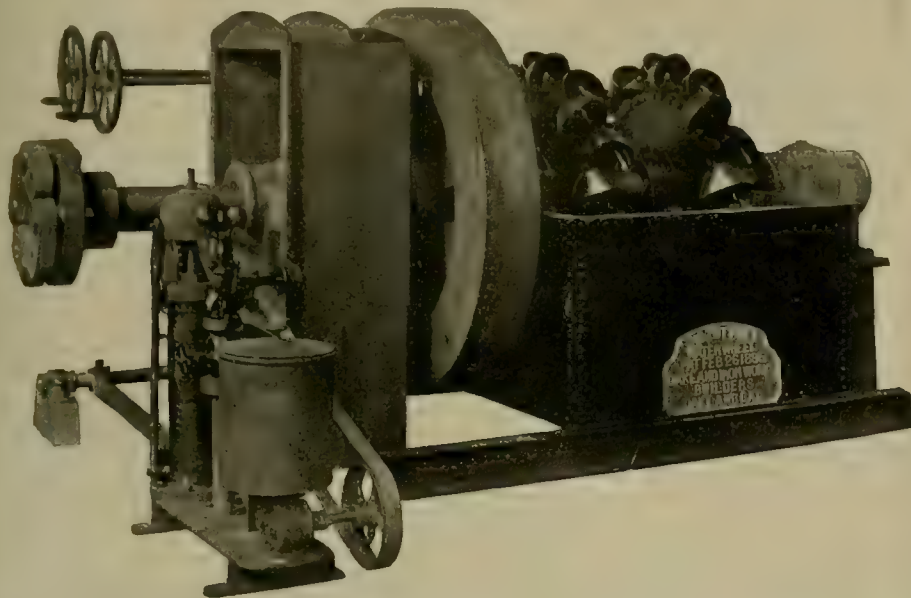
Written for the MINING AND SCIENTIFIC PRESS by
MATT W. ALDERSON.

In the following the aim has been to avoid all technical terms and to make everything so plain that it may be easily followed by anyone. Time is always of value, and in my own work I have sought to simplify matters so that mill employes could be trained quickly and easily to make such tests as might be necessary and record their conclusions without the aid of more experienced technical skill in charge, thus leaving the chemist free for more important duties. The tests, etc., given are not, therefore, such as the educated chemist might choose for making accurate determinations, but are short-cuts and time-savers for busy men. No originality is claimed, the aim being simply to show how certain well known facts may be utilized to advantage in everyday work.

Assaying Solutions.—Where the practice of determining the gold in solution is by evaporating the fluid, it will be found of advantage to make forming blocks for the leaden trays. Sheet lead c. p., for evaporating purposes, comes in various shapes. A very convenient kind is in rolls 2½ inches in width. For this size make a block 1½ inches in width by 3 to 4 inches in length. Lay this crosswise of the sheet lead to be cut and you have a convenient measure; all your trays will thus be same width, the block acting as a guide for penknife in cutting the material. Now make another block, 1x2½ inches. Over this fold the piece of sheet lead, pressing the corners together in the form of a triangle. If a little care is exercised in bringing corners together evenly, the tray when completed will be of nearly equal height on all sides and hold fluid full to the brim. You now have an oblong tray, similar in shape to a housewife's basting pan, but with projecting corners. Press these corners together closely with knife or spatula, so when the fluid is evaporated in the tray no lurking moisture will remain in the corners to cause sputtering when the trays are folded up and put in the cupels. A very convenient quantity of the solution to evaporate down is two assay tons. Take a 50 cc. cylinder and fill with two assay tons of solution. Mark with a file where the fluid stands and you have a convenient measure for future work. Evaporate down on a stove or over any convenient flame, boiling lively. Add silver, if you wish to ascertain gold only, cupel, part and weigh. If fifty divisions on the beam of your assay balance correspond with one milligram weight in the pan, then each division on the beam will mean one one-hundredth of a milligram for your gold button. The advantage of using two assay tons of solution, then, is that in weighing no calculating is necessary. You have simply to register the actual reading of the beam.

Assaying Cyanides.—Weigh out five-hundredths of an assay ton. Scorify with test lead and a little borax glass as usual. Note the weight of the gold in milligrams and fractions thereof. Multiply each milligram by twenty, and you have the value in dollars and cents of each pound of your precipitates. You can thus, by multiplying the pounds, dry weight, of your cleanup, quickly determine its value.

Testing Strength of Solutions.—Nearly all works on cyanide and records of practice in South Africa and elsewhere refer to strength of cyanide in per cent. In actual practice it will be found a great convenience and saving of time to make all calculations by



ONE SET TUTTHILL PATENT WATER WHEELS, 550 H. P., WITH WALL BOX, FLY WHEEL AND CASING; TOP REMOVED AND GOVERNOR CONNECTED IN PLACE.

the Southern Cal. Power Co. has about finished its work in Santa Ana canyon, designed to transmit electrical power to Los Angeles, a distance of 81½ miles. Here it is designed to carry the water through a tunnel 11,000 feet in solid rock, thence flume it 4000 feet, carrying it into two 30-inch lap-

ton is raised the water is shut off and when the piston lowers the water is turned on.

The water enters the bucket at a point just inside of its edge and is deflected by an increased angle, the idea being to have the whole stream concentrated, with sufficient velocity left to control the dis-



FOUR SETS TUTTHILL PATENT WATER WHEELS AND RECEIVER IN COURSE OF ERECTION AT THE SAN GABRIEL ELECTRIC CO.'S POWER STATION, AZUSA, CAL.

welded steel pipes, 2200 feet in length, giving it a 50-foot head.

The San Gabriel Electric Co. is also engaged in a work of great magnitude, and is transmitting power into Los Angeles from the San Gabriel river, 23 miles, at 16,500 volts. The water power plant is now installed at the foot of the San Gabriel canyon, near Azusa, Cal. It comprises eight Tutthill impulse water wheels, made by the Oakland Iron Works, Oakland, Cal., and illustrated herewith.

There are four units, the wheels working in pairs, two wheels for each shaft. They are 48 inches diameter and receive water from two 3½-inch diameter nozzles, two wheels and two nozzles for each shaft. The shafts are 6½ inches, 12 feet long, a 5000-pound flywheel being placed on each shaft to facilitate governing. The couplings are of the leather link type. The casings are sheet steel, angle iron frames with

charge. The high efficiency guaranteed the San Gabriel Electric Co. by the Oakland Iron Works is noticeable. At the tests made the wheels developed from 82 to 85% of the theoretical H. P. of the water used. Under favorable conditions they have obtained as high as 90% efficiency and they say they will contract to deliver the same efficiency under like conditions.

A Practical Miner in the Yukon Region.

TO THE EDITOR:—There are creeks in the valley of the Yukon where ground sluicing or even hydraulicking can be carried on during the summer months, notably Ten-Mile creek, off Sixty-Mile river, and portions of Sulphur creek, but the majority of the creeks are so very flat that in my opinion they can only be worked during the winter season, and the

the pound. Perhaps there is no one with sufficient intelligence to cyanide ore or tailings who does not know that 1 per cent of 2000 would be 20, and who could not calculate the fractional part of a per cent when he had to; but why do a lot of unnecessary work, when one may save time and liabilities to make mistakes by a much shorter system? In making up the nitrate of silver solution for testing strength of cyanide solutions, use 6.535 grams of nitrate of silver to 1 litre of pure water. Take 10 cc. of the cyanide solution and the amount of silver solution used from the burette will tell in pounds and tenths of a pound the quantity of cyanide it contains, each cc. in the burette representing a pound. From this it will be easy to figure the number of pounds of cyanide needed to bring any solution up to the desired strength. Where there is liability of cyanide solutions being fouled by arsenic, etc., and, in fact, in general practice in many places, the use of potassium iodide as an indicator will be very helpful. For this purpose, add 5 grams of potassium iodide to 200 cc. of pure water. Get a medicine dropper, and before titrating your 10 cc. of cyanide solution, add two or three drops of the iodide solution. The reaction is more marked with than without the indicator and is of advantage accordingly, especially when one is running weak solutions. In testing solutions very weak in cyanide, take 20 or 50 cc. of solution, instead of 10, and divide by the number of tens used.

Calculating Quantity of Solutions.—Do not attempt to figure the amount of your solutions in gallons. On the contrary, take the area of your vat and calculate its capacity in tons. This is easily done, as each cubic foot of solution weighs 62½ pounds. Figure out, then, the number of inches in depth of your vat necessary for one ton, and base all calculations on tons and decimal parts thereof.

Test for Alkaline Sulphides.—All works on the cyanide process have considerable to say about ores and tailings of an acid character, needing to be neutralized before they can be successfully handled by cyanide; but only one makes more than a bare mention of those of an alkaline nature. All the accumulated tailings in Montana, unsuccessfully treated until the past few years, contain alkaline sulphides to a greater or less extent. The following will be found a very simple, delicate test for determining their presence: To five cc. of the cyanide solution add one drop of dilute nitric acid (one part acid to three parts water). If alkaline sulphides are present, the acid will impart a milky appearance to the solution. If the strength of the cyanide solution is in excess of one-half pound of cyanide to the ton, more nitric acid will be needed to neutralize the alkalinity and bring about the reaction. With such solutions it will be well to take 50 cc. and add drop by drop of c.p. nitric acid until the end point is reached.

Testing for Copper.—In testing for copper with ammonia, do not be certain there is no copper present until after you have filtered the solution. Of course, a chemist would not neglect such a precaution, but the ordinary cyanide man, or prospector, whose knowledge of chemistry is limited to such chemical tests as can be made quickly, and without excessive care, is liable to deceive himself to his sorrow. The above mentioned test is made by digesting the ore in nitric acid, diluting with water and filtering the solution, then adding ammonia. If copper is present, the solution will have an intense blue color. But ammonia is a precipitant of many other metals, which, if present, may conceal the blue color, unless the above suggestion to filter is observed.

Simple Test for Antimony.—Antimony exists in two forms in Montana ores—one where it is chemically combined with sulphurets and acts as an effectual bar to the successful extraction of gold without breaking the combination by roasting the material, and the other where it is taken into solution by the cyanide, thus causing a greater or less consumption of this valuable aid to the recovery of the precious metals. I believe Park is the only author who makes any mention of this objectionable character in antimony. He says: "The presence of a small percentage of antimonite (the grey sesqui-sulphide of antimony) in the large accumulation of tailings at Boatman's creek, near Reefton, is said to have caused all attempts to treat them to end in failure, chiefly owing to the large consumption of cyanide and the low rate of extraction." (The Cyanide Process, Park, p. 13.) There is at least one tailings pile in Montana where the consumption of cyanide is in excess of five pounds to the ton, principally because of this objectionable element, and it no doubt occurs in isolated instances elsewhere. A simple test for its presence, in either form, is as follows: To 5 grams of pulverized ore, dried perfectly, add 20 cc. aqua regia (made by adding one part nitric acid to two parts hydro-chloric acid); stir thoroughly for, say, fifteen minutes, with glass rod. Let stand, and, when settled, decant the fluid. To this add water. If antimony is present a light, liver-colored precipitant will be thrown down.

Requisite Strength of Cyanide Solutions.—The consumption of cyanide, in treating any material, depends more on other metals susceptible to the solvent action of cyanide than on the amount of gold to be dissolved. In the language of Furman (A Manual of Practical Assaying, p. 408): "For every part of

cyanide rendered inoperative, a corresponding proportion of metal enters solution." Herein is a suggestive fact in determining the strength of cyanide solution which it will prove of advantage to use. Authorities generally advise laboratory tests with solutions of strength running from .25% to 1%, such one of the strengths used to be chosen as produces the best results. It will be apparent that in following this line of suggestion one may easily be led to adopt a strength of solution far in excess of the amount actually needed for the work in hand. To illustrate: Suppose in the tests the two weak solutions contain .25% and .5% respectively, the first does not secure a satisfactory extraction and the latter does. Then a .5% solution is adopted. This means ten pounds of cyanide to the ton of solution. In the other test but five pounds were used. We will suppose that five pounds were not enough to secure good work, but that six pounds would be; then, if the ten-pound solution is used, the solution is of considerably greater strength than necessity requires.

Prof. Christy says (MINING AND SCIENTIFIC PRESS, Feb. 6, 1897): "A ton of solution of .01% potassium cyanide solution contains thirty times as much as is needed to dissolve \$3 worth of gold in a ton of ore." And Scheidel says (The Cyanide Process, p. 17): "In accordance with Elsner's equation, 10 parts of cyanide should dissolve 15.12 parts gold." In 1895 W. A. Caldecott made a series of working experiments on five vats of thirty-four tons each, the treatment being exactly the same except in the strength of cyanide employed. The strengths used were 1.4 lbs., 2.8 lbs., 9.5 lbs., 26.6 lbs. and 86.6 lbs. After three days of percolation and contact, the solution was drained off and water-washing was applied to displace remaining cyanide solution. Mr. Caldecott says (The Proceedings of the Chemical and Metallurgical Society of South Africa, Vol. 1, p. 294): "The highest assay of the residues was seventeen grains and the lowest fifteen grains; this difference of two grains may be attributed to experimental error. Hence it appears that with little more than three days' treatment the same percentage of gold was extracted by a .052% solution as by a 4.334% solution from the tailings of a typical Rand Co." Mr. Caldecott concludes that the explanation is found in the fact that, according to Elsner's equation, for every pound of potassic cyanide actually used in the dissolution of the gold, an ounce of oxygen is required, and if working solutions contain as much oxygen as ordinary water, a solution containing but a quarter of a pound of cyanide would serve to dissolve 6 ounces of gold, .66 ounces of cyanide being required for each ounce of gold dissolved.

Undoubtedly a very small quantity of cyanide would win the gold but for other interfering metals. In a large number of working experiments on ores very susceptible to cyanide and other cyaniding ores containing refractory substances which caused a large consumption of cyanide, I have never failed to secure a good extraction where the strength of the solution, after the original consumption, was as great as one pound of cyanide to the ton of ore. On the most susceptible ores, where one could easily get at least 90% of the gold contents in solution in three hours of agitation, I have never been able to depend on securing a good extraction with a solution of less strength than one-half pound to the ton, though I would not be surprised if such ores exist.

The usual theory is that the readily soluble gold and silver are the first to be attacked by the cyanide. It is a question if, in actual practice, it will not be best to reverse this proposition. One is certain not to make a good extraction of the gold so long as the other metals present continue to cause a consumption of cyanide. Make a test, therefore, of the ore for the amount of cyanide it consumes. If the ore contains few minerals which render part of the cyanide inoperative, then a one-pound solution will do as good work and practically in as short a time as any other strength, providing, after the solution has been applied, such proportion of the cyanide has not been decomposed as will bring its continued working strength below six-tenths of a pound. If the ore is of such refractory character that several pounds of cyanide are consumed per ton, then it will be well to have the cyanide not less than one pound per ton, after the initial consumption, to be sure of a good extraction. It is a peculiar fact that a stronger solution will be needed to secure a good precipitation in the zinc boxes, also, where the consumption of cyanide is great, because of the interfering metals carried in solution, though, generally speaking, perfect precipitation can be had from any solution by the use of zinc shavings where the solution contains as great a quantity of free cyanide as half a pound to the ton, all authorities to the contrary, notwithstanding.

Plan to Measure the Earth.

It is now proposed to measure the earth. The longest arc at present known is 89 deg. 32 min. in length. The southern termination of this arc is in latitude 45 deg. 20 min. 2 $\frac{2}{3}$ sec. This termination is marked by a pyramid of cast iron which rests on a cube 7 feet wide, bearing an inscription showing what the monument really is. The northernmost limit of this arc is at Hammerfest, in Norway. Every man who navigates a ship figures out his

course each day upon a basis of longitude and latitude which in turn depends upon the arcs of meridian. If the measurement of that arc be in any way wrong, the course of the vessel will err accordingly, and it takes but a trifling variation to so steer a ship that she will strike a charted obstruction. Every survey that is made to make the arcs of meridian more accurate, simply renders the liability of ships meeting with disaster just so much less in corresponding degree.

The first operation under the new plan will depend primarily upon the measurement of a base line some miles in length, upon the most level stretch of land available. A base line is a point of beginning. The laying down of a base line is a tedious and delicate process, for even if the line be seven or eight miles long, it must be perfectly straight, and its length ascertained to the inch. One of the greatest difficulties to be faced is the difference in the length of the measuring rods used by the surveyors, because changes of temperature as a rule make the rods longer or shorter, the slightest difference in a matter of this sort making eventually a very great difference.

The present measuring rod in use is calculated to overcome this annoyance to a certain degree. It is formed of a bar of brass firmly joined at its center to one of iron. Pivoted at the ends are a pair of projecting metal tongues, certain marks on which remain at a constant distance, because the expansion of one rod pushes them apart just as much as that of the other endeavors to bring them nearer together. Such rods cannot be put in contact end to end, and they are, accordingly, placed a constant and known distance apart by means of a pair of microscopes which are joined together by means of compensation bars. Sights and levels to insure the straightness of the line complete the essential parts of the apparatus.

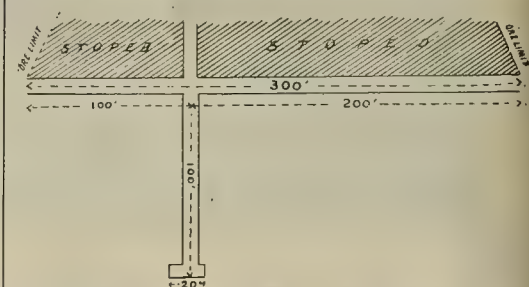
The work of measurement is carried on in a series of triangles, and these triangles, being joined, constitute the arc. Therefore, the arc is really not a single line. Surveying degrees of meridian is not so widely different from surveying anything else. First, a base line is secured, and no survey is attempted without a base line or a point from which to start. Then at each end of this base line are placed accurate theodolites.

At each end, the angle between the base line and the object which may be sighted through both theodolites is measured, and it is easy enough to calculate the distance of the object from either end. The triangle is now formed and its sides may serve the same purpose as the original base line. By this system, which is called triangulation, the measurement is carried on to any desired extent, being checked here and there by the actual laying down of new base lines, the length of which have been previously determined in the course of the surveys.

"Ore in Sight" and "Estimated Ore."

"Promoter" questions concerning the value of the ore below the horizontal dotted lines in the suppositional instance illustrated in the accompanying sketch. He assumes for purposes of discussion that the average width of the vein is 7 feet and the average value of the ore \$7 gold per ton of ore.

The question of "ore in sight" and "estimated ore" is always a live one to miners and mining engineers. It is nearly always a problem in the examination of a mine, and one on which buyer and seller often hold widely variant views. The real problem in such a case as the one herein indicated is, Where shall one draw the lines determining the



boundaries of ore which may be termed "estimated" ore, or ore probably available for mining? It is not essential that the thickness of the ore body be considered, as the query is really one of area. It is this indeterminate quantity of ore that in many cases determines the value of the mine.

Shall we assume a length of ore outside of the proven ore body proportional to the thickness of the ore? To illustrate: If the ore is 2 feet thick (average), then may we assume that ore will extend 50 feet below a proven zone? If an average of 3 feet thick, 75 feet below?

The value of a mine is based upon the net amount one can safely figure the mine will yield in a reasonable period—that is, where one leaves the realm of speculation and considers mining as a legitimate business. It is an interesting subject of general practical value, and one to which these columns are open for discussion.

Coast Industrial Notes.

—The engineers of the S. F. & S. J. V., Cal., road are inspecting the Tejon pass.

—At Biggs, Cal., 550 acres of hemp this year has yielded the growers from \$120 to \$200 per acre.

—Near Fresno, Cal., a body of land comprising over 25,000 acres is being planted in wheat.

—The Northern Pacific R'y Co. has reduced its passenger rates 20 per cent in the State of Washington.

—Coast lumbermen have advanced the price of lumber from \$9.50 and \$10 per M to \$11, cargo delivery.

—English purchasers have secured the Coal-Ingalls wells of Fresno county, Cal., for a locally stated price of \$300,000.

—The citrus fruit crop of southern California for the season amounts to 15,000 carloads, representing \$4,000,000.

—The stock of oil on hand Oct. 1 in the Los Angeles field and in storage was 16,000 barrels less than on Sept. 1.

—A \$25,000 paper manufacturing plant is to be erected on the Truckee river, twenty miles from Reno, Nevada.

—Track is laid on the Visalia, Cal., division of the Valley Road to Corcoran Junction, twenty-four miles from Visalia.

—The Oregon Short Line will lay 10,000 tons steel rails on the main line from Glenn's Ferry, Idaho, to Huntington, Or.

—Custom house receipts in San Francisco the first week of October were \$91,095.08, a total since January of \$4,637,704.32.

—The value of five exportations of bananas from Merida, Mexico, in August to New Orleans, New York and Hongkong amounted to \$1,606,088.40.

—Three hundred tons of grapes on the vines in Santa Clara Co., Cal., have been sold for \$6 a ton. That price is considered equal to about 15 cents a gallon for wine.

—The Stockton & Tuolumne County, Cal., Railroad Co. will issue bonds to the extent of \$1,000,000, payable forty years after date and bearing 6 per cent interest.

—Track laying on the Utah & Pacific Southwest from Milford to Pioche, Nev., was begun on the 11th. Pres. McCune says it will never be stopped until the road gets to the Pacific.

—The Esquimalt & Nanaimo railway has been extended to Oyster Bay, eleven miles from Nanaimo, B. C. The shipments of coal during August from Vancouver island were 75,700 tons.

—The Southern Pacific Co.'s new ferryboat Berkeley, which has been building at the Union Iron Works, will be launched next Tuesday. She has a seating capacity for 1700 passengers.

—The controlling interest in the Spokane & British Columbia Telephone and Telegraph line from Spokane, Wash., to near Rosland, B. C., was sold last week to O'Brien, Reddin & Co. for \$255,000.

—The engineering work on the Sacramento river, Cal., undertaken by the Commissioner of Public Works, is progressing. The five dikes at the Newtown shoals and the overflow weir at the mouth of Feather river are nearing completion.

—The Government of New Zealand offers a prize of \$10,000 for improvements in the process of treating the native fiber (*Phormium tenax*), or New Zealand flax. The successful competitor will not be required to surrender title to his invention.

—Bids have been asked for by the Interior Department for work on the Buttes reservoir in Pinal county, Arizona. The construction of this dam means the conserving of water sufficient to reclaim more than 300,000 acres in the valleys of the Gila and the Santa Cruz.

—The Territory of Hawaii, U. S., has authorized the sale of \$300,000 of bonds to erect and improve the system of water works. Bids for the construction of the pumping works and for the necessary water pipes and mains will be asked from constructors and manufacturers on the coast.

—Stockton, Cal., reports an increased flow of natural gas, which is to be utilized to operate gas engines, which in turn generate electricity for light and power service. The cheapness of this natural gas has also reduced the cost of fuel. Numerous wells have been sunk of late, but the supply does not seem to diminish.

—The Pacific Car Equipment Company has incorporated in San Francisco, capitalized for \$250,000, of which \$233,000 has been subscribed by J. H. Thompson, \$75,000; A. C. Rumble, \$75,000; W. D. Huntington, \$30,000; R. Gorrell, \$10,000; M. L. Requa, \$10,000; G. H. Strong, \$10,000; F. W. Fry, \$20,000; H. L. Huntington, \$20,000.

—At Tacoma, Wash., the Tourist Hotel, under construction by the Northern Pacific Land Co., was burned on the 11th inst. There had been expended on the structure up to date \$600,000. On Sept. 20th the Tacoma Exposition building burned, with a loss of \$120,000; Oct. 2nd the Tacoma woolen mills burned, with a loss of \$30,000.

—The recording at San Bernardino, Cal., last week of a trust deed from the Pacific Borax & Redwood Chemical Works to the Indian & General Investment Trust of London, to secure a second mortgage of \$750,000, was the close of the recent deal which transfers the works from Alameda Co., Cal., to the Atlantic side of the continent.

—The construction of the jetties at the Newtown shoals, on the Sacramento, Cal., river, near Rio Vista, will soon be completed. The work has been done by the Commissioner of Public Works in accordance with plans approved by the War Department. It consists

of a series of wingdams so placed as to concentrate the flow of the river. The effect, it is believed, will be to greatly increase the scouring action of the current, so that the deposits of sand and silt which compose the shoal will be cut away.

—Gov. Brady of Alaska, who has returned from an official tour of the Pribilof islands, says of them and of the Aleutian islands: "They are destined to become the home of countless herds of cattle and sheep. Some of the islands have not a stick of timber on them, but are covered all over with a luxuriant growth of grass, affording the finest kind of pasture land for cattle and stock."

—The contract for building the Central Railway of Coahuila, Mexico, has been awarded to the Coahuila Central Construction Company, Mexico City. Sixty-two miles of standard gauge road will be laid with 55-pound rails. The company, according to the report from Mexico, will also build a hotel and smelter at Saltillo, for which valuable concessions have been granted by both the Federal and the State Governments.

—It is again asserted that arrangements have been perfected between the North German Lloyd's Steamship Company and the Atchison, Topeka & Santa Fe system of railways for a through line by rail and steamer from New York via San Francisco to Japan and China, and that the extension of the S. F. & S. J. Valley road from Bakersfield to Los Angeles, Cal., will give a through line independent of the Southern Pacific system from New York to San Francisco.

—Electrical power from the Sooke mountains, eighteen miles distant from Victoria, B. C., is completed. The water from the mountains starts 2300 feet above the level of the sea, and is the highest fall in Canada. About 700 feet above sea level, and sixteen miles from Victoria, these waters form a lake covering 150 acres, into which empties Goldstream river, which is tapped three miles from its source by an artificial lake or reservoir, covering $\frac{7}{8}$ acres, 1122 feet above sea level. From this reservoir the water passes through a steel pipe, 33 inches in diameter, 6700 feet to the power house of the electric company, which is 460 feet above sea level, thus giving a fall of 1000 feet from the main lake, supplying 1500 H. P.

—According to the new treaty of commerce and navigation between Japan and the United States of America, the subjects or citizens of each country shall have liberty freely to come with their ships and cargoes to all places, ports or rivers in the territories of the other, which are or may be opened to foreign commerce. Osaka is a distributing center for merchandise in the central part of Japan, and absolutely controls the local trade in the southwestern part of the empire, but cannot be considered the most important export port. The new treaty is to go into operation July 17th, '99, and to remain in force for a period of twelve years thereafter; but either party shall have the right to give notice to the other of its intention to terminate the agreement, and at the expiration of twelve months after such notice is given, the treaty shall wholly cease and determine.

—The Hawaiian Commercial & Sugar Company has decided not to increase its capital stock from 100,000 to 150,000 shares, as was proposed. A detailed report last Thursday states that the total liabilities are \$644,466.52, including operating expenses of \$140,000 until December 31, 1898, \$256,491.52 liabilities matured and \$247,975 liabilities incurred, part of which will not mature until June 30, 1899. The assets amount to \$357,264, including \$349,564, the market value of 4976 tons of sugar afloat, at \$70.25 per ton. On January 1, 1899, after having paid all expenses of operation of every kind up to that time and after setting aside sufficient money to pay for all the improvements authorized by the stockholders at their last meeting, the company will be in debt \$287,202.52. The new crop of sugar, estimated at 17,000 tons, will then be ready for milling. The value of this crop is estimated at the present price of raw sugar at \$1,194,250.

Personal.

A. A. ANTHONY becomes Gen. Mgr. Central mine, Whitehouse, Cal.

J. JOSEPH, Supt. Gerry-mander mine, Sonora, Cal., is in San Francisco.

L. MAYER, Supt. Ghost mine, San Andreas, Cal., is in Ottawa, Canada.

A. H. MELIN has been appointed Gen. Mgr. Washoe M. Co., Butte, Mont.

H. PENGALLY has been appointed Supt. Orleans mine, Grass Valley, Cal.

D. HUNT, Supt. Niagara mine, French Gulch, Cal., is in San Francisco.

DAV. R. OLIVER, part owner Bonanza mine, Sonora, Cal., is in San Francisco.

J. SCRANTON, part owner Black Bear mine, Shasta, Cal., is in San Francisco.

P. REDDY, San Francisco, is visiting his mining properties at Darwin, Cal.

JAS. W. ABBOT, M. E., has returned from Portland to Grant's Pass, Oregon.

M. THOMPSON succeeds G. W. Delamater as Supt. Tripp mine, Hillsboro, N. M.

F. H. HALL of San Francisco is examining mining properties near Shasta, Cal.

WM. YORK becomes Supt. Spanish Bar gravel mine, Mokelumne Hill, Cal.

CAPT. THOS. COUCH of Montana is examining properties near Grant's Pass, Oregon.

JOHN HAYS HAMMOND is now consulting engineer to the British South Africa Co.

W. H. HOLMES of the United States National Museum is visiting Calaveras Co., Cal.

A. WEARE, Supt. Mt. Shasta mine, Shasta, Cal., has returned from San Francisco.

L. RUEL of the Roessler & Hasslacher

Chemical Co., New York, is in San Francisco on his semi-annual Western trip.

R. MARTIN, part owner Mayflower mine, Nevada City, Cal., is in San Francisco.

F. L. PICKET of Philadelphia is inspecting his mining properties at Phoenix, Ariz.

G. MAINHART, Supt. Omaha Con. mines, Grass Valley, Cal., is in San Francisco.

H. W. WINCHELL, geologist of the Anaconda mine, Butte, Mont., is at Deadwood, Cal.

B. McDONALD, Supt. Alameda mine, Jamestown, Cal., has returned from San Francisco.

G. MC. ROSS, Supt. Con. Cal. & Virginia mines, Virginia, Nevada, is in San Francisco.

E. D. EASTON of the Young America gravel mine, Graniteville, Cal., is in San Francisco.

J. THOMAS, Supt. Central Eureka mine, Sutter Creek, Cal., has returned from San Francisco.

J. FRED. HUME Minister of Mines for British Columbia, has moved from Nelson to Victoria, B. C.

C. D. CRANE, Supt. Oro Fino mine, has returned to Grant's Pass, Oregon, from Spokane, Wash.

A. J. BOWIE is again on his way to Dawson City. This time he takes with him an electric lighting plant.

J. RICHARDS, Placerville, Cal., managing owner Hill Ranch mine, El Dorado, Cal., is in San Francisco.

P. STOLBERG, part owner Shurtliff Hill mine, Shasta, Cal., has returned from San Francisco to the mine.

S. B. MILNER, Mgr. Dexter M. Co., Tascara, Nev., has returned from the East to Salt Lake City, Utah.

J. A. FISHER, Pres. Golden Gate M. Co., Jamestown, Cal., has returned to San Francisco from a visit to the mine.

H. E. PICKET, Mgr. Grand Victory mine, Placerville, Cal., has returned from Pennsylvania and is in San Francisco.

W. H. HUSBANDS, Supt. Gopher-Boulder mine, Kelsey, Cal., is in San Francisco en route home from Los Angeles, Cal.

J. B. ELDERIDGE of Alameda, Cal., has returned from Jacksonville, Oregon, where he has been examining mining properties.

D. KIETH, managing owner Silver King mine, Park City, Utah, has returned to Salt Lake City from an extended Eastern trip.

A. L. COLLINS has been appointed Gen. Mgr. of the Gregory Con. Mines Co., and of the Gold Coin Mines Co., Central City, Colo.

A. H. LEBECK, who has been operating a mining property for a company in Peru, S. A., has returned to his home at Park City, Utah.

J. B. HAGGIN of New York is at Anaconda, Mont., conferring, it is locally stated, with Marcus Daly, relative to the erection of the new copper reduction works of the Washoe Co.

WM. B. PARSONS sails on the next steamer for Hongkong, accompanied by four assistant engineers, to begin a survey of a railway between Hongkong and Hankow, 600 miles. This road will be built by Americans, who have obtained a concession from the Chinese Government.

Recent California Mining Incorporations.

Homestake M. & M. Co., San Francisco; capital stock \$300,000, subscribed \$107,000; F. E. Sohl, A. Johnson, O. Olsen, A. Edlund, G. Olson.

Sheep Train & Minnie Con. M. Co., San Francisco; capital stock \$100,000, subscribed \$5; W. Bowers, T. Cole, C. Mau, W. Bannon, R. R. Grayson.

Lost Log M. Co., San Francisco; capital stock \$115,000, subscribed \$50; E. J. McCutchen, H. G. Stevenson, J. C. McBride, A. H. Wina, P. S. Muller.

Marguerite M. Co., Placerville; capital stock \$107,000; P. Maul, W. W. Tenney, C. H. Dutton, G. Lilly.

Royal Group G. M. Co., Los Angeles; capital stock \$2,000,000, subscribed \$60,000; E. E. Bowles, A. A. Bowser, G. R. Wyson, N. R. Schooley, S. E. Thomas, L. H. Renkert, H. C. Brinker.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING OCTOBER 4, 1898.

611,986.—ASSAYING APPARATUS—W. H. Adams, Los Angeles, Cal.

611,765.—ALMOND HULLER—J. E. Beach, Routier, Cal.

611,674.—CARBURETOR—H. T. Bradley, Oakland, Cal.

611,888.—FIRE ESCAPE—Britt & Enns, Dallas, Or.

611,694.—TRUCK—Brown & Burns, Jerome, A. T.

611,769.—WATER WHEEL—J. D. Campbell, Magalia, Cal.

611,770.—OVEN DOOR—Chadwick & Clarke, S. F.

611,782.—TREATING DRIED FRUIT—W. Forsyth, Fresno, Cal.

611,738.—ALARM CLOCK—F. Gundorph, S. F.

611,902.—FUNNEL—Sarah A. Hess, Haynie, Wash.

611,758.—BICYCLE LOCK—C. H. Melquiond, Oakland, Cal.

612,006.—ANIMAL EXTERMINATOR—C. K. Myers, Stockton, Cal.

611,940.—STATION INDICATOR—Reynolds & Turner, S. F.

611,874.—WATER MOTOR—W. Turner, Wenatchee, Wash.

611,877.—BALLAST UNLOADER—H. H. Warner, Tacoma, Wash.

611,851.—GEAR CUTTER—N. A. Wheeler, Stockton, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

OVEN DOOR.—Messrs. Chadwick & Clarke, San Francisco, Cal. No. 611,770. Dated Oct. 4, 1898. This invention consists essentially in the employment of a plurality of openings made through the door of an oven with transparent covering plates, and a means for supporting and fixing the plates in position so that an evenness of expansion and contraction is effected while the interior of the oven can be easily inspected at any time without opening the door to allow currents of air to enter the oven. By our means of supporting and fixing the glass we prevent its fracture by currents of varying temperature striking different portions of it. The door has spaced vertical and horizontal ribs forming channels into which are placed packing strips of some material which will not be affected by heat, the glass resting in contact with these strips having the angles cut away and bolts are cast into the door plate, projecting so as to receive nuts by which the whole is clamped together.

BICYCLE LOCK.—Cyr H. Melquiond, Oakland, Cal. No. 611,757. Dated Oct. 4, 1898. This invention is intended to lock the revolving parts of a bicycle to make it impossible to carry away the machine surreptitiously. It consists of a block or support fixed within the saddle post, having an upper and lower arm provided with guides, a cylinder movable in the lower guide and provided with a bolt extension which engages a corresponding socket in the crank or pedal shaft. A rod is slidable in the upper guide and has its lower end acting as a piston in the cylinder previously described, while its upper end, bent to one side, passes through a slot in the saddle post so that its end is convenient for moving the parts. A spring within the cylinder is pressed upon by the plunger upon the slidable rod so that when the rod has been pressed down it forces the cylinder and the locking bolt downward, and when the shaft has been rotated to bring the slot in line with the bolt the spring causes it to engage; a pawl is so arranged with relation to a lug on the actuating rod that it will engage with said lug and holds the parts in position to be locked until the pawl is disengaged by a key carried for that purpose.

ALMOND HULLER.—J. E. Beach, Routier, Cal. No. 611,765. Dated Oct. 4, 1898. This invention relates to an apparatus for cleaning, hulling and separating almonds. It comprises a series of rotary cylinders made of wire screen or covering work peculiarly arranged so that one forms a cleaner and a second a huller, while the third separates the almonds from the hulls before they are delivered to a carrier or other point of deposit. The cleaning cylinder has its periphery formed of spirally coiled wire with interstices for the escape of the dirt, while the hulling cylinder has a periphery of wire netting and is formed with a converging flange at its receiving end into which the nuts are delivered from the cleaning cylinder. Within this hulling cylinder are a series of arms having their outer arms bent into lips turned backwardly and susceptible of rotation in the same direction with the cylinder, but at a different rate of speed, so that the hulls are stripped from the almonds and all are delivered into a vertically disposed chute at the lower end, the huller being inclined for this purpose, and from the chute they are again delivered into another inclined wire cylinder having a peculiar arrangement of network, zig-zag arranged wires through which the hulls may pass and leave the almonds to pass out of the apparatus.

WATER WHEEL.—John D. Campbell, Magalia, Cal. No. 611,769. Dated Oct. 4, 1898. This invention relates to a water wheel having peripheral buckets and means for applying the weight and momentum of a column of water to the buckets carried by the wheel so as to rotate it. It consists of a wheel having depressions in the face of the rim within which the buckets are seated and a stationary enclosing casing within which the rim of the wheel turns and within which the buckets are enclosed during a portion of the revolution of the wheel; an extension of the enclosing chamber into the line of the nozzle through which the water is delivered, and a means whereby the buckets are opened out into this extension so as to receive the pressure of the water while passing through it, and a means by which they are again retracted into the rim after passing beyond the discharge opening. By this construction the buckets are exposed to the full pressure of the water when opened out during their travel through that portion of the rim having the large diameter and are closed into the periphery of the rim after passing the point of discharge.

Recently Declared Mining Dividends.

Pennsylvania, California, 5 cents per share, \$3575; payable immediately.

Silver King, Utah, \$37,500; payable Oct. 15.

Mercur, Utah, $\frac{1}{2}$ cents per share, \$25,000; payable Oct. 20.

Bullion-Beck, Utah, 10 cents per share; payable Oct. 20.

Portland, Colorado, 2 cents per share, \$60,000; Oct. 15.

Anchorage-Leland, Colorado, 1 cent per share, \$6000; Oct. 15.

Vindicator, Colorado, 5 cents per share, \$75,000; Oct. 10.

Mountain Copper Co., California, $\frac{6}{8}$ cents per share; Oct. 15.

Associated G. M. Co., Colorado, 1 cent per share, \$12,500; Oct. 10.

Large High Speed Water Wheel.

Herewith is illustrated a large tangential water wheel manufactured by the Risdon Iron Works of San Francisco, made entirely of steel except the hub, 30 feet in diameter, running sixty-five revolutions per minute. It is designed to transmit 330 H. P. with one nozzle or 1000 H. P. with three nozzles, each nozzle being $1\frac{1}{2}$ inches diameter. The wheel operates under a head of 775 feet water pressure. The power is transmitted from the rim to the hub and to a shaft on a duplex single-acting, compound air compressor. This wheel is manufactured under the Cobb patent, August 4, 1896. The total weight is 13,370 pounds. It is now being placed at the North Star mine, Grass Valley, Nevada Co., Cal., where a wheel of similar construction, but much smaller, was put in operation about two years ago. That wheel is $18\frac{1}{2}$ feet diameter, weighs 10,500 pounds, runs at 110 revolutions per minute, under 750 feet head, developing 300 H. P., and giving good service. The novel construction of these two wheels is of interest. It was fully discussed in the issue of August 2, 1896. The unusual diameter—30 feet—of the one illustrated on this page is not the limit of possibility in that direction, as this design of wheel can be made of still larger diameter or rim section, suitable for fly wheels, band wheels, gear wheels or water wheels, of any desired weight, and to travel at any number of revolutions per minute up to 20,000 feet per minute rim velocity.

The wheel shown is made in four sections for convenience of shipment. There are no bending stresses in any of the members, all stresses are tensile, proper strength being provided for by suitable cross section of material used.

The water wheel buckets are of the Risdon's latest patent, dated March 1, 1898, noticeable points being the large area for discharge, and that when the water first enters the bucket it is discharged at the back and gradually brought round to right angles with the stream, thus leaving the bucket with the minimum of perceptible velocity. In this particular wheel, it is to be noted that the buckets are finished on the inside and polished to a smooth surface. The makers of this wheel publish a circular describing tangential wheels in all forms.

Hearing Heat and Cold.

It is now possible to hear heat and cold. G. C. Whipple, biologist of the Brooklyn, N. Y., Water Works, has invented an electrical instrument by which the various ranges of temperature may be heard in an ordinary telephone receiver. The apparatus in external appearance is like an ordinary electric battery box such as is used in sick rooms. From one side of the box extends a long insulated wire, carrying a small coil of bare wire on the end of it. From the other side of the box extend wires which hold a telephone receiver. The latter is to be held to the ear so that the temperature into which the bare coil is thrust may be heard. Heat or cold acting on the bare coil of wire causes an electric current to set up a buzzing in the telephone. When the instrument is used the telephone is held to the ear, while the listener looks at a dial on the battery box, in appearance like the face of an ordinary mechanical thermometer, marked with figures representing degrees of temperature above and below zero. Let us suppose, for instance, that we are to listen to the temperature of a pail of water. The coil of

bare wire is thrust into the water, and the observer places the telephone to his ear. There is a hand or pointer pivoted in the middle of the dial face. The observer proceeds to turn the pointer from figure to figure on the dial. When the telephone is placed first to the ear a loud buzzing sound is heard. This is

Mass., State Capitol corridors at the height of a man's shoulders. If the engineer wishes to know the temperature he has merely to place the telephone to his ear and turn the dial pointer until the buzzing ceases. He then can note the temperature of the building in all its parts without going



LARGE TANGENTIAL FLY WHEEL.

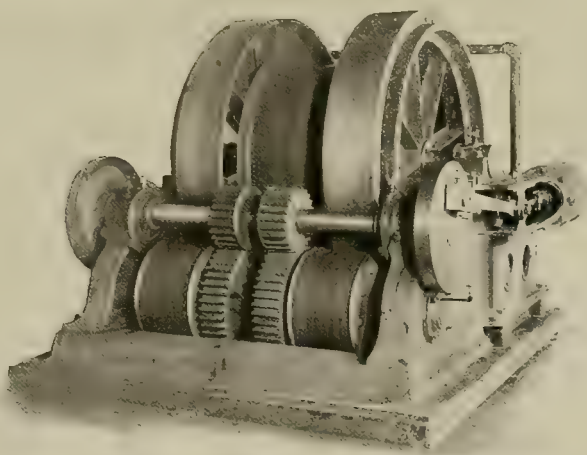
because the pointer does not happen to be at the figure representing the temperature of the water in which the bare coil is placed. As the pointer nears the figure that indicates the correct temperature, the buzzing sound in the telephone becomes fainter until when it comes opposite it, it stops altogether. As soon as the buzzing stops, the observer knows that the temperature of the water has been found.

It is not necessary that the bare

out of the engine room. The instrument is now being used in cold-storage warehouses to ascertain the temperature of the various rooms without opening them.

Gear and Friction Hoist.

The accompanying illustration represents a new Bolthoff gear and friction hoist, manufactured by Hendrie & Bolthoff Manufacturing & Supply Co.,



NEW BOLTHOFF GEAR AND FRICTION HOIST.

coil mentioned above should be in that precise form. It may be straightened out to form a long flexible wire. That the engineer in the basement of the building should know the temperature of every part of it, one of these straightened out coils has been placed behind the wainscoting in the Boston,

Denver, Colo., and which is to be installed at the Ajax mine, on Battle mountain, Cripple Creek district. It is made for power and high speed, having a hoisting capacity of 6000 pounds, and weighs 18,000 pounds. The drum has a 48-inch diameter and a 25-inch face; the friction wheels have a 72-inch

diameter and 12-inch face; the paper frictions are 24-inch diameter by 12-inch face. The gearing is in the ratio of 2 to 1, friction surfaces 3 to 1. The pinion on the engine shaft meshes into the gear on the intermediate shaft to which the paper frictions are keyed. To throw on or off the friction in hoisting and lowering, it is only necessary to move the intermediate shaft. This obviates the necessity of moving the entire drum with its load, leaving drum free to revolve in dropping bucket or cage.

Is Darwinism True?

W. S. PROSSER.
NUMBER VIII.

True votaries of science seek unselfishly, and with open, candid minds, for truth, and that only. Therefore to such I present, with confidence, these arguments—concise, but I hope sufficient.

The chief is that the seventy instances given in the PRESS of April 2, and others, are new ideas—real inventions—whose origin, under the Darwinian or other material plan, is impossible. A just appreciation of this fact is necessarily fatal to Darwinism.

This theory is very vague. It merely guesses that one animal changed into some other, and leaves each person to wade around in his own little mudhole of conjecture as to means and methods.

The three things alleged as causes originating new forms—the yearning of the animal, environment and food—are not worthy of consideration, for the reason before given, that these were the product of ideas of which animals, lower than man, are incapable. Darwinism requires that eyes, ears, legs, wings, brains, nerves, etc., should have been invented by worms, sponges, mollusks and such (not for themselves, but for their remote posterity), yet believers in that theory constantly deceive themselves by failing to put these things in plain language, but begot them by vague and misty words. If the early worm did not invent the marvelous mechanism of bird's wing or fish's tail, two things that men envy but cannot equal, who did? One clear-cut idea is worth an acre of fog. If any answer can be given, outside of idle chat, about "accumulations of heredity," "intermittent pressure," etc., I would be glad to hear it.

Let me give a few of the explanations essayed by evolutionists. The backbone was a necessary part of the original idea of an animal with internal skeleton, and limbs for locomotion; muscles pulling in every direction give strength, nerves to the brain give control, many parts and cushions between give flexibility, the whole forming an ingenious and complete machine. Yet so bright a genius as Herbert Spencer suggested that the "ultimate cause of the segmentation" was "due to transverse strains"!

An address to the American Association for the Advancement of Science by Prof. Packard attempts many explanations: "About this time certain worms, as the simple mechanical result, perhaps, of threading their way over or through the rough, gravelly bottom became segmented." "Following this was the segmental arrangement of the internal organs," etc. "In certain of these primitive protannelids, as the result, perhaps, of external stimuli intermittently applied, bristles originated to aid in progression." "The evolution of jointed limbs was accomplished in the most economical and direct way. The parapodia were, perhaps, utilized and, at first retaining their form in swimming phyllopoda, afterwards from being used as supports became cylindrical and jointed," etc. That is the explanation of the leg and its joints, marvelous and perfect even in the lowest forms. "They became jointed." Compared to this, Jack and the Bean Stalk, or Cinderella, is cold, plain history. It is said that very early—pre-Cambrian—time was a "critical creative period," and "that those early forms were more rapidly evolved, and were more plastic, than forms now existing." And Darwin himself to the same effect. Which amounts to saying that the

most brilliant inventions in animal mechanics were made in an inverse ratio to the capacity of the makers. Another point is that most new forms originated not gradually but suddenly. Prof. Hyatt says of certain mollusks: "These groups originated suddenly." Packard says eight orders of insects originated about "same geologic date" and speaks of the "acknowledged sudden appearance" of all types of invertebrates and nearly all existing and fossil types in the Paleozoic, and that "during the late Paleozoic were evolved the three air-breathing classes of Arachnida, Myriopoda and insects, and also amphibians, reptiles, birds and mammals."

(To be Continued.)

Mining Summary.

ALASKA.

S. G. Dawson has been prospecting on the southeastern Alaska coast and islands as far north as Ketchikan, and says:

"I found the geological summit of the country near the center of Revillagigedo island. Archæan granite crops on the head of Carroll inlet and is overlaid with gneiss and mica schist—really schistose gneiss. This is overlaid by a series of metamorphic slates, talcose in parts, which are cut with quartz stringers, carrying in some instances the precious metals. This seems to be a pocket belt. Following is a series of syenite interstratified with serpentine greenstone. Lying west of this is a strong belt of porphyritic felsite interstratified with syenite and carrying ore veins of quartz with chalcopyrite, marcasite (white iron pyrites) and carrying more or less barite. This belt extends from near Cape Fox northwesterly, crossing Cat, Mary, Annette and Gravina islands, a part of Prince of Wales island and probably extending to part of Baranof island.

"This is the copper ore belt of that section and numerous claims have been staked all along it and assessment and development work is being done. The center of disturbance appears on the south end of Gravina island, where an extinct crater, now filled by a lake of warm water, exists. In this portion of the belt the lower strata are covered nonconformably by belts of clay slates and argillaceous sandstone, altered at numerous points by lavas, which overlie them.

"I had a laboratory kit with me and we sampled a number of veins and located a few claims on Gravina island. The croppings are not very well marked, being generally capped with argillaceous sandstone or altered rocks of one kind or another, so that it is difficult to tell what they are. Where these cap rocks are found to be very much oxidized with iron stains, sulphide ores are found by sinking. Marcasite is first encountered, then barite with chalcopyrite and blende. Ordinarily, to characterize a vein it is necessary to sink 5 or 10 feet. The cap rocks seldom show more than the merest trace of gold.

"On Seal bay, on the south end of Gravina island, ex-Governor Swineford has taken under bond the Anaconda group of half a dozen claims and has men sinking. He has good copper ore. The Dallhead mine, on the south end of Gravina island, consists of six or eight claims, where there are men at work. Recent discoveries of galena ore have been made on the southeast end of Prince of Wales island, the west end of Gravina island, and also galena and pyrrhotite ores on George inlet, on Revillagigedo island. They lie in a syenite belt, which is east of the porphyritic belt I have described.

"The country is easy of access, for you can't get away from transportation. One noticeable fact is that there is almost no fallen timber. To any one who has traveled on the west side of the Cascades that means a great deal. The ground is covered with variegated moss, from 3 to 14 inches deep, which in wet weather acts as if you were walking on a sponge. But no matter how much you get wet, or sleep in wet blankets, you never catch cold, and everybody could eat three meals a day when he could get them."

The Alaska Gold Fields, Ltd., of London are said to have bought for \$1,000,000 twenty-three claims on El Dorado, Bonanza, Dominion, Sulphur and Moose Hide creeks from I. Rosenthal and others, owners.

In the Klondike the old method of thawing the earth with log fires is no longer in vogue. Timber is too scarce and the process does not pay. The method now is to strip off the muck and moss and let the summer sun thaw the frozen soil. It does it nicely and then sluicing can be done in the ordinary way. That is the method of work all over the district, and there will be little doing up there this winter. Some one has a project to bring water around from the Klondike and get a sufficient fall to wash all the benches and the gravel in the richer portion of the district.

Herewith is presented an interview with Mr. Alf Tregido. It illustrates the methods of reaching the diggings and pictures the difficulties of travel, together with the prevailing mode of work pursued by the miners in their search for gold in the north, from the standpoint of an experienced California gold miner:

All the work is done on the mines during the winter. The Yukon river freezes solid in November. Then the miner quits Dawson for the scene of his labors and hauls his belongings over the ice to the diggings. He usually hauls 200 or 300 pounds at a time and has to make several trips to get it all there.

With such a load from fifteen to twenty miles a day is good traveling, and El Dorado creek can be made in a day from Dawson. We will say, for instance, that the "adventurer"—who may either be a lawyer, doctor or layman—arrived on the Klondike during the first excitement in the month of July, 1897, and took up a claim on El Dorado creek. He is fortunate enough to have enough grub to last him and his partner a year. They have been in Dawson all summer, taking care of their supplies, living in a tent, have had no money to spend, and are anxiously waiting for the river to close to get their stuff on their claim and go to work. They arrive at their destination and pitch their tent, in which they place all their belongings and live whilst they hunt over the ridge for logs large enough to build a cabin, which are not at all plentiful. Having found a set and cut them down, they must wait until there has been a snowfall to facilitate hauling them to the cabin site. The cabin is built of logs, in the ordinary way, and "chinked" with moss. The moss, being frozen, must be thawed before using, and as the creek is nothing but muck (decayed vegetation) and the ridges on either side nothing but moss, to find dirt for the roof is quite a job, especially as at this season of the year it is generally snowing and the thermometer away below zero. While the cabin is being built one of the partners is off cutting wood and hauling it over the snow to the point in the creek where the shaft is to be sunk, usually near the cabin. In course of time the "house" is completed and occupied, and with plenty of grub and wood on hand everything is in shape for developing the claim. At night the parties whittle shavings so as to start "burning down" in the morning, and early next morning a fire is started on a patch of ground that has been cleared of snow. This fire is made of dry wood, covered by green logs so that it will burn down and as much of the heat as possible penetrate the frozen ground. Generally a foot or so in depth will be thawed by each burning. This muck is immediately shoveled out of the hole and the process of thawing the muck and shoveling it out continued, usually for a depth of from 6 to 10 feet, when gravel is struck. If "colors" are found in the gravel there is great joy in camp, and no time is lost in getting to bedrock. Should good returns be found on bedrock, the news goes all over and by the time it reaches Dawson God only knows how rich they have struck it. A stampede occurs for the diggings and any vacant ground on the creek, or in the vicinity, is soon located, many being willing to forfeit their right of locating a 500-foot claim to have a "fraction" of a few feet near by the recent discovery. In order to hasten the extraction of gravel in creeks where the channel has been developed, it is customary to sink two shafts, one on each side of the creek, from 30 to 40 feet apart, and make a connection on the bedrock. This causes a good draught and at night a big fire is started right across the breast and enough dirt thawed out to keep the men busy all next day hoisting it on top. The man down below has the better job, as standing at a windlass all day, with the thermometer varying between 15° and 150° below zero, is trying. As soon as the bucket of gravel is dumped over the "cribbing" it freezes again and becomes like hydraulic cement concrete. The channel is worked up and down from the openings until the snow and ice, thawing, fill the shafts up with water and prevent further excavation. Very little timbering was done last year, the miners below trusting to the overlying muck being frozen hard enough to remain standing; but in many instances such inexperience caused bitter repentance, as so much dirt was dumped on top, around the shaft, as to cause a total collapse of the muck and the loss of all their winter's work—distressing in the extreme, but nevertheless true.

The thawing commences about the middle of April, and the miners abandon further extraction of gravel and start building their dams and erecting flumes and sluice boxes. The latter are brought right alongside the many dumps of gravel, but the gravel cannot be shoveled into them only as it thaws out from the face of the dumps. By the time a large dump is half washed, the amount of water for washing is almost exhausted. I believe many on El Dorado creek will not get all their dumps washed this season. The majority of the miners are through with their washing by the beginning or middle of July, and from that time till November there is practically no work to be done on the mines of the Klondike or the Yukon district. Between ten and fifteen thousand newcomers (chechakas) arrived at Dawson from Juneau, down the river, between the 12th of May and the end of June, as soon as possible after the ice broke up in the river. They would arrive in Dawson and see a couple of sawmills working, and some building going on, but no other show for work. If they went to the mines they would have to pack their supplies on their backs and walk either in the creeks up to their knees in mud and disturbing a colony of mosquitoes at every step, or on the high ridges between the creeks where the trails were rough and abominable, to find everything located and very little to do. But if, instead of sitting down on the sidewalks in Dawson "chewing the rag" over their troubles, without shelter and without work, bemoaning their lot because there was not a developed mine for each and every one of them to jump onto and claim, they would only use a little judgment, build themselves a cabin, which they are permitted to do anywhere as soon as they take out a miner's license (the Canadian laws outside the city of Dawson), and having provided themselves with shelter for the winter and cut wood enough to keep them from perishing, the chances are in their favor of finding both employment and a claim during the coming season and returning in the near future with a sack and a whole lot of experience. How many return without the sack is not altogether the fault of the country.

ARIZONA.

At Stanton, in the Rich Hill country, mining is active.—There are about 100 men engaged in placer mining at Weaver.—A deal has been closed whereby E. B. Gage and others become the owners of the McNary property in Copper basin. The claims are opened and show good ore. A large force will be placed at work immediately.—The Temple Bar Co. are said to have the ground along the Colorado river on each side secured from the mouth of the Grand canyon to El Dorado canyon. They employ fifty white men and thirty Indians. They have also a bond on the property of M. Bonelle at the ferry for \$30,000 and they recently paid \$15,000 for ground.—The San Juan mine in Lone Star district has twenty-two men at work. Sinking is progressing at the rate of 90 feet per month and the vein is growing larger. The ore is copper and of excellent grade.—The Tennessee mine near Kingman shipped seven cars of ore to the smelter.

At the 250-foot level of the C. O. D. mine in Mojave county a good grade of concentrating ore is being taken out.—The Cherry Creek G. M. Co. of Yavapai county is reducing the ores of the Elta mine with a 10-stamp mill. The large vein produces ore from \$15 to \$40 per ton, and most of it is free milling.—The last carload of ore from the Blackfoot mine in Mojave county averaged 204 ounces in silver per ton, 7 per cent copper and several ounces of gold.

The Old Dominion Copper M. & S. Co. has resumed smelting copper after a shut down of seventeen months, waiting until the railroad should be built, which is fifteen miles from Globe.—Large consignments of ores from the mines near Kingman arrive daily. Of the producing mines the Tennessee at Chisleride is the heaviest, followed by the Merri-mac, Paysall and Elkhart.—The Oro Mining Co. in the Oro Blanco district will increase its milling capacity to thirty tons daily.

Yuma Star: On the Carmen mine near Yuma a 100-foot shaft has been sunk, and the first 50 feet display a ledge running \$35 per ton, 3½ feet in width.—The Muey Bien has two shafts, 84 and 32 feet, and the ledge averages 9 feet. The ore ranges from \$7 to \$72.—The Saginaw mines and mill near Tucson are again running.—Thirty-five men are employed at the Mojave county Sheeptrail mine.—A 200-ton cyanide plant is contemplated at the Little Jessie mine near Prescott.—The Planet-Saturn mine at 800 feet depth has cut a vein of high-grade ore.—The Maguire mine near Kingman is being tested for H. J. Delamar.

CALIFORNIA.

Amador.

Dispatch: The Blue Lakes Co. has had an increase of water since the advent of cool weather, and as a result the Kennedy mill is operating forty stamps again.—The Keystone mill at Amador City resumed operations last week, after an idleness of two months owing to shortness of water.—At the Amador Queen No. 2 mine, Jackson, the two sets of lessees have struck a rich streak of ore in the 150 and 300 foot levels. The shaft is down 300 feet from the tunnel and 600 feet from the surface. The shaft is being sunk on contract work.

Republican: The shaft of the Bay State mine at Plymouth is about 700 feet deep and work has begun to unwater it. Enough rock is being taken out of the tunnel at the 100-foot level to run ten stamps.—Work is progressing at the Wheeler mine. Only five stamps are used at present, but a new mill is being erected, in which an additional fifteen stamps will be placed.

Record: The final payment of \$56,750 was paid last week by the Bailoi M. Co. on its properties at Sutter Creek. The total amount paid for the Marre, Allen and Hayden ground was \$100,000. The Bailoi Co. will at once resume operations on a large scale.—The Central Eureka has arranged to pay its indebtedness and will resume sinking the shaft.

Butte.

Alm Bros. & Wickman have leased the Campbell mine and mill at Enterprise and resumed development on the property, which has been idle a year.

Work is resumed at the Carlisle quartz mine near Forbestown and the mill put in good condition. The mine has been closed for time. Indications are that the quartz will pay with proper management.

The Gold Bank Co. at Forbestown is working its regular force making repairs and putting in machinery preparatory to working ore in the Gold Bank proper.

Near Rio Benito last week two new dredgers were launched. There are now three dredgers operating for gold on the Feather river.

Register: McClung & Braselton have bought the Sunnyside mine and will push developments.—Work on the ditch of the Banner M. Co. is progressing. Four gangs are employed and although on one section the rock is very hard good progress is made.—Huse & Wilson have struck a ledge of gold-bearing quartz near Bidwell Bar. They have a shaft, and a tunnel 100 feet. The ledge is 3 feet wide. They have put up an arrastra and made one run that turned out well.

Calaveras.

Prospect: Lund & Sorenson have opened up a small vein of good ore in their claim, near Skull Flat.—At the Eaton mine sinking has been suspended and levels are being run on the vein.—The Machu mine, at West Point, has been unwatered and taking out ore has begun.—Gibson & Manley of West Point, developing a mine on the North Fork, are hauling ore to the Granite mill.—The Bruner mine has been bonded. The company which has possession of the property is making a trial run of 100 tons of ore.—The Golden Gate mine, near San Andreas, was bonded to W. H. Clary & Son for two years for \$7000.—Zavilla, Cueto & Co. have driven a tunnel 130 feet, showing a vein averaging 1 foot in

width that will mill \$25 a ton.—D. Palmer is opening the Chilli Hill gravel mine, which has not been worked since the '50s.—The Thorpe mine, owned by the California Expl. Co., is to have a 30-stamp mill in a short time. The Thorpe has developed some good rock.

Citizen: The Great Western mine, at Altaville, has been bonded by the Drake Properties for \$300,000 cash and \$12,500 April 1, '99.—The Lively G. M. Co. of San Andreas has both its mines—the Fellowcraft and Bodie—in operation.

El Dorado.

(Special Correspondence).—The Smith & Rainey mine and 10-stamp mill near Kelsey have resumed work. The property has been idle for some time. The Strable slate quarry which has not been worked for several years has begun work under a new organization. The output under present methods of work will be quite extensive.

Kelsey, Oct. 10th, '98.

The U. S. Debris Commission has granted a permit to F. J. Goyan & Co. to mine by hydraulic process near Placerville.

Inyo.

P. Reddy of San Francisco has bought half interest in the Indian Queen mine near Benton.

Kern.

Los Angeles Review: In the Rademacher district the Baron mine shaft is down 200 feet. Levels have been run and good ore bodies have been opened. Three thousand tons of ore are on the dump.—The Badger is opened by a 200-foot shaft and 100 feet of drifting. Sulphure ore is shown.—McNitt & Co. have sunk a 100-foot shaft, showing 3 feet of high grade ore.—McKinney Bros. are down 150 feet on their claim, and by drifting and cross-cutting, expose a good body of sulphuretic ore.—The Eureka mill is running on Little Butte ore, as are five stamps of the Johannesburg mill. The other stamps of the latter are crushing Big Butte ore.—The Little Butte, besides keeping its stamps busy on low grade ore, is shipping large quantities to Barstow.—The Eureka mill made a four-ton run of ore from the Santa Ana mine, which netted \$400.—De Roemer Bros. had twelve tons milled which netted \$1600.—The Eureka mill people are buying all the base ore that is brought to them, paying smelter rates on assay value, less transportation charges.—At the borax works the Colo. & Cal. M. D. Co. is sinking on a 25-foot ledge of low-grade, gold-bearing quartz. They are down 75 feet, and at that depth there has been no diminution in the size of the ledge.

Randsburg Miner: M. Scott, of the Merced mine, near Randsburg, had twelve tons of ore milled at the Eureka mill which yielded \$1600. Another three tons brought \$300. This is the result of one month's work.—At the Hard Cash mine, a dry concentrating plant is being built. The mine has large body of low grade ore. This is the first mill of the kind in this district.

Nevada.

The Bismark & Gladstone mine near Nevada City will resume work as soon as water can be obtained.—The Diamond quartz mine near Rough and Ready has been bought by people from Cleveland, Ohio.—Union: The old Union Hill, Cambridge and Lucky group of mines have been bought for \$12,000 from the McLean estate by E. Crelmer.—At the Missouri river claim near French Corral the daily cleanups have been big. The flume into which the river water is diverted is 14 feet wide and 6 feet high and has a capacity of 68,750 inches. A storage dam is 100 feet long and 10 feet high. The plant is run by two undershot wheels, one supplying power for the derrick hoisting the gravel and the other furnishing the pump, the buckets of which are 6 x 24. Fifty men are employed, working eight-hour shifts.—The Malakoff mine at North Bloomfield have struck soft ground again and are making good headway.

Placer.

Colfax Sentinel: The Pioneer Co., near Towles, has sixty-two men on the payroll and is putting in an electric plant. Fifteen stamps are being run by a gas engine. The two Rix compressors run the drills by steam. The company has measured for use this season 2684 cords of wood. A tunnel to tap the ledge will soon be started 750 feet below No. 4 tunnel, and will still be 530 feet above the bed of the river. Poles for wire from the power plant to the mill, a distance of 4000 feet, have been set. Work on the dam on the American river is progressing. The dam is located 1600 feet below tunnel No. 3. It is built of logs and will be 24 feet high. The length across the stream will be 150 feet. The width of the dam at the bottom will be 50 feet and at the top 4 feet. It is built of cribs filled with stone ballast. A flume 6 x 7 feet conveys water 900 feet, where, with a head of 38 feet, it will be used to run the 353 H. P. water wheel. The electric power will be transmitted to the mine for running the 20-stamp mill, the blower and the two compressors. The company hope to have the electric plant in operation Jan. 1st.

At the Herman mine, near Westville, twenty-five men are employed. The 10-stamp mill is running day and night. An average of thirty tons of ore is crushed every twenty-four hours. Tunnel No. 3 crosscuts the ledge at 300 feet, and has been run on the vein 900 feet. The ledge is from 7 to 10 feet in width. A lower tunnel has been run and sinking done to connect with the tunnel. Water for the mill is pumped from the lower tunnel. Steam power is used to run the mill. The company next spring will build a 24-stamp mill. Dr. J. L. Barton is Supt. of the mine.

Riverside.

The Good Hope mine at Perris is said to be working in a large body of good ore.

San Bernardino.

In the Pinon district a number of properties are producing good ore. The Lost Horse mine

has a 10-stamp mill at work, while two other small mills are running in the district.—From Oro Grande there is some good ore being sent to Barstow.

San Luis Obispo.

At Cambria the Oceanic quicksilver mine is to be incorporated. There is a very large cinnabar deposit yielding about one-half of 1 per cent. The output is about fifty flasks monthly. W. H. Wright is manager.

Sierra.

E. Reynolds has leased the Morristown hydraulic claims near Port Wine and will operate them.—At the Plumbago mine near Alleghany progress is being made on the new air compressor plant.—The Happy Hollow claim is employing a number of men and taking out good gravel.

Enterprise: The North fork mine at Forest made a cleanup last week of sixty-five ounces.

Messenger: Last week the York mill near Downieville was started and five stamps will drop as fast as the ore can be extracted.—Developments at the Gold Bluff mine continue night and day. I. Copeland is sinking with twelve men employed. The new machinery is working successfully. The new air hoist recently put in is giving satisfaction. He is also unwatering the Triple Pocket mine near Downieville.

Shasta.

The engine room at the Mammoth mine, in Old Diggings district, was destroyed by fire on the 11th. A thirty-gallon tank of gasoline in the building exploded. A storeroom 50 feet away containing 2000 gallons of gasoline escaped.

The mining companies of the county who employ most of the labor of the county exact a monthly payment from their employees to pay for hospital service in case of accident or sickness.

At the Mountain Copper Co.'s mine the first six months of the year 103,000 tons of ore were extracted, averaging 7.53 per cent of copper. The stacks in process of calcination and local treatment at Keswick were increased, as only 72,000 tons of ore were smelted, producing 4329 tons of copper in matte, which has been sent to the New Jersey works to be refined. The delivery of fine copper from these works during the period was 3980 tons, of which 2900 tons were marketed, the balance being still in process of treatment for the separation of its gold and silver.

Free Press: The mill at the Gopher mine near Iron Mountain is shut down pending the construction of a building to house the machinery.—E. W. Brackett is again shipping ore from the Mount Pleasant mine to the smelter.—Masons are at work at Keswick on a new rotary roaster for the Mountain Copper Co.—C. A. Hamilton of San Francisco, accompanied by J. Barr, the representative of a syndicate of Scotch capitalists, is examining the Cleveland Con. M. Co.'s property at Bullychoop.—Hanley & Cannon have sold to G. McEnery and others a half interest in their mining property in the Hazel creek mining district, comprising five locations.

Searchlight: Near French Gulch, on the Washington mine, Blagrove & Collins have about thirty tons of ore that will mill \$70 a ton. D. McQueen has forty tons of \$25 ore on the dump. Blagrove & Condon have an 18-inch vein which assays \$308 a ton.—Donabue & Sweeney have 8 inches of ore that will assay \$400 a ton.—Foster & Co. have good shipping rock; eight tons netted \$1600.—On the Oro Psyche, Chambers & Driscoll working on a lease have forty-six tons of \$70 ore on the dump.—On Vogel & Reinhaus' claim the tunnel was driven 230 feet and opened 2 feet of ore assaying from \$160 to \$180 a ton and free milling about \$20. They have forty tons out.—The owners of the Central mine in Old Diggings district, Whitehouse & Bliss of New York, will resume work shortly.

Trinity.

Work on the new tunnel of the Brown Bear mine at Deadwood has begun. It will prospect four ledges. The length of the tunnel will be 4200 feet. It will give in depth below the lowest workings 360 feet.

After three years of work G. Carr of the Boulders mine in Echo Lake district has tapped an 8-foot ledge of quartz.

Journal: Near Dedrick, at the Stanley-Helen mines twenty men are employed and tunnels are being run, shafts sunk and general development carried on. If development justifies a stamp mill will be erected in the spring.—At the Chloride-Bailey group a large force are taking out ore.—At East Fork the Enterprise Co. are working steadily on their property with success.—Day & McWorthy have bought the lease on one of the Enterprise Co.'s mines and are working it.—R. A. Skinner, owner of the Yellowstone mine is driving a tunnel and making good progress.—A second large shipment of machinery for the new hoisting and pumping plant of the Altona Quicksilver M. Co. at Cinnabar has been received.

Tuolumne.

(Special Correspondence).—The Eureka Con. mines at Summerville are on the east belt. The main shaft is 1670 feet deep. The vein matter at that depth is 20 feet in width, carrying free gold in streaks. The pay matter runs from 3 to 15 feet. About 1 per cent of sulphurets are found of \$40 value per ton. At present they are not working, the power being water. The project in the future is to open up the mine by a tunnel driven from the North Fork canyon. When the shaft has been sunk 1700 or 1800 feet the Eureka will be the deepest exploration in the county. F. Corkhill is the Supt. The company is erecting a cyanide plant and making general repairs.

Summerville, Oct. 11th, '98.

The Santa Isabel is just about paying expenses and has \$63,000 on hand.—At the Big Betsy mine, Groveland, a new engine and boiler is being put in. A good deal of mining machinery is arriving at Chinese Station from the Groveland country.

The Oro Grand mine, at French Camp, is

showing a 4-foot vein of fair grade ore. The property has been idle many years until recently.

Sonora Democrat: A hearing will be held before a notary public in Sonora, November 2, as to the mineral or non-mineral character of a list of Government lands, which have been returned by the Surveyor General as mineral, but the department may classify them as agricultural. All these lands lie in mineral belts; but landholders are after them, and hundreds of quartz and placer claims will be lost to miners unless they look up the lands and appear with evidence of their mineral character. Attention is likewise called to another advertised list of lands in this county, which have been selected by the State as idemity school lands. It is asserted that they are all mineral, but will be declared non-mineral unless protests are filed at the land office at Stockton before October 27.

Magnet: There are 160 workmen at the Shawmut mine, Jacksonville.—At the Atlas mine, near Tuttle town, work has begun on a 2000-foot tunnel which is to cut the vein at 500 feet depth.—The Dutch Co. at Quartz has again started the 20-stamp mill.—The shaft at the Mazepa mine, near Stent, is down 90 feet.—The Densmore mine, near Parrot's ferry, has been bought by J. Fischer & Co.

Yuba.

M. Wolf is developing a quartz property near Dobbins and will keep a full force at work during the winter.

COLORADO.

BOULDER COUNTY.

T. J. Crone has leased the B. & M. properties at Eldora for \$20,000.—Returns from a 25-ton shipment from the Anti-tam mine gave \$25 per ton in gold. Ore is being sacked for shipment which will run from \$60 to \$100 per ton. Over 100 tons are on the dump that average \$30 per ton.

The Populist tunnel at Eldora is in 250 feet and is outputting ore from \$30 to \$75 per ton in gold.

CHAFFEE COUNTY.

The strike at the Pass Creek mine in the Poncha district shows a vein of 54 inches of ore that returns \$53 per ton.—The Chance-Excelsior group of five claims on Cameron mountain has been leased to Hatfield & McKee for \$15,000, and work will begin Nov. 1st. The new Tetrault mill at Whitehorn, with a daily capacity of ten tons, will be in operation the 15th inst.

A half interest in the Iron Mask and Sundown was sold to W. Scott for \$5000 cash.

CLEAR CREEK COUNTY.

The Alice mine and mill on Yankee Hill has resumed work. The ore averages \$3 per ton. The mill saves 95 per cent of the values and it costs less than \$2 per ton to mine and mill.—The King Solomon mine on Yankee Hill has been a producer of \$60 gold ore since last April.

The Denver Republican tells this, which is new, if not so: Near Georgetown, T. Cunningham, two weeks ago, uncovered what appeared to be a vein of silver glance running 75 per cent pure silver. After sinking 13 feet he found that he was in a slide. He followed the flow some distance and came upon a vein of ice several feet in thickness impregnated with particles of silver glance, assays showing it to run several thousand dollars per ton in silver. The vein of ice has been followed for some distance and still maintains its richness. At intervals solid chunks of silver glance are found twisted as though they had been subjected to tremendous pressure or heat.—In the Naylor Lake district a vein running over 200 ounces in silver was uncovered.—The shipments from the Pelican Dives and Dunderberg mines continue and the mills are almost blocked with ore. All the leasers on these two mines, numbering over 200 men, are shipping their ore.—The Griffith is shipping seventy-five tons a week, which will average about \$55 to the ton.

EL PASO COUNTY.

A twenty-four months' lease has been given on the Nettie Dutcher Co.'s block of the Elkhorn to S. McDonald for \$35,000.—Litigation on the ownership of the Elkhorn property on Carbonate Hill has been settled out of court. The claim comprises three and three-fourths acres.

The production of the Lillie for September was nearly 1200 tons.

Near Woodland Park the new forty-ton stamp mill belonging to the Deposit Co. is running full time.—The Frisco cyanide mill at Golden gulch is running steadily and the tanks are being filled. There are 150 tons of ore on the dump.—The Farrell mill on Bald mountain is nearing completion and the owners expect to fire up about the 15th inst.

The Victor mine, Cripple Creek, output 1800 tons in September and promises an increase of one-third as soon as the improvements in progress are made. Dobois & Connel, leasing the Wallace, Victor property, are in good ore and are making regular shipments.—The output of the Portland mine has been kept to a limit for two months, all work over that has been in the line of development. The ore between levels seven and eight is the richest yet found. Water is making 1000 gallons per minute and is full capacity of the pumps.—The Lucky Guss of Cripple Creek a few months ago was covered with miners' liens, and had nothing but debts in sight. Under the new management all debts were cleared off in June, new development commenced in July, a number of leases were granted and the company is receiving a goodly sum in royalties.

Post: The Battle Mountain Con., near Victor, is making regular shipments from its new discovery in the Trail tunnel. The last shipment averaged \$30 per ton. A steady output is also being maintained from the Wilcox and Cramer leases on the Trail.—The Portland mine is again suffering from too much water. Work below the ninth level has been

suspended on this account and will not be resumed until a new pump is installed, which will be within sixty days.—The daily output from the Kieth & Grube lease on the Victor amounts to twenty-five tons of \$35 ore.—The Arequa Savage on Beacon hill has been leased to J. Dozier of Colorado Springs for \$70,000.—The Woods Investment Co. gives the production of the Gold Coin for September at 2800 tons. The main vein at the fifth level is said to be about 20 feet in width, with values fully as good as were those above.—In the Independence the output remains at about forty tons a day.

GILPIN COUNTY.

During September there was shipped from Black Hawk 326 cars of ore, or 5868 tons.

The last lot of smelting ore shipped by the lessees on the East Notaway near Central City brought \$484 46 per ton as follows: 35.62 ounces gold, 7.24 ounces silver, and 3.20 per cent copper per ton. The ore body is holding out good.—During September the Phoenix-Burroughs produced 2855 tons of ore, of which 2725 tons were mill ore and 130 tons were smelting ore. That property employs 100 men.

The Concrete mine in Eureka district employs fifty men and the September production was 1530 tons mill ore.—A lot of ore is being taken out through the Bobtail tunnel, from the leases on the Bobtail lodes, and from the Klein-German and A. P. R. properties. The tunnel rights are owned by an English syndicate who exact a toll of 25 cents per ton on all ores hauled through the tunnel.

LAKE COUNTY.

The Theodolite group of mines near Leadville has been bonded to an Eastern Co. for \$250,000.—The Ibox M. Co. is pushing work in its shafts, drifts and levels and while ore shipments are heavy, development is opening up ore bodies daily and the reserves are large. Shipments for last month were 8000 tons. The working force is 450 men. The A. Y. & Minnie mine and mill have resumed operations. The shipments daily are forty tons of concentrates carrying 25 per cent lead, 20 ounces silver, 25 per cent iron and some gold.—The Red Cliff mine is daily shipping two carloads of low grade ore.

At Leadville, the Leadville & Gunnison Railroad will extend its line to a portion of the silver-lead producing section of the camp which will enable the mines there to increase their output, and within a few months many of the big mines of the camp will be connected by rail with the main lines of the roads.—Catalpa-Crescent continues its production from a number of claims of the group which are in operation by lessees. The output runs in the neighborhood of 6000 tons per month, half of which is oxidized iron and the remainder manganese.—On the New Monarch and Lida shipments last month were over 1200 tons.

LA PLATA COUNTY.

Reports from the Omaha & Grant Smelting Co. at Durango show that during the present year the increase in concentrates has been 50 per cent in excess of the production of last year.

MINERAL COUNTY.

Creede Candle: The Creede M., M. & L. Co. is working night and day and shipping 100 tons of concentrates every month, in addition to several cars of smelting ore. The mill is completed and running.

At Creede Wilson & Coombs, on the Ridge, are shipping 600 tons of ore per month.—The Amethyst is working a large force and shipping 300 tons a month.—From the Solomon about 125 tons of concentrates a month are shipped, in addition to a number of cars of zinc.

SAGUACHE COUNTY.

The ore shipments from Creede last week were ninety-three carloads.

SAN JUAN COUNTY.

Twenty-two inches of smelting ore in the Champion mine on Sultan mountain pays \$600 per carload, the balance of the ore running \$50 per ton. The vein is 6 feet wide.

Ore is found in the Reed mine on Boulder mountain that returns from the sampler \$16 in gold and 128 ounces of silver per ton. The outcrop of the vein has been traced over 2000 feet.

SAN MIGUEL COUNTY.

L. W. White has leased and bonded the Wasatch near Telluride for \$25,000.—The ore from the Marie Antoinette mine at Ophir plates \$35 per ton in gold. The vein is 7 feet wide and is all milling ore and requires no sorting.

SUMMIT COUNTY.

In the Swandyeke district another body, 3 feet wide, of manganese and iron has been uncovered which runs forty ounces of silver per ton.

IDAHO.

The first shipment of copper bars from the Cuprum smelter in the Seven Devils country was fifteen tons. The assay showed 98½ per cent copper, \$12 gold and \$41 in silver.

Near Murray nearly all the mills in the gold belt are running again. Both mills of the Golden Chest are running on ore from the Dora and Katie Burnett.—The Yosemite mill will start in a few days after a long idleness.—The Daddy mill is busy and there is ore in sight to run it all winter.—The Mother Lode mill, the only water power mill in the camp with a single exception, is again running.—The Granite mill is running five stamps; the gold-saving capacity of the mill has been increased.

The Hummingbird M. Co. has let a contract to continue its lower tunnel 300 feet. The company owns five claims; in one tunnel they cut 45 feet through a lead carbonate ore which also carries gold.—The Sonora M. & M. Co. has let a contract to continue the tunnel, which is 466 feet, an additional 334 feet.

The Lucky Boy mine of Custer shipped a gold bar last week amounting to \$2500.

Statesman: In the Morning Star mine at

Basin the tunnel has been driven 2190 feet. It cuts four veins. The largest lode is 207 feet wide. They are running a number of drifts and most of them are in pay. The second ledge is 12 feet thick. The other two veins are also good. Development is being done on all of them. A shaft is 252 feet deep.

Supt. J. T. Keegan says a mill will be erected with concentrating tables and a cyanide plant. The concentrates will be handled on the ground.—The H. J. Kelling Co. of Chicago is building, near Salmon City, a gold-dredging plant of large proportions on a tract of placer ground bought for \$150,000. The plant is of the New Zealand type with all the heavy parts annealed steel, and has a daily capacity of 4500 cubic yards. The boat was floated last month and the machinery is on the ground and being rapidly put in place. The company expects to make a test run this fall before the ground freezes up. This property has been worked twenty years by hydraulicking from one to three months each year, as the water supply permitted, during which time they took out something like \$75,000. It produces what is probably the purest gold found in Idaho; it is worth \$19.75 per ounce as it comes from the ground. The pay streak is 200 to 300 feet wide and 12 to 20 feet deep and averages 60 cents per cubic yard. The gravel is fine and the bedrock soft, crumbly granite.

World: Shipments of ore from the Narrow Gauge group of mines near Hailey have begun. They will ship about fifty tons a month.—The Cresus mine and mill have started up for a winter's run.—At the Independence mine near Idaho City a cleanup from seven tons of ore crushed in an arrastra weighed 21.1 ounces, worth \$13 76 per ounce.

MICHIGAN.

The Marquette Mining Journal says that on Oct. 1 the mines in Houghton county furnished employment to 10,400 men, an increase of 1742 over that of Oct. 1, 1897. Add to this the number of employees of Keweenaw and Ontonagon counties, and the total will be swelled to about 11,000. This increase promises to be duplicated within the coming year. Monthly payrolls of the mines in the vicinity of Calumet alone now aggregate about \$400,000.

MISSOURI.

At Joplin mining district, the total value of lead and zinc sales for the week ending Oct. 1st, was \$152,492, and top-grade zinc ore advanced \$3 per ton, closing at \$33, dropped to \$22.75 per 1000 pounds.

MONTANA.

The third annual report of the Anaconda Copper M. Co. for the year ending June 30, '98, gives the following results of the year's operations: Shipments from Anaconda—124,417,471 lbs. fine copper, 5,300,000 ozs. fine silver, 16,610 ozs. fine gold. The sales during the fiscal year amounted to 135,002,147 lbs. fine copper, 5,706,377 ozs. fine silver and 19,930 ozs. fine gold. The following statement shows the sales and prices realized for copper, silver and gold for the past three years:

| COPPER | | |
|---------------------|------------------------|----------------------|
| <i>Fiscal Year.</i> | <i>Lbs. Sold.</i> | <i>Price per lb.</i> |
| 1895-6..... | 105,470,705 | 10 08c |
| 1896-7..... | 120,864,007 | 10 76c |
| 1897-8..... | 135,002,147 | 10 82c |
| Total 3 years.. | 341,343,039 | |
| SILVER | | |
| <i>Fiscal Year.</i> | <i>Fine Ozs. Sold.</i> | <i>Price per Oz.</i> |
| 1895-6..... | 4,498,560 | 67 01c |
| 1896-7..... | 6,057,067 | 64 08c |
| 1897-8..... | 5,706,377 | 66 73c |
| Total 3 years.. | 16,262,004 | |
| GOLD. | | |
| <i>Fiscal Year.</i> | <i>Fine Ozs. Sold.</i> | <i>Price per Oz.</i> |
| 1895-6..... | 14,364 | \$20 62 |
| 1896-7..... | 18,511 | 20 65 |
| 1897-8..... | 19,930 | 20 67 |
| Total 3 years.. | 52,825 | |

Since the organization of the present company the aggregate profits for the three years amount to \$12,945,908.92. During this period \$6,750,000 have been paid in dividends, leaving a balance or surplus of \$6,195,908.92. About \$1,000,000 of this surplus has been devoted to an increase of capital and the remaining \$5,200,000 is represented by working capital in the shape of the various metals produced, cash, etc. Houston & Co. hear that Anaconda production recently has been from 8,000,000 to 10,000,000 pounds of copper per month.

All the mining companies in the Butte district of Montana continue to run full capacity, hoisting about 11,000 tons of ore daily. When the Washoe Copper Co. begins extracting ore and the Butte & Boston completes its development, Butte's daily output will be at least 15,000 tons of ore.—The Granite-Bimetallie Con. M. Co. at Phillipsburg has filed its annual statement with the recorder of Granite county, which shows that it is capitalized for \$10,000,000. Its total indebtedness in Montana is \$35,288 and outside of the State \$90,551.

J. W. Ladd of Boston has brought suit in the U. S. Court against the Montana D. P. Co. for alleged trespass of property for \$12,888 88 and costs.—Mesh & Johnson, leasers of the Sunbeam mine near Sheridan, shipped to the smelter at Butte fifty-one tons of ore which yielded them \$20,900 in gold.

Two strikes have been made in Saltese district by the Eclipse M. & M. Co. near Saltese. The more important is on the Kearsage, being 3 feet of ore which runs 25 per cent lead and 140 ounces in silver. They have about four carloads of it ready for shipment. The other is on the Shakespear, where they have cut through 5½ feet of ore and are not yet through it. It runs 25 ounces in silver, \$3 to \$5 in gold, a little copper and no lead.

Clancy Miner: The East Pacific mine at Winston is to be incorporated under the laws of Maine, with head offices in Boston, as the East Pacific Mining Co. It employs 110 men. The tunnel is in 1600 feet and is being driven

100 feet a month. A 50-ton concentrator will be built.

The *Inter-Mountain* says that the Washoe M. Co. has opened offices in Butte and the impression prevails that the work on a new smelter is not far off. The Washoe M. Co. has for its principal owners Marcus Daly and J. B. Haggin, but will be run distinct from the Anaconda Co. The principal mines of the Washoe are at Butte. In addition they have extensive coal fields and lumber interests, all calculated to make one resource depend on the other. The basis of so much mineral wealth in mines has been planned and perfected for three years until at this time a large smelter is all that is necessary to make a company almost as large in proportion as the Anaconda Co. Mr. Haggin has arrived from the East, and it is claimed the new site for a smelter will be selected.

NEVADA.

Near Como on the Ely mine an 18 inch vein was opened that runs 454 tons.—The test run from the Reno mine at Como gave bullion returns of \$2900.—Work in the copper mines at Golconda has been suspended, awaiting the building of a railroad to the property. Work on the railroad was begun this week.

The upper workings of the Diamond mine, near Eureka, have been leased to tributaries. The White Pine News says eighteen copper claims in West Camp have been bonded and will be worked, and that the Chalmers mill will start up in a few weeks.—Salt Lake people will continue the development of the Old Imperial mine at Cherry creek. The tunnel has been driven 12.0 feet.

Twelve miles of narrow-gauge railway will be built between the mines of the Glasgow & Western M. Co. and the Adelaide Reduction Works at Golconda to cost \$100,000.

The ore shipments from Eureka and Hamilton districts for the week ending Oct. 8th were 4709 80 pounds.

NEW MEXICO.

New Mexican: The Santa Rita Copper & Iron Co. is shipping six cars of ore daily from Silver City.—The Helena M. Co. of Graham is preparing to operate its plant with electric ity.—The Timber Peak M. Co. of Socorro county is completing a reduction plant of 150 tons capacity to run on the company's ores.—The September payroll of the Richmond mine in Sierra foot up \$2300. The payrolls of the Snake and the Opportunity mines foot up \$3000. The Tripp mine has increased its force to twenty-six men.—The large copper properties near Hillsboro have been bought by M. M. Freed of Salt Lake City, who will erect large reduction works there. It is said that there are nearly 2,000,000 tons of ore in sight and that will yield from 6 to 8 per cent copper and some gold and silver.—The output of Hillsboro's gold mines for the week ending Sept. 29 was 280 tons; total since Jan. 1, 6310 tons.

OREGON.

Operations at the Braden mine near Gold Hill are being pushed. Many improvements have been made and the mine and mill will be worked to full capacity.

Grant's Pass Journal: Near Grant's Pass the Sugar Pine mine has been bonded to R. Jones, who has let a contract for tunneling.—H. M. Chapin is opening up a mine near Merlin.—C. D. Crane, Supt. Oro Fino, has resumed work at the mine. All ore taken out will be shipped.—The Eureka M. Co. will have their cyanide plant in operation in three weeks.—Ten men are working on the dredger near Tolo. It is said that the machine is a success.—J. Hill has sold a half interest in his placer mine on Rogue river to M. Pyles, who will equip the mine for hydraulic mining.—La Bellevue mine, at Granite, is said to be on a paying basis and everything is working well. Five tons of concentrates are being shipped daily. The property is owned by J. Bamberger and D. Keith of Salt Lake City.

SOUTH DAKOTA.

In the Omega mine, at Terraviva, a cement ore is produced, of which three men break about thirty tons in twenty-four hours. The average value is from \$4 to \$5 a ton. A 10-stamp mill crushes thirty tons a day. The cost of mining and milling the ore is put at \$1 a ton.

UTAH.

From Silver City were shipped last week thirty-nine carloads of ore.—It is estimated that the output of the Old Jordan concentrator at Bingham for October will reach over 1500 tons.—The No. 7 tunnel on the Highland Boy at Bingham has been driven 300 feet, expecting to get the vein at 1000 feet.—Assays from the War Eagle at West Tintic show 175 ounces silver, 35 per cent copper and \$1 in gold. The ore body is extensive and is on the 200 level.—Shipments from Bingham last week were 1000 tons, besides 160 tons treated at the Markham mill.—The daily output of the Silver King mine at Park City is 100 tons of second and 50 tons of first-class ore.—Ore shipments from Park City for the week ending Oct. 8 were 1,587,950 pounds.

The further development of the Eagle M. Co. property at Eureka will be done by air drills.—The Ontario at Park City for September marketed nearly 900 tons of crude ore, while the run on the tailings from the old Ontario mill has increased to seventy tons daily at the Marsac. About 100 men are employed.—In the Luzerne at Silver City another strike has been made of a good quality of ore at a depth of 300 feet, running well in copper.

Work on the property of the Electric M. Co. at Sunshine will be resumed November 1st and continued through the winter. The company has done about 1600 feet of prospecting.—At Provo E. E. Schmidt sold to G. Robinson a half interest in the Cyrus Oliver mining claim for \$3000.—The Mercury mine shipped its first October lot of auro-cyanides. The value is \$25,000.—The Ophir Hill Con. mine marketed 1500 tons of concentrates during September.—The big blast furnace at the Hanauer smelter has blown in and will run

continuously. The starting of the furnace will employ twenty-seven men and will dispose of 100 tons of ore daily. At the same time the new steam blowing plant was put in operation.—Connection with the main ore bodies of the Bullion-Beck at Eureka has been made. To do so it was necessary to drift 500 feet off the 1300-foot level. The ore bodies are said to be of large size.—The Galena of Fish Springs has recovered the old and original ore chute from which its shareholders derived dividends amounting to \$71,000, and is raising ore which shows 250 ounces in silver and 72 per cent lead. In January, '97, the Galena chute disappeared at a depth of 280 feet. The shaft was put down to 500 feet and a drift run and the original chute recovered.

At Green river wells are reported discharging water impregnated with pure carbonate of soda susceptible of commercial utilization by evaporating the water.

Mining: The Highland Boy M. Co. of Bingham has secured a bond on the Honorable mine at Stockton and will soon commence sinking. They will employ thirty men.

J. P. Mitchell & Co., leasing in the Honorable, shipped thirty-five tons of high-grade ore last week.

The Hercules has resumed work. The Geyser-Marion made its semi-monthly shipment of cyanides, amounting to 500 pounds.—It is estimated that \$150,000 worth of cyanides have accumulated at the Golden Gate mill since August 23d, the date on which the refinery was closed down.—The Northern Light shipped cyanides last week weighing 250 pounds valued at \$2500. It is reported that a large body of milling ore running twenty ounces per ton in silver has been found.—The Chloride Point made a double shipment of cyanides last week. They will make semi-weekly cleanups in a short time.

Tintic Miner: The Mammoth at Eureka on the 600 level uncovered a body of copper which will run 50 per cent and a vein of quartz that assays from forty to fifty ounces silver and two ounces gold.—Shipments from Tintic last week were seventy-nine cars of ore, five of concentrates and four bars of bullion.—C. Hutchinson shipped two cars of copper ore, one from Milford and one from Frisco, for a test run.—The second payment has been made on the Big Indian copper properties at Moab by Loane & Co. of \$5000. Since the present owners obtained the properties they have run 1200 feet of tunnel and have in sight considerable ore ranging from 8 to 50 per cent copper.—In the Silver King at Stockton on the 300 level an ore chute 12 inches wide was uncovered which assays 75 per cent lead, forty ounces silver and \$1.60 in gold per ton.

Tribune: Having satisfied himself that it is possible to bring a number of properties that have hitherto defied working at a profit within the radius of paying ones, Prof. Chas. Butters is trying to tie up a number. It is learned that his tests on Mercur mill tailings had been followed by overtures looking either to an outright purchase of the dumps or to the leasing of them.—The cyanide tankage capacity of the Golden Gate mill is being increased from 2500 to 5000 tons.—The Sacramento Co. will construct roasters and double its present output.—Within ninety days the mill at the Cigale, with its plant for the roasting of its ores, is to be in operation.—The Overland new mill will be putting out auro-cyanides within thirty days.—The Washington mine at Frisco made another shipment of 100 tons, yielding 25 ounces silver and 15 per cent lead.

WASHINGTON.

At Republic the Gold Leaf tunnel No. 1 is in 205 feet and driving at the rate of 2½ feet a day.—Near Springdale the Cleveland mine is showing good ore; shipments will begin soon.

The output of the Republic mine, in Republic camp, for September was 270 tons milled, which produced in round numbers \$28,000, and 143 tons shipped, which yielded net \$35,000. The mill is an electro-cyanide plant and was installed as an experiment, the capacity being only ten tons per day, but as it proved a success it will be increased to a 35-ton mill. All the ore is made to pass through a 120-mesh screen. They are saving 90 per cent of gold and silver at a cost of \$6.50 per ton, which includes \$1.50 per ton for crushing. The average of ore shipped to the smelter is eight and one-half ounces gold and seven ounces silver.

The Everett Hydraulic G. M. Co. is preparing for extensive work near Everett. Seven prospect shafts have been sunk 25 to 93 feet in depth and a tunnel driven. The gravel yields about 25 cents to the cubic yard. The company owns 320 acres. A flume has been built for water supply three and three-quarter miles long. Before an attempt will be made to take out gold over \$100,000 will have been spent putting everything in readiness. The earth will be washed into two flumes each 1000 feet long, 4 feet wide and 4 feet deep.—Bourne & Brown have sold the Mountain Lion mine at Republic to the Mountain Lion M. Co. for the \$150,000.

At Bossburg the Copper-Gold M. Co. has sold 100,000 shares of stock at 5 cents and will put the amount into development work.—The new 100-ton steam hoisting plant of the Bonanza mine will be in place within ten days, when 100 tons of ore per day will be raised and shipped to the smelter.—The ore shipments from the Le Roi mine to the Northport smelter are from 350 to 450 tons per day. The plant is running at its full capacity.

At Colville, Wash., on the 9th a deed was filed transferring the forty-seven acres of land at Northport occupied by the smelters there to James Breen. The deed is signed by W. D. Turner, as president, and J. M. Armstrong, as secretary, for the Le Roi M. & S. Co. There are \$15 worth of internal revenue stamps on the deed.

There is an object lesson in the history of the Mountain Lion, in Republic. As a prospect the claim was not more favorable looking than a dozen of others in the camp, but W. H.

Brown, who owns half of the claim, is a miner. He laid his plans so that every dollar's worth of work would make permanent improvement of the property. He first sank a shaft and uncovered a pay chute. He realized that the cheapest and best method of developing the mine would be by tunnel, as it would save the cost of hoisting. He began the work of driving into the hill. The task meant over 700 feet of drilling and blasting before he could reach the ledge. He and his partner furnished every dollar that went into the development until it was no longer possible to operate without machinery, when some assistance was called for. The assistance came promptly, and it is probable that by July 1st, '99, the property will be among the dividend payers of the camp.

Near Meyers Falls work will soon begin on the Blue Grouse. This claim was located about thirteen years ago and considerable work has been done, including a tunnel and a shaft. The ore is high-grade galena.—The owners of the Klondike on Mingo mountain will shortly start to develop their claim.—A mining engineer is examining a group of claims on the Hawk's Nest, near Kettle Falls. The claims are the Copper King, Columbia View and Nellie Calder, which have considerable development done. The ore assays \$16 gold, eighty-five ounces silver and 11 per cent copper.—Meyers Bros. on the Sunday group of claims, Gold hill, will soon resume work. Shipments will be made during the winter.

WYOMING.

Near Grand Encampment the Ferris mine is producing ore that runs 60 per cent copper. The ledge is 7 feet wide.

FOREIGN.

BRITISH COLUMBIA.

(Special Correspondence).—The North Star M. Co. are sinking a double compartment shaft on the North Star mine at Kimberly to a depth of 300 feet, and are also clearing the right of way for an aerial tramway from the mine to Mark creek immediately above the town. The Sullivan M. Co. are developing their property to make large shipments as soon as the branch railway line is completed. Fort Steele, Sept. 30th, '98.

J. B. McLaren bought the Tretheway interest in the Providence mine at Harrison lake for \$24,000 cash.

R. T. Ward, Mgr. of the Horseshoe G. M. Co. mine in the Cariboo country, the only one north of California which is using hydraulic elevators, is in San Francisco with \$12,000 in dust, the result of a preliminary cleanup, the cleanup of the main flume not having been made. He says:

"We have over 500 acres of ground and are working two giants on the slope of the bedrock, following it along. We have opened a channel 2000 feet wide and have sluiced off four acres, finding the gold coarser as we go down. There is a good deal of fine gold, but we make no effort to save it. We take our water from two large lakes on Moffatt creek, one of them being nine miles long, and bring it down through five miles of 8-foot canal, one mile of 4-foot flume and three miles of 30-inch steel pipe. As we have no natural dump, we have two hydraulic elevators to create an artificial dump. A large steel feed pipe runs down an open pipe with a nozzle at the end, resting in the bottom of the flume. This nozzle discharges into another steel pipe, which rises vertically for 50 feet to the surface of the ground, where it empties into another flume to carry off the gravel. This latter flume has a steel hood over its upper end. We turn 1000 inches of water into the feed pipe and this stream, shooting out of the nozzle at a pressure of 130 pounds, strikes the gravel as it comes out of the flume and throws it up the elevator. The elevator pipe narrows from 22 to 14 inches a short distance above the nozzle, so that the column of water entirely fills it and keeps the boulders flying upwards. The force of the water is so great that the boulders and gravel rarely strike the sides of the pipe. This is of ½-inch steel and has behind it a cushion of rubber no thicker than paper, which takes off the shock of the blow and prevents the crystallization of the steel."

He says that R. H. Campbell of the Miocene Company has sunk a shaft 400 feet to the old channel on Horseshoe creek, has run down the rim to bedrock, drifted out from that, struck the gravel again and found good pay in it. The Cariboo Gold Fields Company is working with four giants on the south fork of Quesnelle river. They cleaned up \$60,000 in July and expect to clean up \$100,000 more this fall. They are building a dam at Moorhead lake and digging about eight miles of ditch which will cost about \$120,000. The Golden River Quesnelle Dam & Mining Company is building a dam at the foot of Quesnelle lake to hold the water in for four or five months in the year. This will leave the bed of the river dry for four or five miles below and the company will work it.

Since Jan. 1, and with the Le Roi out of the shipping list for the greater part of the time, the output of ore from Rossland amounts to 75,000 tons. The total shipment last year was 72,840 tons.

The Center Star has resumed operations and there are 100 men at work. The War Eagle force is to be increased to 300 and the Le Roi will be working as many men in the next few weeks. These three properties alone will employ between 900 and 1000 men.

At the Center Star work has commenced on a three-compartment shaft. The compressor has been fired and two drills are employed from the tunnel level raising to meet the shaft. There are 100 men at work.

In September the Le Roi shipped 10,208 tons of ore. When the new vertical shaft is in operation the company expects to output 1000 tons daily. At the 700 level the ore body is 42 feet 8 inches in width.

The sale of four big mines in British Columbia was closed in Seattle last week. They are the Esmeralda, Independent and Confederate, in the Trail Creek district, and the

Kennebec in the Fort Steel district. The mines join the Le Roi, War Eagle and Deer Park and are part of the same group. The sale was made by J. R. Rollins, owner, to J. R. Finch and R. C. Caldwell on behalf of the same English syndicate that tried to buy the Le Roi and which owns the War Eagle and Deer Park mines. The price is not made public.

The Rossland Miner says that on a conservative valuation of \$30 a ton the mineral output of that camp for the last week of September was \$125,070.

Rossland Miner: The shipments from Sandon the first week of October amounted to 675 tons. Payne, 350 tons; Ruth, 105; Last Chance, 30; Slocan Star, 120 and Treasury Vault, 40.—From Slocan the Goodenough owners are in 700 feet with their tunnel, and several stringers of fine ore have been struck.

Cory & Ward have bonded the Eclipse to H. T. Bragdon for \$10,000, 20 per cent to be paid in three months and the balance in nine.

Two carloads of ore have been shipped from the Blue Bird mine.—The Minnesota Silver Co. with twenty men is developing the Ivanhoe and has a large amount of high grade ore on the dump.—The Enterprise mine has shipped eighteen cars of ore and has in its bins thirty-two carloads; the ore is taken out entirely in development work.—The Last Chance recently shipped 500 tons of ore. About forty men are employed.—The Sovereign is shipping one car of high grade ore a week.—The Idaho employs ninety men and is shipping one car a day.—At the Queen Bess seventy men are employed and shipments of ten cars a month are made.—The Cariboo-Rambler ships one car per week and employs twenty men.—The Antioch near McLaughlin siding is shipping four cars per month.—The Ruth employs fifty-five men, one car of high grade ore is shipped daily.

MEXICO.

The Rothschild Co., which has acquired the Ingauran mines, Michoacan, has begun work by draining a number of old mines. The work will be carried on on a very large scale. The company also proposes to build an independent railroad line to the Pacific coast, probably to Zihuatanejo.—From the Vantanea mine near Candelaria the lessees are shipping ore running fifty-eight ounces of silver to the ton and fifty per cent copper.—The Escandida mine, Summit station, on the Rio Grande Railway, shipped to the Juarez smelter another carload of gold ore averaging \$65 gold to the ton and few ounces silver.

In the Animas mine near Querobabi, Sonora, the extraction of ore has begun. The property is a good grade gold one.

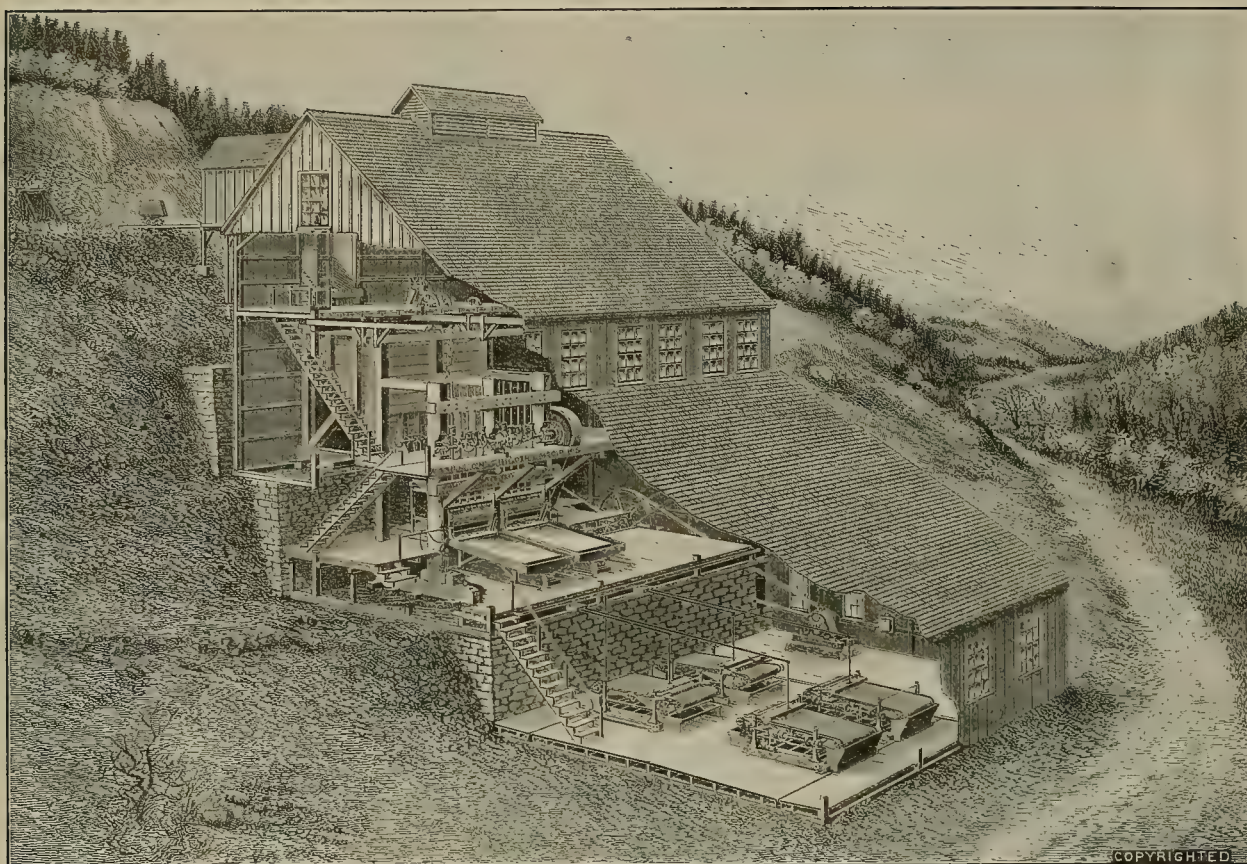
The Quebradilla mine, from which were taken in five years \$20,000,000, is again in a fair way of producing ore, the drainage works being about completed.

NOTICE TO CONTRACTORS.

WATER WORKS.—Sealed proposals will be received on or before 12 M., November 15th, 1898, for the construction and completion of certain additions to the existing water works, owned and controlled by the City of Seattle. The said water works include a gravity water supply from Cedar River, reservoirs and portions of an auxiliary high-service system in the city. The contract to be let will include the following: (a) Construction of Diverting Weir, Intake Canal (400 feet long) and Settling Basin, Pressure Pipe to City, 42 inches diameter, 28.4 miles in length, of which 6.4 miles are to be riveted steel and 22 miles to be stave-lined, banded with steel bands ½ inch in diameter. High-service Reservoir in City; capacity 16 million gallons. Low-service Reservoir in City; capacity 20 million gallons. Auxiliary High-service Steel Stand-Pipe, 30 feet diameter by 60 feet high, located in Ransome concrete. Pumping Main to Stand-Pipe, 18.200 feet 12-inch Kalamain Pipe; 2900 feet 16-inch Kalamain Pipe; 36-inch Stave Pipe, connecting the reservoirs, about one mile in length; 30-inch Stave Pipe, 3000 lined feet, waste from High-service Reservoir; 30-inch Riveted Steel Pipe, 4800 feet length, connecting Low-service Reservoir with distribution system. Changing Cedar River Channel, 1600 feet, in the city, including the Cleaning, Dam and Connections at Swan Lake, Two Gate-Houses, Specials, Valves, etc. The contract to be entered into will provide that payment shall be made for this work only by warrants upon the "Cedar River Water Supply Fund," established by Ordinance No. 3890 of the City of Seattle, and the contractor shall have no claim against the city except as therein provided. By said ordinance 75 per cent of the cash receipts of the city water system are irrevocably set aside and pledged to the payment of interest at 5 per cent per annum and the gradual redemption of said warrants. In addition to the warrants, which will be issued in payment for the construction of said additions, the contractor will also be required to purchase at par any and all warrants which shall be drawn on said fund by the city in such amounts as shall be required to pay for any real estate, claims, liens, or other matters necessary for the prosecution of the work of construction and the perpetual control by said city of the additions to the water works herein specified, whether obtained by purchase, agreement or condemnation proceedings, and also such warrants as shall be drawn upon said fund by the city in payment of engineering and other expenses necessarily incurred in connection with said additions; provided that the amount of the warrants thus required to be purchased by the contractor shall in no case exceed the sum of Sixty-four Thousand (\$64,000) Dollars. Each bid must be accompanied by a certified check, payable to the order of the City Comptroller, for a sum not less than five (5) per cent of the bid, and no bid will be considered unless accompanied by said check. The successful bidder will be required to enter into a contract and furnish satisfactory bonds for the amount required by the City Charter and the laws of the State of Washington, within ten days after being notified of the award of the contract to him; failing so to do, the said check and the amount fixed therein will be forfeited to the city. No person is eligible as a bidder who has within two years prior to the letting of said contract made default in payment of any just claim, for any work or labor performed, or any skill or material furnished pursuant to any such contract as has been advertised, or who within said two years failed to complete any such contract. Special attention is called to Article XXIII of the City Charter, as now in force, relating to "hours of labor," and to Article XIII, Section 31, Subs. 1 and 2, relating to "hours of labor." All bids must be made in accordance and comply with the plans and specifications now on file in the City Engineer's Office, and in compliance with Ordinance No. 3900. The City of Seattle reserves the right to reject any and all bids. Proposals must be indorsed on envelope "Bids for Constructing Certain Additions to the Water Works of the City of Seattle." By order of the Board of Public Works.

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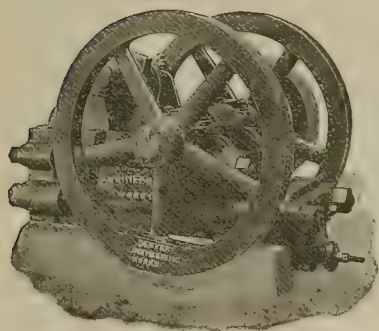


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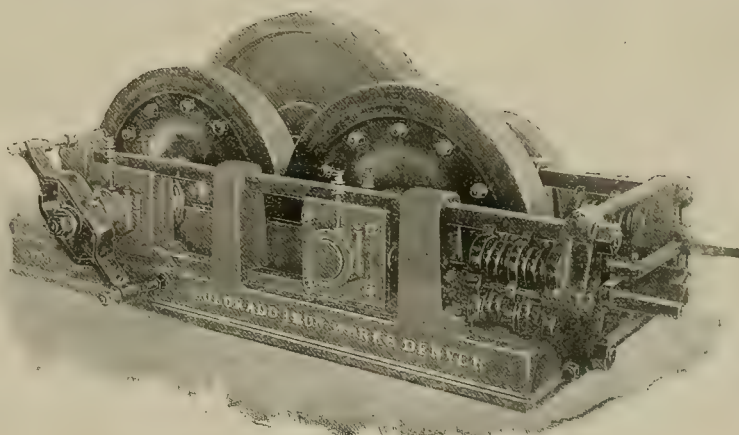
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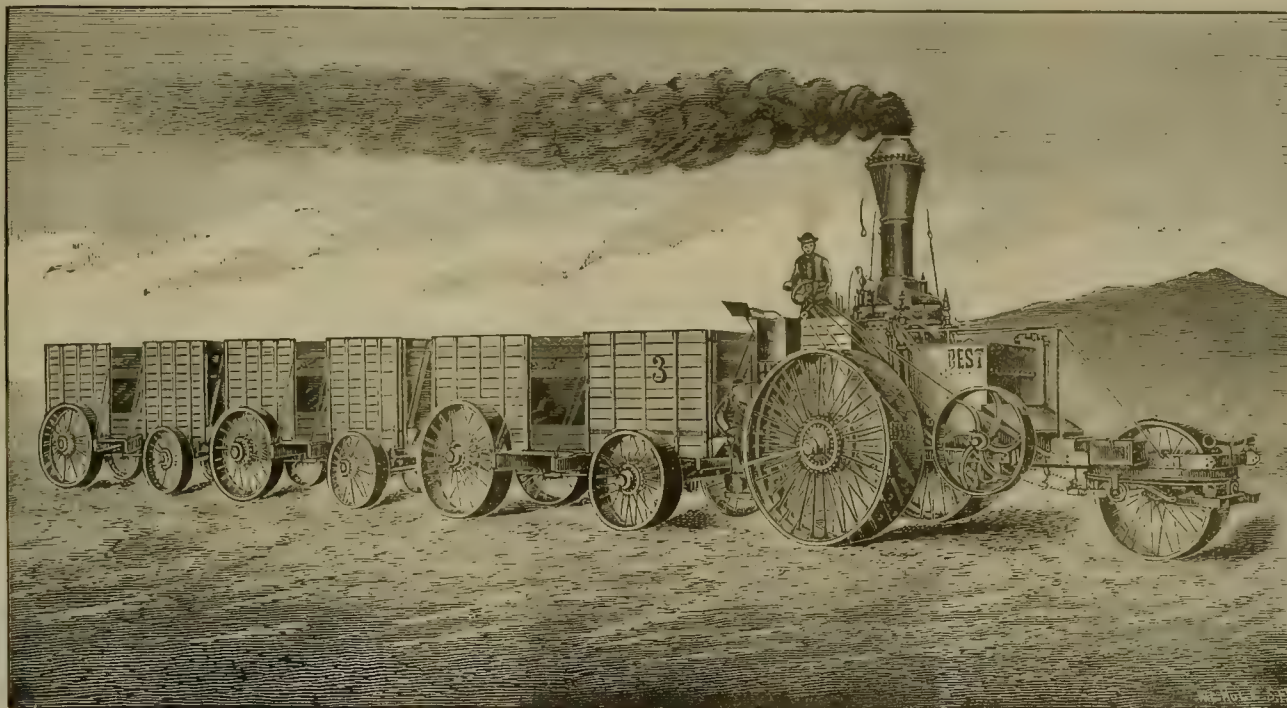
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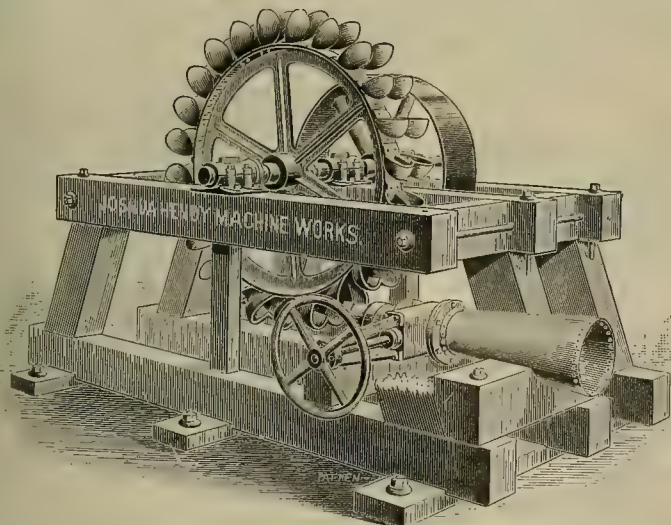
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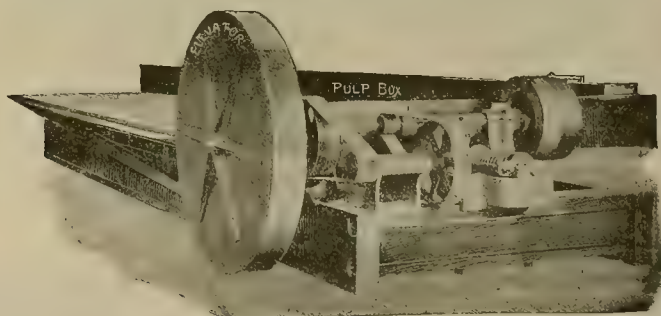
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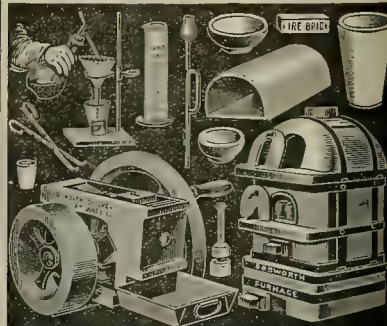
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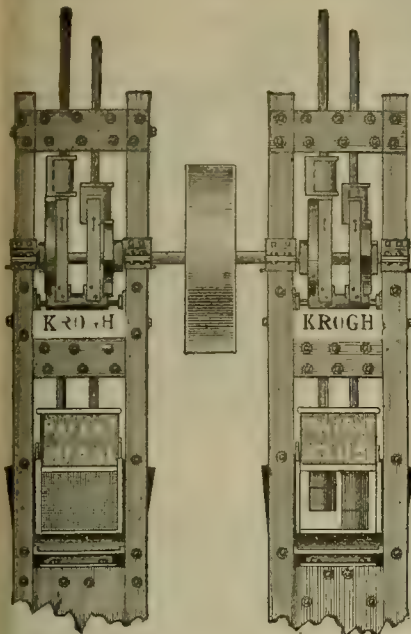
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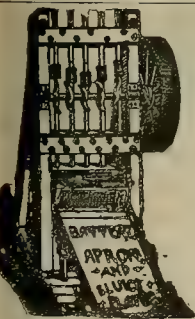
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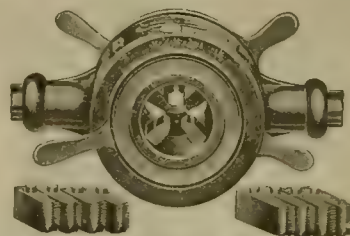
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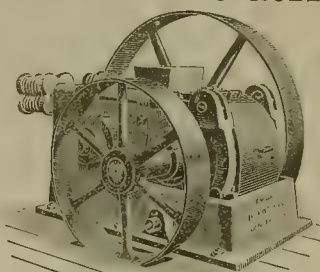
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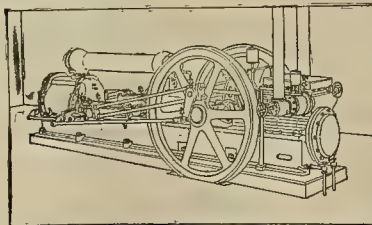


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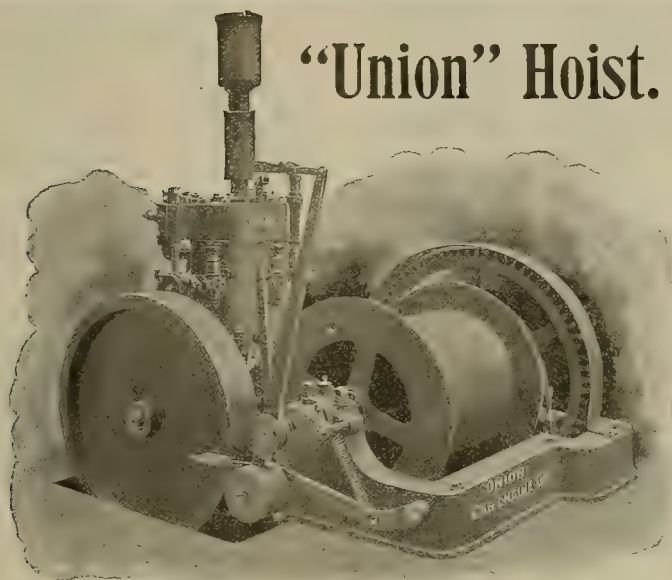
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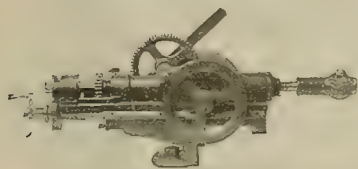
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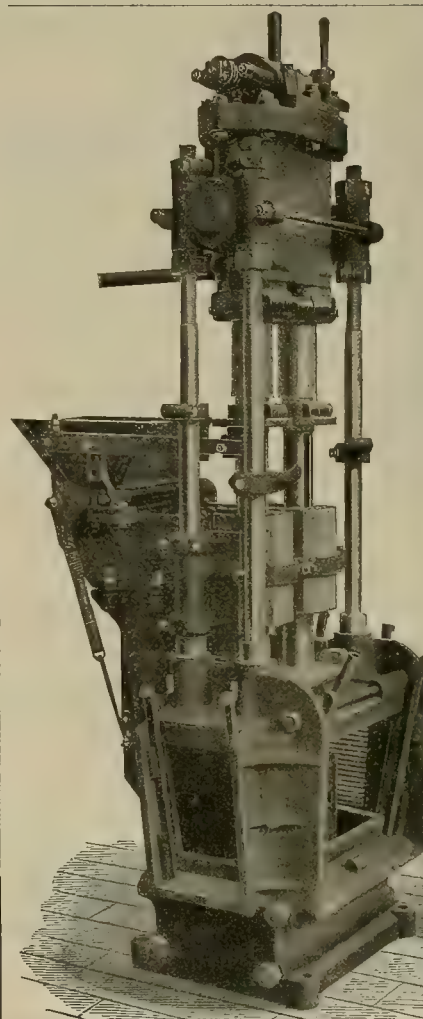
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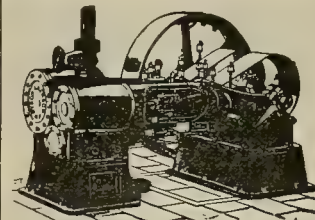
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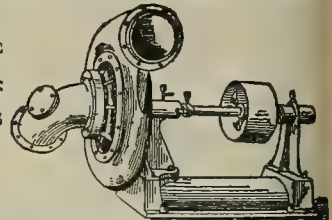
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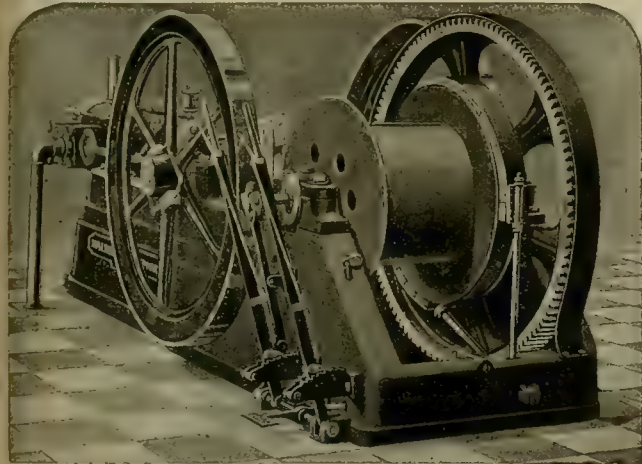
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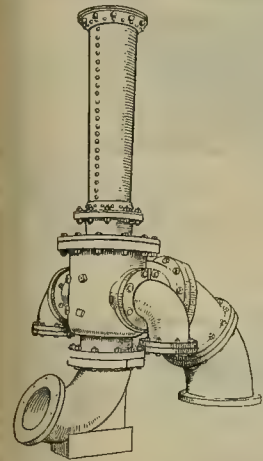
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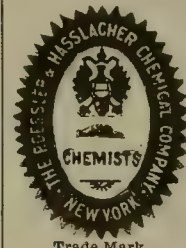
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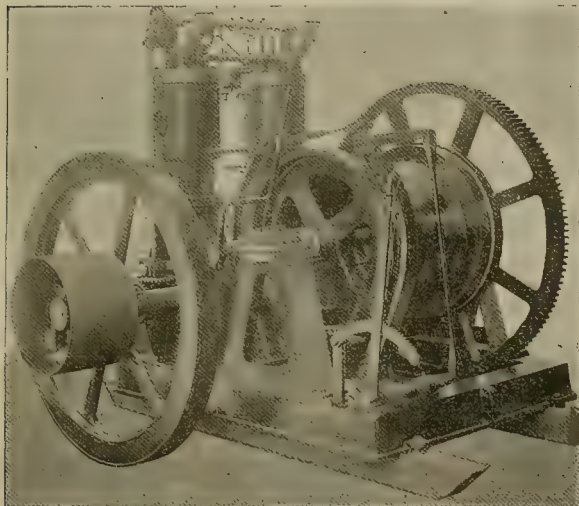
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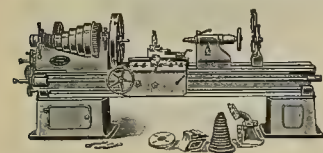
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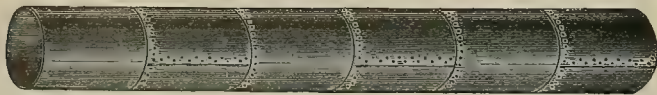
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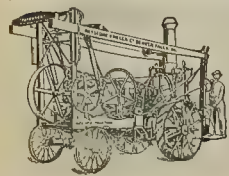
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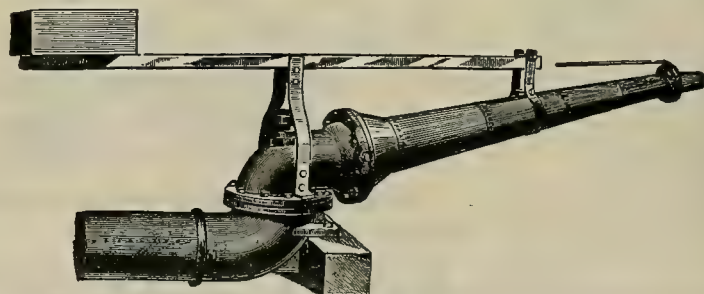
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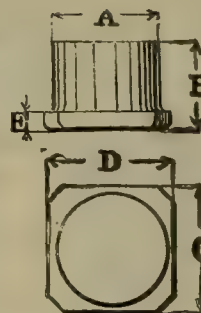
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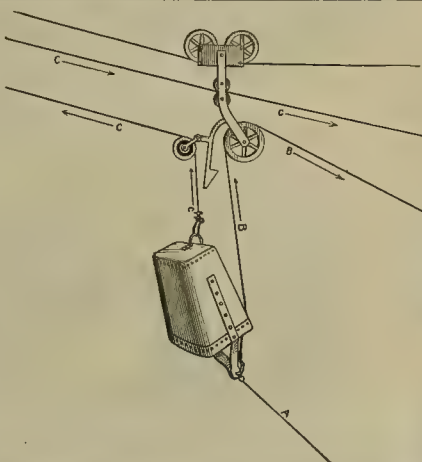
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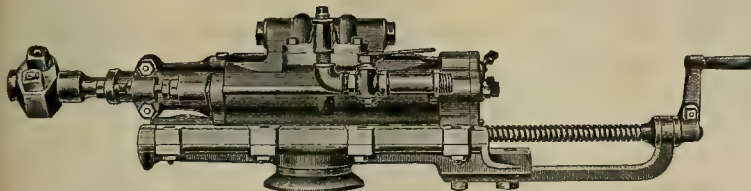
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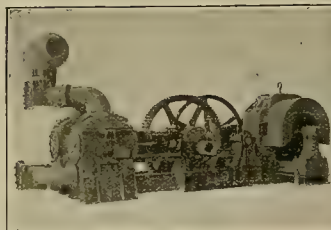
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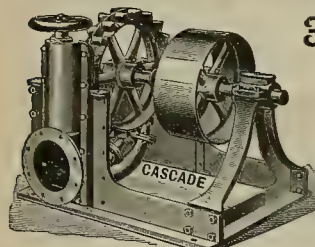
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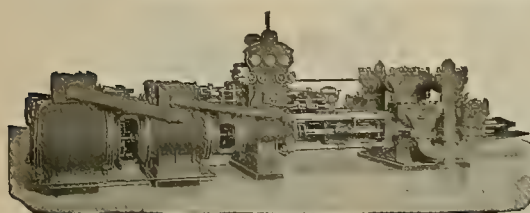
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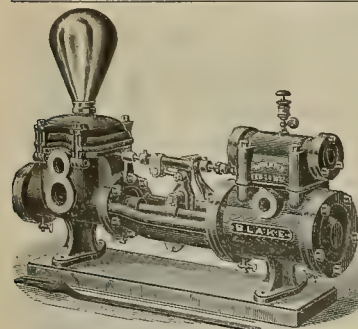
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AUTOMATIC ORE LOADER AND
AUTOMATIC DUMPING DEVICE.



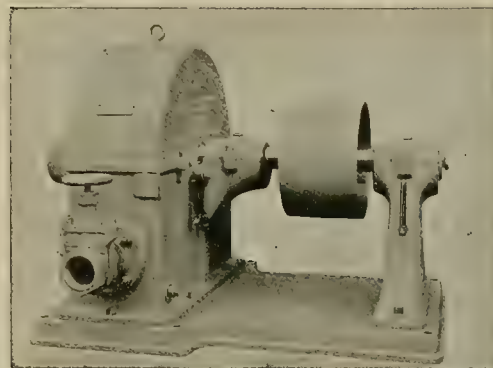
For Conveying
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EMPIRE, NEVADA, April 17, 1896.
Vulcan Iron Works.—GENTLEMEN: The Ropeway furnished by your company to convey tailings from Morgan Mill to Mexican Mill, a distance of seven-eighths of a mile, is giving entire satisfaction. We transport 200 tons of tailings in ten hours; one man does the whole business, including elevating tailings from hopper in the ground, operating Vulcan self-loader, and attending to the Ropeway generally. The self-dumper requires no attention whatever. The Vulcan loader I consider the best feature in the whole Ropeway, making it possible for one man to load 200 tons in ten hours.

Yours very truly, J. P. WOODBURY, Supt.

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Gives exclusive attention to the development and utilization of water powers by the most modern, economic and improved methods.

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Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.

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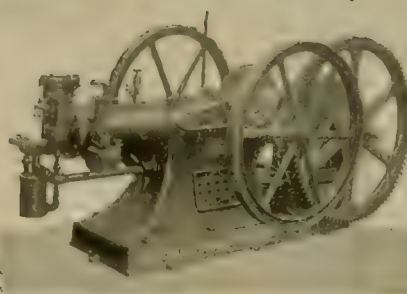
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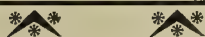
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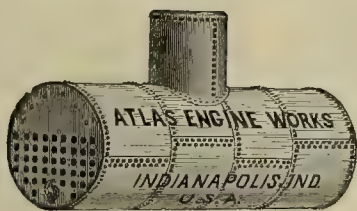
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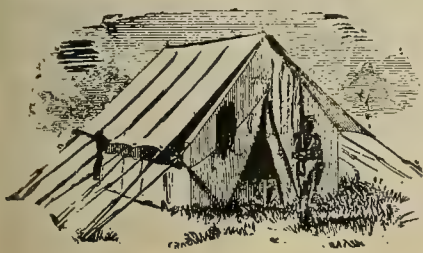
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Market Reports.

The Markets.

SAN FRANCISCO, Oct. 13, 1898.

SILVER.—London, 28d; New York, 59%; San Francisco, 60; Mexican Dollars, 47½@47¾. New York exchange, sight, 17½; telegraphic, 20 cents premium.

LEAD.—New York reports "unchanged;" \$3.87½ bid, \$3.90 asked. Local, pipe, 6@6½c; sheet, 6½@7c; pig, 5½c; bar, 6c.

COPPER.—New York reports Lake, \$12.25 @12.37½. Boston *Financial News*, on the copper situation, says it shows improvement. Heavy falling off in the visible supply abroad has been followed by steadily advancing prices in London. At the same time the visible supply of the metal abroad is now down to within a few tons of the lowest figure known since the records have been kept. Owing to the considerable disparity between the European and American scales of quotations foreign consumers have been pursuing a Fabian policy, holding back their orders in the vain hope that by so doing they would face a break in prices this side of the water. In their endeavor to buck against the immutable law of supply and demand they have been unsuccessful. Now they have given up the fight, and late London advices are to the effect that producers are placing heavy orders on a steadily advancing market. The small supply of the metal on hand, all in the control of three parties, assures a further continued advance in prices. There is practically no spot copper to be had. Not only are the companies sold way up ahead, but a number of them—notably the Anaconda and Calumet & Hecla—are believed to have sold more copper than they can deliver, and before many days must come into the ore market themselves as buyers of the metal in order to cover their deliveries. As many of these sales were made on a basis of 11½ to 12 cents, against a present market of 12½ to 12¾ cents, there is little wonder that powerful interests have been trying their best to hold down the copper market and prevent any "unwarranted further marking up the price."

IRON.—American, soft, \$20 and \$22 per ton; Scotch, \$23.

SPELTER.—5½@5½.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c; Bar, 19c.

ANTIMONY.—10, 10½.

BABBITT METAL.—10-12-14—best 16c.

QUICKSILVER.—Domestic, unchanged, \$41; export, \$37.00@37.50; carload lots, special rates. On the breaking out of the war with Spain, quicksilver advanced. It has since declined to \$41 a flask and is in good demand. This year has been a prosperous one with all the American quicksilver companies, which are largely owned in Boston.

POWDER.—F. O. B. San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1** 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8.00; Coos Bay, \$5.00; Seattle, 6.00; Southfield, 7.50.

Cargo lots, Eastern and foreign:
Wallend, \$7.50; Cumberland, \$9.00
Brymbo, 7.50; Cannel, 9.50
Pennsylvania, hd., 14.50; Welsh Anthracite, 12.50
Scotch, 8.00; Rook Springs, 7.60

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.12 per gal.; bbl., \$1.07; pure No. 2, cs., 85c; bbl., 80c; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.11; less than 200 gals., \$1.20; in bbls., 4c per gal. less than case; Baker's Crystal, \$1.50; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 43c; cs., 43c; raw, bbl., 41c; cs., 46c; lots of 5 bbls., 1c less; Lucol, boiled, bbl., 38c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17c; Astral, 17c; Star, 17c; Eocene, 19c; Extra Star, 21c; Elaine, 22c; Water White, bulk, in tanks, 11½c; Mineral Seal, iron bbls., 21c; wooden bbls., 23½c; cs., 26c; Mineral Sperm, 27c; Deodorized Stove Gasoline, bulk, 12½c; do., cs., 13c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½c; do., in cs., 16½c; Lard Oil, Extra Winter Strained, bbl., 55c; cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatsfoot Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs., 60c; Sperm, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31c per lb.; carloads, 29c; in 10-lb. tins 37c; sulphuric acid, 2½c per lb. 66% B.

soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½c per lb.; blue vitriol, 4½c per lb.; borax, refined, 5@6c per lb.; chlorate of potash, 9½@10c; roll sulphur, 2½c; alum, \$1.90@2.00; flour sulphur, French, 2½@2½c; California refined, 1½@1½c; nitric acid, in carboys 8c per lb; caustic soda, in 10-lb. tins 15c per lb.; Cal. s. soda, bbls., 65c; sks., 60c @ 100 lbs; chloride of lime, spot, 2.10 @2.25c; salt peter, 15c; chlorate of potash, 25c; caustic potash, 12c.

CANDLES.—Electric Light Candles—6s, 16 oz., 7½c; 6s, 14 oz., 6½c; 6s, 12 oz., 5½c; 6s, 10 oz., 4½c; Granite (Mining) Candles—6s, 16 oz., 8½c; 6s, 14 oz., 7½c; 6s, 12 oz., 7½c; 6s, 10 oz., 6½c. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8c; colored, 9c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.35; cut, \$2.25; 10 to 20d, wire, \$2.40; cut, \$2.30; 8d, wire, \$2.45; cut, \$2.35; 6 and 7d, wire, \$2.55; cut, \$2.30; 4 and 5d, wire, \$2.65; cut, \$2.40; 3d, wire, \$2.80; cut, \$2.55; 2d, wire, \$3.05; cut, \$2.95. In carload lots, 10c per keg less.

Mining Share Market.

SAN FRANCISCO, Oct. 13, 1898.

"Sell what you have if you wouldn't buy it if you didn't own it," seems to be a present effort in the stock market. The shorts seem in the ascendancy. Assessments have been levied by a few of the companies to raise their pledged pro rata of the proposed pumping fund.

San Francisco Stock Board Sales.

SAN FRANCISCO, Oct. 13, 1898.

9:30 A. M. SESSION.

| | |
|----------------------------|---------------------------|
| 200 Best & Belcher.....18c | 100 Mexican.....16c |
| 100 Caledonia.....20c | 500 Ophir.....51c |
| 500 Ollar.....10c | 200 Sierra Nevada.....77c |
| 900 C. Cal. & Va.....71c | 300 Union Con.....20c |
| 100 Gould & Curry.....16c | 800 Yellow Jacket.....17c |

2:30 P. M. SESSION.

| | |
|----------------------------|---------------------------|
| 400 Ophir.....52c | 300 Crown Point.....11c |
| 200 Mexican.....15c | 500 Yellow Jacket.....13c |
| 400 Gould & Curry.....18c | 100 Belcher.....08c |
| 700 Best & Belcher.....18c | 400 Sierra Nevada.....79c |
| 300 Con. Cal. & Va.....72c | 300 Bullion.....02c |
| 200 Savage.....08c | 400 Overman.....02c |
| 100 H. & N.....08c | |

Commercial Paragraphs.

THERE are now in course of construction for the Associated Gold Mines of Western Australia, Ltd., four of the largest size Ropp straight line furnaces. They are each 150 feet long by 14 feet wide, and the combined capacity will be about 200 tons per day. Their purpose is to roast the rich sulphide ores of the company, and prepare them for subsequent treatment. The Ropp furnace, since its introduction into Australia by Parke & Lacy Co. of Sydney and San Francisco, has been steadily gaining favor. The Broken Hill Proprietary Co., Ltd., made the first installment in Australia two years ago; and the two 150x14 feet furnaces, which were then erected, have been recently supplemented by a further installment of two others of similar capacity. The Mount Morgan Gold Mining Co., Ltd., has also a 105x11 feet furnace in operation. The principal features claimed for the Ropp are large capacity, economy and simplicity.

Acetylene Gas.

A handsome new illustrated catalogue will tell you where and by whom the new light is being used, and what the verdict is. Mailed upon application. **PACIFIC ACETYLENE GAS CO.,** 115 New Montgomery St., San Francisco.

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Death of proprietor. **PETALUMA MACHINE SHOP, FOUNDRY AND PATENTS.** Will take city property in exchange. **SANFORD BENNETT, 17 & 19 Beale St., San Francisco.**

Mine and Mill Superintendent

Will be open for an engagement Nov. 15, '98. Highest References Furnished.

Can also do Mine Surveying, Mapping and Assaying. Competent to take full charge of a gold, silver or copper mine anywhere.

As to terms, qualifications, etc., address H. I. Mining and Scientific Press Office, San Francisco.

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Position as Mine and Mill Superintendent.

Thoroughly practical. Highest references furnished. California preferred. Address L. care of Mining and Scientific Press, San Francisco.

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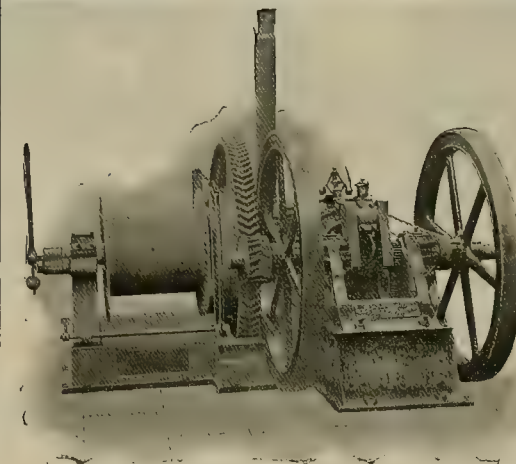
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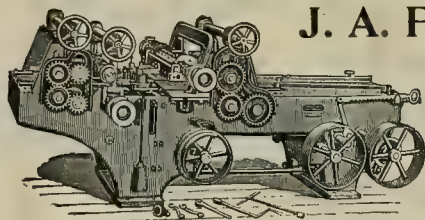
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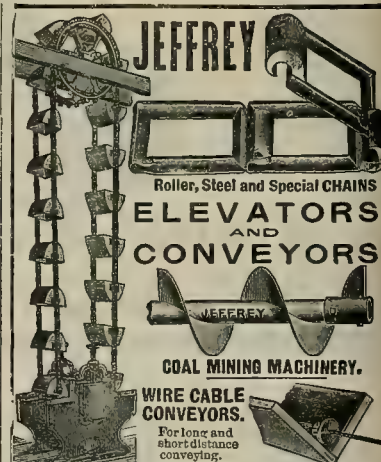
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Assessment Notices.

EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Forest Hill, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 12th day of September, 1898, an assessment (No. 13) of one-half cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Nos. 1209 11 Claus Spreckels building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of October, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 1st day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. J. CRAWFORD, Secretary.
Office—Nos. 1209-11 Claus Spreckels building, San Francisco, California.

MARINA MARISCANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of September, 1898, an assessment (No. 13) of 2 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 31st day of October, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 21st day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
CHARLES BOVONE, Secretary.
Office—217 Sacramento street, San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of October, 1898, an assessment (No. 21) of three (3c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of November, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 28th day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
CALVERT MEADE, Secretary.
Office—106 Leidesdorff street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of October, 1898, an assessment (No. 11) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 237 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of November, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 5th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
F. METTMANN, Secretary.
Office—237 12th street, San Francisco, California.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 22nd day of August, 1898, an assessment (No. 4) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 916 Market street, Room 57, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 3rd day of October, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 31st day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
GEO. W. FLEISSNER, Secretary.
Office—No. 916 Market street, Room 57, San Francisco, California.

POSTPONEMENT.
By order of the Board of Directors of the National Cons. Mining Co., the day of delinquency of the above assessment has been postponed to November 1st, 1898, and the day of sale to FRIDAY, November 25th, 1898.

Office—No. 916 Market street, Room 57, San Francisco, California.

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DELINQUENT SALE NOTICE.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Riverside County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 11) levied on the 10th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------------|-----------|-------------|---------|
| W. H. Bailey, Trustee..... | 260 | 2,000 | \$30 00 |
| W. H. Bailey, Trustee..... | 261 | 2,000 | 30 00 |
| W. H. Bailey, Trustee..... | 262 | 10,000 | 150 00 |
| C. A. Bailey..... | 133 | 1,000 | 15 00 |
| C. A. Bailey..... | 135 | 1,000 | 15 00 |
| C. A. Bailey..... | 136 | 1,000 | 15 00 |
| C. A. Bailey..... | 138 | 500 | 7 50 |
| W. H. Bailey, Jr..... | 159 | 2,000 | 30 00 |
| C. A. Bailey..... | 210 | 4,532 | 67 98 |
| R. L. Cheney, Trustee..... | 245 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 246 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 247 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 248 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 249 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 250 | 250 | 3 75 |
| R. L. Cheney, Trustee..... | 251 | 2,500 | 37 50 |
| R. L. Cheney, Trustee..... | 252 | 1,000 | 15 00 |
| R. L. Cheney, Trustee..... | 253 | 3,000 | 45 00 |
| W. H. Bailey, Trustee..... | 259 | 7,300 | 109 50 |
| W. H. Bailey, Jr..... | 147 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 148 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 149 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 150 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 151 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 188 | 2,500 | 37 50 |
| W. H. Bailey, Jr..... | 208 | 4,000 | 60 00 |
| W. H. Bailey, Jr..... | 209 | 532 | 7 98 |

And in accordance with law, and order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 508 Safe Deposit building, San Francisco, California, on TUESDAY, the 1st day of November, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office—Room 508 Safe Deposit building, San Francisco, California.
R. L. CHENEY, Secretary.

To Our Customers and Friends on the Pacific Coast:

Through frequent complaints made to us, we have learned that unprincipled and dishonest dealers on the Pacific coast have counterfeited our trademark numbers and substituted inferior, spurious goods as ours, when ours were distinctly ordered, thus defrauding the customers and injuring our trade and reputation.

Our goods are acknowledged to be the best, and are fully warranted by us, and are marked with our name or initials or with our well-known trademark and catalogue numbers.

We request direct notice if any goods alleged to come from us, or bearing our trademark or numbers, prove to be other than the best, and perfect in every respect, as we will follow up and expose such frauds for our customers' and our own protection. We have no exclusive agents on the Coast, but our goods are obtainable from all respectable dealers in drawing materials, stationery, hardware, artists' material, etc. Respectfully,

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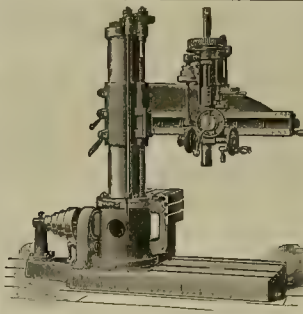
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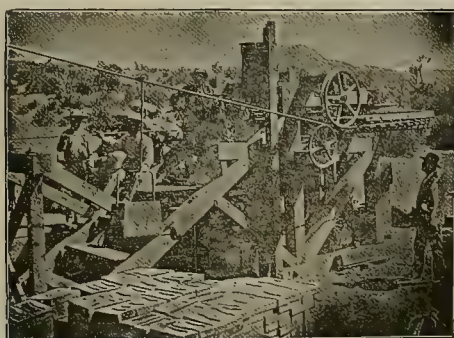
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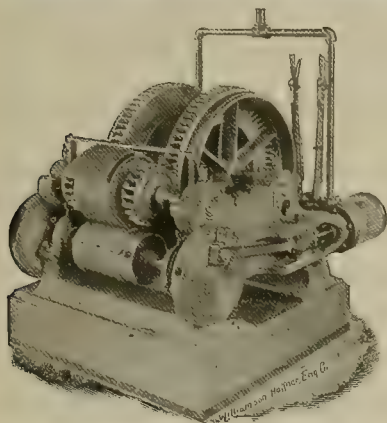
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Mining Machinery & Supplies.

Sole Licensee for the Manufacture and Sale of the

ROPP STRAIGHT LINE FURNACE

FOR ROASTING, CHLORINATING AND DESULPHURIZING ORES.

Extracts from Letters Received from Mr. Philip Argall, Manager the Metallic Extraction Co., Cyanide, Colorado:

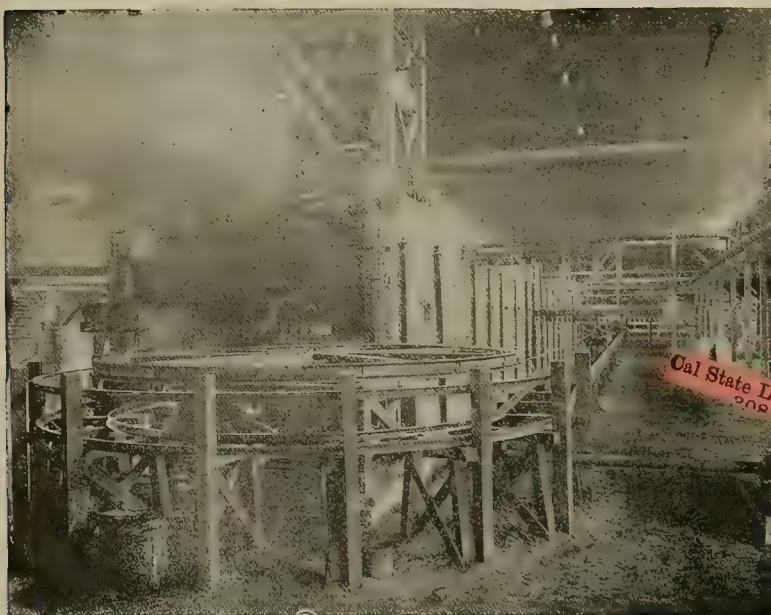
"The roasting is invariably good. We can do 80 tons per day to 0.13% sulphur, when everything runs smooth. Our month record which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.16%." January 2, 1897.

"The furnace is now running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it." February 19, 1897.

"For 24 hours ending 7 A. M. to-day 102 tons were roasted."

The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, Utah (one furnace); The Metallic Extraction Co., Cyanide Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, Colo. (three furnaces); The Selby Smelting & Lead Co., Selby, Cal. (two furnaces); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); Broken Hill Proprietary Co., Broken Hill, New South Wales (four furnaces); Puget Sound Reduction Co., Everett, Washington; Colorado Ore Sampling & Reduction Co., Cripple Creek, Colo.; Consolidated Kansas City Smelting & Refining Co., for the Arkansas Valley Smelting Works, Leadville, Colo.; Robert Lanyon's Son's Spelter Co., Iola, Kansas (two furnaces); Mountain Copper Co., Ltd., Keswick, Cal.

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in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness. 50 Cents a Copy.

MINING AND SCIENTIFIC PRESS, 330 Market St., San Francisco, Cal.

MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1998.—VOLUME LXXVII.
Number 17.

SAN FRANCISCO, SATURDAY, OCTOBER 22, 1898.

THREE DOLLARS PER ANNUM.
Single Copies, Ten Cents.

Restraining Barriers.

In '93 California appropriated \$250,000 to build restraining barriers against further advancement of debris in Sacramento valley river beds, contingent upon the appropriation of a like amount by the federal legislature for that purpose. In June, '96, such appropriation was made. This entire work and the expenditure of the half million dollars jointly appropriated is solely under the direction and control of the members of the U. S. Engineer Corps constituting the U. S. Debris Commission. The intent is to impound mining debris and thereby protect the navigable streams of California. Various reports have been made by the Debris Commission, and from a consensus of official opinion the conclusion has been reached that near The Narrows, in the vicinity of Smartsville, Yuba Co., Cal., on a tributary of the Sacramento river, is the most suitable site for the construction of the proposed work. Since the passage of the federal act preliminary investigations have been made there—prospecting, calculating, estimating, boring, etc.,—and the Commission is now in possession of sufficient information to determine how best to begin the work of construction, its approximate cost and accompanying details.

Investigations and surveys at The Narrows dam site have been in progress without interruption, under the direction of Assistant Engineer Hubert Vischer, from the middle of November, '97, to the beginning of last month to determine the depth of the tailings in the bed of the river, the configuration and character of the bedrock and sides of the canyon, the country or formation being broken and such as required detailed investigation to determine the actual



APPARATUS USED IN MAKING SOUNDINGS, BY BORING AND SUCTION PROCESS.

termine the feasibility and cost of a diversion project, by means of which detritus might be conveyed and stored on the plains. Plans and estimates are being prepared and it is expected that a report will be ready to present for the consideration of the Commission, covering the question of storage by means of a dam at The Narrows, about November 1st. But there are methods of treatment other than the one at present under consideration, which will undoubtedly be investigated by the Commission before final conclusions are reached, and surveys are being now made for this purpose.

Little official information has been hitherto given concerning this work, the Debris Commission, in accordance with established custom, deeming it in keeping with the courtesy due the Congress of the United States to first submit its report to that body.

In the work of boring, pebbles three inches in circumference were brought from a depth of 80 feet by the suction process of the boring machine. Pieces of boulder and whole boulders are also among the detritus, of which the Commission has preserved samples. Pieces, too, of the pipe and broken parts of the casing are preserved, showing in a measure the obstacles encountered in the search for bedrock through the tailing pile. The country where these soundings were made, known as The Narrows, is wild though picturesque, and rocky. The gorge is 300 feet deep, from the bed of the tailings to the top of the canyon. The steep hillsides are rocky and dangerous, and amid such rough formations of country the engineer and his employes have diligently carried on their work for many months. The maps, designs and contours prepared for the Commission and for Congress are an exhaustive piece of work and illustrate thoroughly the



THE NARROWS, WHERE SOUNDINGS WERE TAKEN.



RIVER BED, AND EMBANKMENT 300 FEET HIGH.

conditions. In course of the work some twenty-five test holes or borings to bedrock have been made, showing depth ranging from 50 to 85 feet of gravel. To execute this work it became necessary to devise special apparatus, of a novel and interesting nature, there being no well-boring device in use which would have been applicable to the conditions. The depth of

the tailings make the foundation a serious problem and add so much to the expense of the dam that within the limits of the present appropriation only a dam of moderate height could be constructed, the storage of which in the canyon itself would be limited however. Going hand in hand with this project a further project has been under consideration to de-

magnitude of the work accomplished, and that to be considered, in preparing suitable storage reservoir for the detritus. The three accompanying illustrations are from photographs taken by Major W. H. Heuer of the U. S. Debris Commission, and graphically depict the nature of the country and the novel devices used by Mr. Vischer for boring.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....Publisher

San Francisco, October 22, 1898.

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A LETTER from South Africa states that on the Rand the gold mining companies are coming to the conclusion that the only permanent and satisfactory solution of the native labor question is to employ machines and skilled white men to manipulate them, and that air compressors, rock drills and electrical plants will be in increased demand in that region.

COLORADO'S GOLD YIELD for '98 promises to outdo its last year's record. The temporary setback to California's gold product by the drought of '98 may prove of ultimate benefit, as the enforced idleness of the stamps was utilized in extensive repairs and betterments, so that at the beginning of this rainy season the mills, and, in many instances, the mines are in better shape for satisfactory gold output than they had been.

In the issue of the 1st inst., in an illustrated description of the U. S. floating machine shop Vulcan, the repair ship which rendered such effective service at Santiago, this paper suggested that it would now be in order for the U. S. Government to equip a similar vessel on this coast and send it to Manila. A note from Washington, D. C., says that such action has been determined upon, and that a vessel similar in equipment and purpose to the Vulcan will be fitted up at the Mare Island Navy Yard for the purpose suggested.

INQUIRIES are still received regarding the possibilities for prospectors in the Yaqui country. It is said that disappointment is the portion of nearly all who have gone there. The glittering tales are mostly from men interested in travel thereto. "The Yaqui country," which is the valley of the Yaqui river, can be reached from Guaymas; the upper eastern tributaries of that river being easiest reached from Casas Grandes, Chihuahua, Mexico. Undoubtedly placer gold is to be found in that region but not in sufficient abundance to justify serious thought of going there.

TO REACH 25,000 mining men, which is best: to put an advertisement in each of 25 different papers—25 advertisements in all—or 1 advertisement in the 1 paper that these 25,000 men see every week? Why pay more for a thing than it is worth? Or why throw good money away on "official programs," "souvenir editions," and other similar schemes that give no return? Economy in advertising is like economy in everything else—judicious expenditure of money, and the man who wants the worth of his money naturally looks for results, which are the only test of value.

UNDER the stress of competition and the present low prices, the business of manufacturing mining machinery is not a very profitable one, but the recent failure of the leading concern of that kind in

British Columbia occasioned a surprise that is mitigated by some published details of that firm's financing. From the statement referred to it appears that in '95 the company declared a 10% dividend, though owing a local bank \$9640.82; in '96 they paid a 6% dividend, and also \$6002.62 interest. On May 31st, '97, the book debts amounted to \$69,616.11, and bills receivable aggregated only \$124.47; interest paid, \$7749.87. The company report refers to this, which, it says, "will show in itself that there is yearly a 7% dividend waiting for the investment of another \$100,000 in the concern." After a perusal of a few items and statements such as those, failure is not so inexplicable. Such management as that would upset any business in Vancouver, B. C., or anywhere else.

In deep mining heat generated by oxidation is often a factor in determining action, thought not always a permanently deterring one. At Sandhurst, Victoria, it was noticed several years ago, that while, as ordinarily, the temperature increased as depth was attained, the depth was not a regular factor in the increase. It was found to be subject to the amount of pyrites in the ground, and to the time drives in which the temperatures were taken had been opened up. It was ascertained that a fall in temperature of 5° occurred after the ground had been opened up for one year, and it was assumed that this was due to the loss of heat in consequence of the decrease in oxidation. After the ground had been opened up for four years the temperature became nearly permanent. The reefs and sandstones of that region are, however, more than ordinarily free from sulphurets.

THE gib crane of Mare Island, Cal., Navy Yard is an object lesson in the advance of engineering and mechanics. Its working capacity is forty tons at a 75-foot radius. Without reversing or stopping the engine it is capable of hoisting, lowering, turning, traveling simultaneously or independently, and is so arranged by differential gearing that the speed of the outside wheels automatically adjust themselves to the increased radius of the curvature over the inner rail. The traveling speed of the crane is 50 feet per minute; speed of hoisting forty-ton loads, 7 feet per minute; speed of hoisting fifteen-ton loads, 15 feet per minute; speed of slewing or revolving complete circle, two minutes. All gears are of steel. Gauge of track, 20 feet; total width of car body, 24 feet; height from ground to highest point when boom is elevated, 54 feet; weight of the crane, 200 tons; weight of the counter-balance, 120 tons; hoisting steel cable, 1 $\frac{5}{8}$ diameter; breaking strain, seventy-six tons. The entire crane rests upon twenty double-flanged wheels, two of the wheels being drivers, and all of the wheels being so pivoted that the crane travels around the very sharp curve of 66 feet radius.

RECENT Amsterdam experiments on babbitt and other anti-friction metals by Behrens & Baucke are of mechanical interest. By slow cooling this alloy—tin 82, antimony 9, copper 9,—split up into compounds of different fusibility. By pressure between hot iron plates a metallic mother liquid was squeezed out; the remaining cakes of crystalline metal were treated with hydrochloric acid and washed with water. An alloy, containing copper 90 parts, antimony 10 parts, on being thus treated, yielded the same cubic crystals as babbitt metal. In babbitt metal the copper forms brittle needles of whitish bronze containing no antimony. Such bronzes show less stability than the compounds of tin and antimony. From an alloy of 90 Sn 10 Cu, the compound Cu Sn was obtained. Repeated heating and cooling brought the percentage of copper up from 35 to 58. Microscopical examination of bearings show that bronzes heated by running were poor in cubic crystals of the compound Sb Sn₂. Babbitt metal is made amorphous by casting in cold molds. Axles running on such metal get tinned; this leads to sticking and heating; re-crystallization sets in, and liquid tin is squeezed out; while a compact layer of crystals is formed on the axle. Microscopical examination of the metallic deposit from the lubricating oil led to the unexpected result that metal with crystals of moderate size will develop ball-bearings. Tin is ground to a fine dust by the sharp fragments of the bronze needles, the hard cubes of Sb Sn₂ are

rounded, undermined, and finally worked up into something like metallic pebbles of microscopical size. Similar spheroids were obtained from the bearings of another anti-friction metal and of aluminum brass, but not from ordinary brass, nor from gray cast iron.

CONSIDERABLE editorial space has been conceded the extraordinary Australian hydraulic project of carrying water through 328 miles of pipe for the Coolgardie district. The scheme has attracted the attention of engineers everywhere on account of its magnitude and the manifest obstacles. California firms bid with others on the contract. It is of interest to note therewith that, according to the *Australian Mining Standard* of the 15th ult., the Australian Government has decided to accept the bids of G. and C. Hoskin of Sydney and M. Ferguson of Melbourne and Perth as contractors. The Government has resolved to use nothing for the whole distance but Ferguson's seamless pipes, thus doing away with the original proposal to use riveted pipes. The aggregate amount of Hoskin's and Ferguson's bids was \$4,680,000, the original estimate for this branch of the work having been \$5,485,000. Under the new arrangement the total of the two bids will be \$5,125,620. Altogether 61,852 pipes will be required, each 28 feet in length, with a diameter of 30 inches. The work of making these pipes will be equally divided between the two firms named. It is considered that using only the seamless pipes will mean a decreased friction, thus lessening the cost of pumping.

THE existence of large lignite deposits lends local interest to recent experiments reported by the superintendent of the Houston & Texas Central Railway, who describes the results obtained from the use for fuel of lignite, large beds of which are near the main line of that road. Experiments were first made by burning lignite under the boilers at water stations, and later it was found economical to use it at the car shops, the creosoting plant, and under all stationary boilers. By changing the draught appliances it was found that lignite alone could be burned on switching engines, and that a mixture of about equal parts of lignite and coal was suitable for road engines. The fuel records of this road show that in January, '96, in all classes of service, the locomotives made 29.9 miles per ton of coal, at a cost of 11.06c per locomotive mile; while in January, '98, corresponding figures are 28.3 miles per ton of coal, costing 6.41c per mile, or a reduction of 4.65c per locomotive mile. The following comparative figures by years were also given: Average cost of fuel per locomotive mile—'94, 9.55c; '95, 7.99c; '96, 7.68c; '97, 6.54c. The use of lignite was begun in '95. He also states that the expenses for repairs to flues, staybolts and fireboxes have decreased since lignite had been used for locomotive fuel.

An article in the issue of July 30, on California hydraulic mining and, incidentally, "drift mining," a form of securing gold indigenous to California, has elicited numerous inquiries as to the feasibility of success therein, the likelihood of success attending investment in that kind of mining, etc. Few gold mines anywhere and fewer other systems of mining have made bigger money for their followers than drift mining; and the millions extracted are but an index to the amount remaining. This, in the *MINING AND SCIENTIFIC PRESS*, sounds extravagant and hardly in keeping with its careful utterances; but it is the sober truth. Of course, the obvious question occurs at once: "If so, why are these mines not worked?" It is a difficult task to compress a mountain into a nutshell, and as difficult to even briefly outline in small space satisfactory answer. One present reason is that the gold lies in "ancient river channels" heavily capped with lava; that the present owners are mostly poor; that to even reach the channel requires heavy outlay, and that, ordinarily, investors find more immediate return for their money in other ways—not, relatively, as profitable, but giving promise of more immediate return. Not often can be found California miners possessed of such ability as that recently shown by F. Chappet of San Francisco, who was able to secure capital and spend \$150,000 in driving a tunnel over 5,800 feet. The investment paid handsomely, but, while such opportunities abound, few have the money or the nerve to make such splendid success of the project.

Concentrates.

ELIZABETHTOWN, N. M., calls loudly for a custom mill.
VANCOUVER, B. C., wants to establish a mining stock board.
A CYANIDE PLANT is being put in at Yucaipa, San Bernardino Co., Cal.
OVER 2800 electric lights will illuminate Dawson City beginning Nov. 1.

COPPER producers say the metal costs from 5½ to 7½ cents per pound to produce.

THE net profits of La Fortuna mine at Yuma, Ariz., are said to be \$50,000 a month.

THE Old Dominion Copper M. & S. Co., at Globe, Arizona, employs over 300 men.

LOS ANGELES men propose building a copper smelter at San Diego, Cal., of forty tons daily capacity.

REPUBLIC, Wash., miners this week sent \$230 as a gift from that camp to help swell the Olympia fund.

COPPER 80 lbs., tin 12 lbs., lead 8 lbs., silicon copper 2½ lbs., make a fine bearing metal for heavy brass stock.

SOME Slocan, B. C., mines still ship their ores to Aurora, Ill., for treatment at a freight rate of \$19 per ton.

IN the underground workings of the Copper Queen mine at Bisbee, Ariz., there are over sixty miles of car track.

GOV. MURPHY writes that Arizona has now a population of 100,000. That Territory should be granted statehood.

THE California State Mining Bureau will soon move from its present quarters to the San Francisco ferry depot.

THE monthly payroll last week of the Geyser-Marion mine at Mercur, Utah, to employees alone, amounted to \$17,000.

OVER 1000 mining locations have been made in the Goat River district, British Columbia, the past twelve months.

SILVER's highest and lowest London quotation in '91 was in Feb.—46½d and 41½d respectively; in '93, June—38½d and 34½d.

IN Great Britain ores and mattes are sold by a ton known as the "miners' ton," which consists of 21 cwt. of 112 lbs. each, or 2352 lbs.

CAKORUNDUM, a new abrasive, was discovered by E. G. Acheson, in 1891, and is manufactured in large quantities at Niagara Falls, N. Y.

THE production from silver-lead mining in Monterey, Mexico, is said to have increased in ten years from 1000 tons to 10,000 tons per annum.

THE largest pump in Montana is being put in at the Butte & Boston. The water cylinders are 17 in. diameter, 21 in. stroke; total weight, 70,000 lbs.

IN old bonanza days Con. Cal. & Va. ore averaged 54% silver and 46% gold yield. Of recent \$15,696.30 bullion yield, \$6366.83 was in gold and \$7329.42 silver.

HIDDEN in the city dump pile at Leadville, Colo., fifty sacks of ore were discovered last week that aggregated \$110,000, stolen from the various mines.

MINING men visiting San Francisco are cordially invited to visit the MINING AND SCIENTIFIC PRESS office where all may see their home papers, etc.

A REPORT from the California mine superintendent who used 1400-lb. stamps in his mill is to the effect that he found 1000-lb. stamps more satisfactory.

THE Tuolumne, Cal., Independent visits deserved censure on those who tend to injure the mining prospects of that county by dishonest schemes and dealings.

CONSIDERABLE development work is being done in Rhodesia, S. A. On four mines 120 stamps have been placed. Supplies cost about the same as on the Rand.

"YOUR paper has more facts and fewer 'opinions' than any other of which I know," is the criticism received from an Arizona mine superintendent this week.

THE Everett, Wash., smelter has appealed to the United States Court to secure a reduction of a little over \$1000 in duties on 1,500,000 pounds of lead ore.

THE total heat in one pound of steam at 90 pounds absolute or 75 pounds gauge is 1179.6 heat units; with steam at 100 pounds absolute, the total heat is 1181.9.

COLORADO calculates that in '97, 37% of the mining returns went to the investor, 36% to the miner and 27% to the mills and smelters and transportation companies.

THE 7th annual convention of the California State Miners' Association will be held in San Francisco, Nov. 21st. So far but few county delegations have been named.

THE electric power plant at the Homeward Bound shaft and pump of the Omaha mine at Grass Valley, Cal., was put in operation last Saturday and works successfully.

W. F. PIERCE, Pres. Blue Lakes Water Co., says the contemplated electric power line will be completed from Blue Lakes to Stockton, Cal., and be ready to deliver power next January.

THE August gold production of the Rand, S. A., in '95 was 203,573 ozs.; in '96, 213,418 ozs.; in '97, 259,603 ozs.; in '98, 376,911 ozs. Of this, in '98, the deep-level properties furnished 80,000 ozs.

AT the April Fool mine, DeLamar, Nevada, 60% of the gold in the ore is extracted on the plates, the residue cyanided. It is expected that the \$400,000 option on the property will be taken up by Dec. 1st.

AN electric railway from Colorado Springs, Colo., to Cripple Creek, via Manitou, is to be built. The electric railway now in operation between Cripple Creek and Victor is believed to be the highest in the world.

THE appearance of the ore vein at the deepest working of the Wedge mine (415 feet), Randsburg, Cal., encourages the belief that deep mining will prove as profitable there as in central and northern California.

MARCUS DALY wants the Washoe Company's new smelter built at or near Anaconda, Montana. J. B. Haggin wants it built as a starter for a new mining town on the Big Hole river at the junction of Camp Creek.

AT Sudbury, Ontario, the nickel ore is crushed, roasted, and then smelted in water-jacketed furnaces, the charge being eight tons roasted ore to one ton coke, resulting in a 15% nickel matte, exported for refining.

THE unlikely story is floating round that the Carson & Colorado Narrow Gauge Railroad is to be extended from Keeler, Cal., its present terminus, to Mojave, "to connect with the Southern Pacific and Santa Fe systems."

AT Sunshine, Utah, D. Hickman, in the Overland mine, was injured last week by the explosion of a shot that had failed to

go off when set. He was on the lookout for it and used the pick in its search. His face was badly cut with bits of stone and his right eye was destroyed.

THE relative dissolving powers of different gold solvent solutions is stated as follows: Chlorine, 1% solution, 1½ hours, 4.49%; bromine, 1% solution, 1½ hours, 6.46%; cyanide, 1% solution, 1½ hours, 0.57%—60° C. in each case.

IN the mines of Houghton county, Michigan, there are 10,400 men on the payroll, which is 1700 more than were employed at this time last year. Mine Inspector Hall estimates that 2000 more will be employed at this date next year.

SUPT. MARTIN of the Fortuna mine, near Yuma, Arizona, says that their cyanide experiments, conducted to determine the best methods for the treatment of their tailings, "have demonstrated the superiority of the percolation method."

IT will be forty years next January since gold was discovered in Colorado. Since then gold to the aggregate of three hundred million dollars has been mined. Since the gold discovery of '48 California's gold output aggregates thirteen hundred million dollars.

JUST 38 years ago the MINING AND SCIENTIFIC PRESS offered "a reward of \$5000 for a mode or process of separating the gold from the sulphurets" in California. This scrap of ancient history is suggestive and illustrative of the generation's progress in scientific mining.

AT Aspen, Colo., the electric current supplied from a small power house at the Mollie Gibson mine is used in the operation of an underground railway connecting that mine with the Argentum Juniata mine, and furnishes surface and underground lighting for both properties.

SLOCAN ore, all things considered, says the Sandon, B. C., *Paysbreak*, is paying the highest treatment charges in the world. This is not because the galena ore is more difficult to handle, but simply because the smelter men, like the railroads, charge all the traffic will stand.

MR. ORR of Salt Lake City, Utah, says that at the Chloride Point mine, Mercur, Utah, silver is being produced at a cost of 23 cents per ounce, so that at even present quotations there ought to be some hope yet for some Utah and Colorado big silver producers. Mr. Orr's assertion is an extremely interesting one.

EVERY considerable mine should have an accurate plat of all its underground workings, brought up to date by a competent engineer at least once a month, as a measure of economy. In case of adjacent mines working on the same vein, or where water is liable to be encountered, the need for such accuracy is even more manifest.

QUATSINO district, British Columbia, mine owners figure closely on \$16 ore sent to Swansea, where they get \$1.50 per unit for copper and all the gold and silver. Figuring \$9 for the copper, \$1 for the gold, and \$3 for the silver, and deducting \$5 freight and \$5.50 for treatment, leaves \$5.50 to the miner for all expenses of extracting the ore and delivering it on the ocean vessel.

"WATER GAS" is made by passing steam through anthracite coal heated to incandescence, the resultant gas passing to a carburetor where it receives the necessary hydrocarbon from petroleum. In a third cylinder the superheater raises it to a high temperature and frees the gas from smoke. Passing through conduits in which it is freed from sulphur, ammonia, etc., it is ready for use.

THE placer gold of Cariboo and Lilloet, and the Fraser and Thompson rivers, B. C., varies from \$15 to \$18.50 per ounce as a rule. Coarse gold is worth more than fine, and amalgam gold, or that saved by amalgamation with quicksilver, is not worth as much as that which is saved without amalgamating, as no matter how dry amalgam is squeezed and how well it is burned afterwards, a little impurity remains.

IT is locally reported that the Allison Ranch mine, Grass Valley, Cal., will install electricity so soon as the power company has completed the two generators in process of being placed. This mine will then be equipped with electric, steam and water powers, so arranged that all can be used with a combined force, or any one independent of the others. It is maintained that this is the only plant of its kind in existence.

A GOOD fire extinguisher for use in mine buildings, factories, machine shops, etc., may be made by dissolving twenty pounds of common salt and ten pounds of sal-ammoniac in thirty liters of water and filling the mixture in quart bottles of glass, securely corked and sealed. They may be thrown in and around the fire hard enough to break them, and if it has not gained too much headway, will extinguish the flames.

IN the Silver King mine, near Butte, Montana, the shaft is vertical to a depth of 75 feet, and from there to the bottom is an incline. With his candlestick in his hat, W. A. Waller was ascending the shaft; when he reached the junction of the incline and perpendicular, the engineer felt a jar, and applying the brake climbed down the ladder. He found Waller standing in the bucket with the candlestick pressed into his brain, dead.

THE twelve-wheeled mastodon locomotive, with cylinders 21x34 inches, drivers 55 inches, boiler 73 inches in diameter, total weight 212,750 pounds, total weight of engine and tender 308,750 pounds, for heavy freight service on the Montana division of the Great Northern Railroad, weighs, in running condition, over 106 tons. The length of the engine over all is 41 feet 4 inches, and the distance from the rail to the top of the smoke-stack is 15½ feet.

IT is difficult to secure sufficient data to enable builders of large water pipes to wholly and accurately determine the flow, friction, etc. R. G. Blaine, in his work on hydraulic machinery, on this point, says: "It is best to allow a margin for excessive friction, and to guard against repeating such an expensive mistake as that made recently at Newark (East Jersey Water Co.), where about 21 miles of riveted steel mains have to be duplicated."

AT the Sacramento, Utah, mine the gross cost of mining, milling, transportation and refining is stated by the manager to be \$1.04 per ton, "with possibilities of even further reduction." At the Sacramento one-third of a pound of cyanide is used per ton of ore; at the Daisy, Utah, four ounces per ton; at the Mercur, Utah, ten ounces per ton. A Montana paper says that some cyanide plants in that State "use a solution containing five or ten pounds of cyanide to the ton!"

COMMENTING on the recent notice in "Concentrates" of the fact that unpatented mining claims are arbitrarily taxed \$100, J. D. Ludwig tells the *Mariposa, Cal., Gazette* that "one reason why mining men do not like to prospect or sink shafts is that the prospecting hole is taxed what it costs to sink it.

This is a peculiar law; the money paid to laborers is taxed to the party who pays it. A hole in the ground while it adds value sometimes to the property, if gold-bearing quartz is hoisted through it, may take value away from the property by proving it valueless where the hole is sunk. A mine's value should not be determined by what it costs to prospect it. The expense of improving mines should be exempt from taxation."

OF the Witwatersrand, S. A., the *Statist* says that the deep-level companies which are crushing fire as good results as their respective outcrops, thus establishing the value of the main reef series of beds in depth. The actual profits realized and economies effected, in spite of want of assistance from the government, by most of the companies during the last half year establishes the dividend earning capacity of those mines situated on the central section of the Rand.

WHEN boiling hot water was encountered at a depth of 1700 feet in the Comstock, Nev., lode, miners figured that further down all matter was molten, but on passing the 3000-foot level in the shaft of the Combination, Yellow Jacket and Union Cos., the temperature decreased, it being more comfortable at the 3300-foot level than half way up to the surface. In the Lake Superior copper region there appears to be a cold zone, the temperature at 4700 feet being 79° F., but 20° warmer than at the 1st level.

THE principal varieties of mica are muscovite or white, phlogopite or amber and biotite or black, the last being of little commercial value. Most of it in this country comes from New Hampshire and North Carolina. The value of the deposit is the ability to get it out in large blocks and the fineness of its grain. There is a constant demand for it, but it must be in such shape as can be mined in blocks of considerable size and split into even sheets. Canada and India furnish mica in such quantities and at such low prices as to tend to keep down the domestic product.

THE Western Australian International Mining and Industrial Exhibition opens at Coolgardie, March 21st, '99, for ninety days. The object is to obtain a full display of mining and other machinery, and of all kinds of manufactures suited to the requirements of the mining, timber and agricultural industries of the colony. The government of the colony has agreed to frank all exhibits from the port of arrival, to and from Coolgardie, over their railways, and to treat the exhibition buildings as a bonded store, so that no charges will be made for freight or custom dues excepting on goods sold in the colony.

THE total production of lead in the United States during the first six months of '98 was 156,113 net tons, including soft lead, hard lead and the metal obtained by smelting foreign base bullion and ores in bond. During the first half of '98 there were exported 33,439 tons of lead from foreign base bullion refined in bond and 7308 short tons of lead from foreign ores smelted in bond. Reports from nearly all the important producers show a decline in stocks from 17,608 tons on January 1st to 16,760 tons on July 1st. The estimate of consumption for the first half of '98 is 118,767 short tons. Consumption is at the rate of 237,000 tons per annum.

FOLLOWING are two provisions of the law governing the cutting of timber on public lands: "No person will be permitted to fell or remove any growing trees of any kind whatsoever less than 8 inches in diameter. This will not be regarded as applicable to black or 'lodge pole' pine growing in separate bunches upon mineral land. Persons felling or removing timber from public mineral lands of the United States must utilize all of each tree cut that can be profitably used, and must cut and remove the top and brush or dispose of the same in such manner as to prevent the spread of forest fires." The penalty for such violation is in a sum not exceeding \$500 or imprisonment not exceeding sixty days, or both.

THE following table shows the flashing point of hydrocarbon oils used as lubricants:

| Deg. Fahr. | | Sp. Gr. |
|------------|---|---------|
| 318..... | Scotch shale oil..... | 865 |
| 330..... | Rosin oil..... | 985 |
| 330..... | Pale Russian petroleum oil, residuum..... | 910 |
| 330..... | Scotch shale oil..... | 875 |
| 348..... | Russian petroleum oil, pale..... | 896 |
| 358..... | Scotch shale oil..... | 885 |
| 376..... | Scotch shale oil..... | 890 |
| 384..... | Russian petroleum oil..... | 908 |
| 390..... | Pale Russian petroleum oil..... | 914 |
| 392..... | American petroleum oil, pale..... | 903 |
| 422..... | American petroleum oil, pale..... | 915 |
| 428..... | American petroleum oil, pale..... | 920 |

TO ASCERTAIN where the loss in sulphurets occur, a good way is to pass one of the 10,000-grain samples through a 60-mesh wire screen; weigh that which passes through and that which remains on the screen, and pan out each lot carefully by itself, from one pan into another, as long as sulphurets can be recovered; then weigh each batch separately. The use of 10,000 grains is recommended, as every 100 grains is 1%, and each grain is 1-100 of 1%; it is also a convenient size for obtaining accurate results. By using pulp samples instead of tailings the amount of sulphurets in the ore may be ascertained. If the sulphurets assay \$75 per ton, and the quantity per ton is 1.7%, the value of the sulphurets in one ton of ore is found by multiplying \$75 by 0.017, which would be \$1.27 per ton. If the loss of sulphurets in the tailings is 11 grains out of the 10,000 grains sample, and the value of the sulphurets is \$75 per ton, then multiply \$75 by 0.011, and the value of sulphurets in the tailings is found to be \$0.0825 (8¼ cents) per ton of tailings.

THE trustees of the Cal. State Mining Bureau have made their report for the two preceding years. The plan of State Mineralogist Cooper is outlined, hiring an assistant and making maps of the mineral resources of the State by counties. The trustees regret that the Legislature repealed the Act imposing a tax upon the transfer of the stock certificates of mining and other corporations, which yielded several thousand dollars per annum, and was expended directly in the interest of the mines. The last receipt from this source was on April 30th, '97. The trustees complain that there is a lack of funds for printing the bulletins of the Bureau. Lack of funds prevented any display of ores at the Trans-Mississippi Exposition at Omaha. The register showed that there were 58,146 recorded visitors during the time for which the report is made. The laboratory department answered 1381 letters of inquiry, accompanied by specimens during the two years. The total bound volumes in the library number 4493; during the two years 27,250 copies of reports and bulletins have been sent through the mails. During the same period, in addition to the 1381 letters answered by the personnel of the laboratory the librarian replied to 12,500 letters of inquiry touching the mineral resources of California.

The Country of the Klondike.

Written for the MINING AND SCIENTIFIC PRESS by RUSSELL L. DUNN.

During the past summer the writer was for several months in the Northwest Territory of Canada in the region of the gold fields. His observations are intended as a contribution to the gradually accumulating mass of information relating to this little known country.

The particular section over which these observations extended includes the drainage basins of the Yukon and Alsek rivers, lying east and north of the international boundary line between Alaska and the Northwest Territory. In round figures this is nearly 100,000 square miles. Not all of this vast area was personally visited, but the information of many explorers and prospectors has been sifted and compared while in the country. So obtained, I have used it with my direct observations as the basis of the general statements and conclusions advanced.

Topographically and geologically, these two basin areas are a tangled mass of many mountains and ranges. These mountains, mountain systems or ranges are built up on axial lines of uplift at all angles to each other, and so close together that there are neither areas of wide valleys nor of extensive plateaus. The drainage is through long, narrow, crooked valleys. Only in the smaller stream branches and creeks are the streams torrential, and more often than otherwise even in them is the torrential flow limited to the upper portions in short mountain canyons. The present surface of the country is the resultant generally of orographic movements of the earth's crust. It is modified only to a comparatively small extent by subareal denudation. That is to say, the valleys and river channels between the mountain ranges are generally depressions left between the axial lines of the mountain uplifts. They are not valleys and channels of subareal erosion cut in the slope of a single mountain uplift. In this respect the surface is quite unlike that of the auriferous region of California where subareal denudation has been the great constructive force in the development of the existing topography.

The entire country, as a whole, has of necessity been formed by a regional uplift incident to the many lines of axial mountain uplift. Of these latter there are two principal ones. One, separating the Yukon basin from the direct Arctic drainage, is the lesser of the two, the lower and probably will on geological examination be found to be the older uplift. The other, much the greater in magnitude, is the Coast Range on the south boundary line of the Northwest Territory. This entire range and its culminating peaks rise more sharply from base level and are much higher than the ranges and peaks of the interior. The range is cut through by the Alsek river, which, with numerous branches, makes the true coast watershed, not the Coast Range mountains described, but a minor range 100 miles inland. From the main Coast Range there is toward the interior first a sharp drop to the mountain base in the high valleys of the Alsek river system, then a gradual diminishing of mean and summit elevations till the Yukon, Lewis and Pelly rivers are reached. North and northeasterly from these the mean level again rises to the other principal mountain uplift—the Arctic watershed line.

My investigation of the stratigraphy and geological age of the rock formation of the country has been quite limited. The eroded schists on which the Klondike placers are found are said to be of Paleozoic age. I noted schists that are probably Paleozoic at the head of the Nordenskiöld river. South of the Nordenskiöld, in a singular isolated mountain range in the Alsek basin, west of Lake Desardash, I noted metamorphic rocks of probably Jurassic age. Crystalline rocks, granite, porphyry and diorite form the entire mass of many of the mountain ranges and the axial cores of others. In these last the sedimentary strata flanking the summits have been shattered and tilted until in many instances they stand vertical. On the Lewis river and on the lower courses of some of its tributaries are conglomerates and sandstones that I consider to be of either Cretaceous or early Tertiary age. They are not, where I observed them, very thick beds and they are not as tilted or broken as the older rocks. If I am correct in the determination of the sandstones and conglomerates as of Cretaceous or early Tertiary age, it may safely be concluded that the erosion that formed the placers of the Klondike and other localities of the Northwest Territory was Neocene, contemporary with the erosion which formed the placers in California. The organic remains found in the Klondike placers are Post-Pliocene and do not fix the beginning of the erosion. This limitation of time of formation of the placers will be referred to and considered more particularly further on.

The age of the present topography of the country under consideration is pre-glacial. That is to say, the river system was the same then as it is now; and excepting the superficial accumulations of

glaciers, there is no change in the surface by subareal denudation. This condition is a sequence of the short remove in time of the country from glacial period conditions, some of the phenomena of which still exist, though the glaciers to-day are only the scattered fragmentary remains of the enormous ice sheet that once covered this entire north land.

So much has been spoken, written and published with reference to a supposed direct relation between the gold placers and the glaciers that a statement of the true relation, or rather lack of relation, is pertinent.

Beginning with pre-glacial conditions, the climate of the country was undoubtedly temperate, possibly as much so as the coasts of Oregon and Washington now are. The extinct mastodon lived in the Yukon basin just as it did as far south as California. Its bony remains are found in stream gravels (in the placers) in both localities under conditions which conclusively prove them not to have been disturbed since the sands and gravels buried them. Existing contemporary with the mastodon was the mammoth, numerous in northern Siberia on the shores of the Arctic ocean. Possibly, too, some of the bones found in the Klondike gravels are of mammoths instead of mastodons.

The change from pre-glacial climatic conditions to the Glacial period was so sudden as to be cataclysmic. There have been found in northern Siberia, on the surface of the frozen land, the frozen carcasses of mammoths, with partially digested frozen food in their stomachs. These mammoths, the largest and strongest mammals that ever lived on the earth, must have succumbed to sudden intense cold, killing them in the short interval between the mastication and digestion of their food. Then they must have been buried in the snow, steadily accumulating and changing into ice, and never thawing through the vast time interval of the Glacial period. Only with the melting of the ice sheet did the carcasses reappear, and, thawing, finally decompose. The frozen mammoths are thus evidence both of the cataclysmic coming of the Glacial period and of the gradual disappearance of it, a disappearance not yet complete, but continuing. This last is again appreciable in the moderating climate of the Alaska coast region, and the upward retreat of the terminals of many of its glaciers. Some of the latter which a comparatively few years since came down to the sea are now a mile and more away. The frozen carcasses of the mammoths demonstrate another important fact, namely, that the ice blanket of the Glacial period was not everywhere a glacier, a moving mass of ice. All over the far north lowlands bordering the Arctic ocean in Siberia and Alaska, all over the interior of Alaska and Northwest Territory in the Yukon basin, the snow must have cumulated and changed into ice in place, and must have melted and disappeared from place without disturbing by erosion the surface of the frozen earth beneath. Only when this vast ice mass had melted from off the plains and lower summits of mountains and hills did glaciers commence to move in such of the stream valleys as headed in the higher mountains. These glaciers, commencing to move, then, under the moderating climatic conditions, enormous in extent at first, gradually diminished upward by the steady gain of solar heat on the accumulated ice, till at the present time most of them have disappeared altogether, and the remainder are only ice patches high up toward the mountain summits. The work done by them remains, much of it exactly as it was left by the retreating ice mass.

These glacial remains are a characteristic feature of a portion of the Northwest Territory. As explained, only commencing to form after the vast mass of the Glacial age ice sheet by melting in place had exposed the low northern plains and lowest mountains and hills just as they were in the pre-Glacial period, the glaciers in the stream valleys which they occupied gathered up the stream sands and gravels and the lake beds, and, adding to them the products of their own erosion from rock in place, deposited the unassorted, unconsolidated mass in enormous moraines, terminal and lateral, the latter forming great terraces, lining the valleys for hundreds of miles. A very large number of glacial lakes and ponds have been glacier formed, some by the cutting out of the solid rock, but more in the closed basins of the moraines. With the disappearance of the glaciers the streams flow again between their old hill rims, but not necessarily in their old beds. Quite generally they flow on beds formed of the distributed moraine drift. The Lewis river in places leaves its old channel, filled several hundred feet deep and a mile or more wide with moraine accumulations, and flows in a new channel cut from the old country rock rims. The Five Finger and Rink rapids are in such new rock cut channels.

Summarizing, the surface of the Northwest Territory under consideration can be comprehensively classified for consideration in detail as follows: First, that portion of it lying adjacent to and north of the main Yukon stream, including the gold fields of the Klondike and its tributaries, from off of which the ice sheet of the Glacial period melted without ice erosion, this being the low-lying area referred to in the preceding. Second, the moraines and terraces that fill and line most if not all of the large

southern tributaries of the Yukon, including the Lewis river and its branches, and which fill and line many of the smaller tributaries of the region, these being the areas of which the surface has been changed during the Glacial period. Third, the summits of the hills and mountains from which the ice sheet disappeared in place, but which rise from the valley containing the glacial drift. These summits and slopes show no traces of glacial erosion and contributed very little to the moraine deposits alongside of them. And, fourth, the high mountain slopes where direct glacial erosion is still going on.

The relation of the preceding to the gold placers is this: Gold placers are the resultant of denudation of gold-bearing rocks in place, and as such are found in stream beds, where water now flows, or where it has at some previous time flowed. The presence of gold alone does not necessarily make a placer. It must be a commercial quantity for which a miner may reasonably risk his labor and capital. Conforming to these definitions, gold placers can only be anticipated in the surface areas of the Northwest Territory that are in the first or third classifications. That is to say, they can only be anticipated in the stream channels of those northern areas from which the ice sheet of the Glacial period has disappeared by melting in place. They cannot be anticipated in those stream channels which have been swept by glaciers, nor can they be anticipated in the vast masses of unassorted glacial accumulations in moraines and terraces. There are, it is true, exceptional conditions under which a glacial accumulation may be a placer. There are a number of such in California, Nevada and on the Alaskan coast, but from my observation I am of the opinion that the special exceptional conditions for such placers do not exist in the Yukon basin. The colors of gold that the prospectors obtain everywhere on these glacial drift deposits, where there has been some surface concentration by water flow since the disappearance of the glacier, are not indicative of rich placers at the bedrock, nor of commercial values in the gravels. A glacier does not assort or concentrate the deposits it leaves, as it retreats upward from the sea level. It grinds the gold particles from rock in place just as it grinds the rock particle and it drops them just as impartially into its slowly growing moraines. Only where the total value of the gold particles so eroded bears a commercial ratio to the barren rock volumes eroded with them can there be a placer. With stream deposits this commercial ratio is created by the elimination of the barren rock by concentration. So far does this concentration extend that many moderately rich gold placers contain, with practically all of the gold originally in the rock in place, only 100,000 part of that original rock eroded with the gold.

Consideration has been given by me to this in detail because I observed both personally and heard of tremendous wastes of time, labor and money, expended in the effort to find placers in the glacial moraines and terraces where it was impossible they should exist. On the Lewis, Pelly, Big Salmon, Nordenskiöld, Alsek, Copper and other streams, hundreds of shafts were sunk seeking gold-bearing stream channels that did not and could not exist. Leases were bought from the Canadian Government to dredge stream bottoms that were nothing but gold barren, glacial moraines. Not alone were "tenderfeet" deceived by these vagrant, so-called grass root and surface colors, but experienced placer miners from California, Montana and far-away New Zealand wasted their labor and money and the summer season of 1898 hunting for placers that could not exist where sought for. On the Lewis river, about fifty miles above the junction with the Pelly, I found miners sinking shafts through frozen moraine gravels for the old channel of the Lewis river. At the surface a small tributary stream had cut down a deep terrace to the river level. The new surface yielded colors concentrated from the drift washed out; but, once below the surface, the shaft gravels showed no prospect or only an occasional color. It cannot be too thoroughly understood that the areas within which it is physically possible for placers to exist are limited. Below or above glaciation are the areas. The Klondike and adjacent basins are areas below and Lake Atlin and Shorty Creek district are areas above. There are other areas than these noted where there might be placers, but no other placers have as yet been found.

All the placers yet found—the Klondike, Lake Atlin and Shorty Creek district—are exactly what typical placers are and have been in every other placer mining district in the world. They are the natural stream concentrations of the stream erosion of gold-bearing lodes and their enclosing country rocks. They are not sea or glacier erosions or tidal concentration of auriferous sands in beaches, for such placers are exceptional. As between placers of the typical description, the differences are not of kind, but of degree. With the Klondike placers there is no variation from the common type. That they are frozen does not imply a difference of genesis or geology of the placers necessitating the establishment and application of new theories to expert their location and value. All it implies is a possible difference in the economic method of exploitation.

(To be Continued.)

The Platinum Metals of Plumas County, Cal.

TO THE EDITOR:—The interesting and instructive paper by Mr. Helmbacker, published in your late issues, relating to the occurrence of platinum in the Ural mountains, suggests the following notes on the platinum metals of Plumas county, Cal., which may be of interest to your readers at this time, when manufacturers are eagerly inquiring about our resources in platinum, and especially in the osmium alloys:

Platinum, with iridium, osmiridium and iridosmium, has for many years been found in several of the deep gravel channels of Plumas county and in some of its surface gravels, always on or near the great serpentine belt, which traverses the county from N.N.W. to S.S.E. They were noted in the early days in the bed of the North Fork of Feather river at and below Rich Bar, and along the river as far south as Oroville, in Butte county. At the southern boundary of the county, platinum is found in Slate creek, chiefly in its tailing deposits, which contain enough of the metal, in conjunction with gold, to pay a good profit on the collection. The La Porte deep gravels also contained a small percentage.

The chief source of platinum and its allied metals within the county is found both in the recent and older gravels of Spanish creek and its tributaries, many of which take their rise and have eroded their channels in the serpentine. Not less than three of the ancient hill channels cross Spanish creek at different points of its course. One of its branches, Silver creek, derived its name from the find of a piece of platinum in its bed in 1853, when it was supposed to be silver.

The writer has found platinum, iridium and iridosmium within the county, and chiefly near Spanish creek. Twenty-three years ago, during the active hydraulic work of the Plumas Mining and Water Company at Gopher Hill, under the management of the late N. Cadwallader, about six ounces of platinum was collected at the cleanup of one season, the most of which was in thin scales averaging $\frac{1}{16}$ inch in diameter. In general the metal occurs in thin scales, in rounded granules or irregular thicker grains, from microscopic sizes up to $\frac{1}{2}$ inch in diameter, the coarsest being found in the shallow surface gravels of Spanish creek, near Green Flat. It is, however, rare to find a piece the size of a wheat grain. In quality the platinum occurs of all grades, chiefly alloyed with iron up to 10 per cent, in which case it is attracted by the magnet. Grains of pure iridium are rare. Iridosmium in its various alloys is present in varying amounts up to about 10 per cent of the crude metals. Ruthenium and palladium as alloys are present, but have not been determined quantitatively. The largest piece of platinum noted by the writer as found within the county, weighed twenty-eight grains. The platinum metals of Slate creek generally run in sizes from $\frac{1}{16}$ inch to microscopic particles, the latter predominating.

Platinum has not here been found in place, but no special effort has been made to investigate its genesis. As having a bearing on the subject may here be mentioned some statements made to the writer by two intelligent and reliable miners, to the effect that they had each found, independently and at different localities, native gold and platinum apparently firmly welded together, and with a well-defined line of junction. In one case the piece of gold-platinum was said to have weighed nearly one-fourth of an ounce. In both cases it was held certain that mercury was not present, as the metal was heated, but not otherwise tested.

Chromic iron is always abundant in the platiniferous gravels, both as sand and as pebbles, and occurs occasionally in place in the serpentine as lenses and short gash veins. It is highly probable that our platinum metals may be traced to this mineral, in which it sometimes occurs in Siberia.

The quantity of the platinum metals is always small in proportion to the gold contents of our gravels. In general, it may be estimated at $\frac{1}{10}$ to $\frac{1}{2}$ of one per cent of the weight of the gold obtained with it. Very rarely will it reach $\frac{1}{2}$ per cent. As no trial has been made on a large scale, this estimate, however, is not conclusive, being chiefly based upon tests of gold-bearing black sand. In the black sands of this region the platinum metals form a much higher percentage in proportion to their gold contents, and in one instance reach 50 per cent by weight.

Unless the market price of crude platinum, osmium and iridium should advance very much, it will not be profitable to collect these metals here, except in a few instances. The tailing deposits of Slate creek would probably yield a fair profit from this source, if properly handled. Besides that locality, the writer knows of only two gravel deposits within the county where the collection of platinum metals may be made profitable, but solely in conjunction with the gold values obtained with them.

The platiniferous sands here always carry cinnabar in very small quantity, in small grains and crystals, a testimony to the common genesis of these two minerals.

Rocks closely related to serpentine seem also to be

productive of the platinum metals. A small deposit of quartz gravel at Dean's Hill, near the southern border of the county, rested upon a steatite or soapstone bedrock, which forms a large irregular body several miles in extent, intervening between the granodiorites of southeastern Plumas and the granite of Butte county. This deposit, long since worked out, contained fine sealy gold, and the platinum therein found in nearly the same physical condition as the gold, formed a proportionally higher percentage than is presented by any platiniferous gravel deposit within California, with which the writer is familiar.

J. A. EDMAN.
Meadow Valley, Oct. 3d, '98.

A Remarkable Deposit of Black Iron Sand.

Written for the MINING AND SCIENTIFIC PRESS by OSCAR H. HERNSEY.

On the southern or Pacific side of the Isthmus of Panama, between about thirty and fifty miles west-southwest of the city of Panama, is a white sea-cliff 100 feet in height. At its base at low tide is exposed a broad beach of fine sand, the color of which as seen from the ocean is a yellowish-white except for many large black patches of irregular outline. Upon landing on the beach near the town of San Carlos these black patches were found to be composed of "black sand"—the black oxide of iron—the purest kind of iron ore. The fine, bright, black grains are a prominent constituent of the sand in the entire beach deposit; but by the action of the waves, they have been concentrated in places into beds of almost pure magnetite. I dug 6 inches into one bed consisting of pure black sand. At another place a small creek issuing from the interior crosses the beach in a ditch several feet deep cut into a bed of mixed white quartz sand and black magnetite sand in which the latter predominates. Indeed, I have no doubt that many areas, acres in extent and 5 to 20 feet deep, could be found in which the iron sand would constitute more than 50 per cent of the whole.

No effort has yet been made to utilize this great deposit of comparatively rich iron ore. Were it in the United States, and situated near fuel and limestone, it undoubtedly would be of considerable economic value. If New Jersey ore, which contains only 14 per cent of metallic iron, can be worked at a profit (when concentrated by the Edison process) in a region where pig iron costs but \$10 per ton, any deposit such as the iron sand of the San Carlos beach within easy reach by water of Pacific ports, where the price of pig iron is \$20 per ton, ought to be worth working, provided cheap fuel and limestone are near.

Both coal and limestone exist on the isthmus, but not in the near vicinity of the San Carlos magnetite sand. The problem of its cheap working can only be solved by washing out the quartz sand or by using the Edison process of concentration, and carrying the pure black sand in ships to some point on the western coast of America, where fuel and limestone are within easy reach. When the people of the isthmus awaken from their long commercial lethargy and build railroads and make other iron-consuming improvements like other civilized people, the remarkable deposit of iron sand in the San Carlos beach will be utilized.

Oct. 3rd, '98.

Silver More Cheaply Produced.

TO THE EDITOR:—I herewith take the liberty of drawing your attention to an error which appeared in "Concentrates" of your issue of Oct. 1st. You say: "In Mercur, Utah, gold is produced from the mine cheaper than silver can be there so produced." This is not the case. From the majority of the mines in the Mercur district, gold is produced at a cost of, approximately, \$8 per ounce, while at the Chloride Point mine, under the management of Mr. Gill S. Peyton, and by the use of the MacArthur-Forrest cyanide process, silver is being produced at a cost of 23 cents per ounce.

Wm. Orr.
Salt Lake City, Utah, Oct. 11th, '98.

P. T. DODGE, of New York, has presented to the museum of the Sibley College of Engineering what is probably, for its size, the costliest piece of machinery ever constructed. This is the Paige typesetting machine, the one in which Mark Twain sunk a lot of money. It consists of 19,000 pieces, controlled by a keyboard, and handles ordinary type, setting, justifying and distributing the matter, and leading it also, when required. It is believed to be one of the most beautifully ingenious pieces of mechanism as well as the costliest. The trouble with it commercially is that it is too ingenious, and, although perfect in the operation, cannot be built for sale. Of course, most of the two millions of dollars this, the original machine, is estimated to have cost, was used in the incessant changing and remaking in which years were spent. The machine occupies a floor space of 11½x3½ feet, and its highest point is 6½ feet from the floor. The weight is a little less than 5,500 pounds, and it runs without a perceptible vibration.

California's Supposed Great River of Ancient Times.

TO THE EDITOR:—A great many hydraulic miners have been very much interested in the finely illustrated two-page article in yours of July 30th, about gold in ancient river channels. After years of research and careful investigation, geological theories with their various ages and fossiliferous evidence are sometimes confronted by other opinions, although not directly in touch with the many branches which go to make up its learned chart, yet we cannot always be too precise and disregard a logical argument from a practical standpoint, especially from men of intelligent speech.

During many trips through various mines of California I have often met the benign-faced miner of '49 who neither possesses nor lays claim to the title of "mining engineer" or "mining expert," but regardless of the absence of these, in some cases assumed, titles, these miners are intelligent and interesting, and have ideas of their own regarding the auriferous deposits of California that compare in reasonable composition with the others advanced by learned scientists. These do not follow the laws of "cause and effect" or the "survival of the fittest," being taken from personal observations which embrace many years of patient toil, hardship and research.

Previous to the Jurassic age our ocean coast line extended far into the interior and even over the seat of the various mountain ranges east of the Sierra Nevada, yet unborn. The presence of the impression of the ammonite fossil in some of the slates and also that of the belemnite go to substantiate the belief that the noble Sierras were born in the Triassic or Jurassic age. During this age the Sierra foothills formed the shore of the Pacific ocean, and the verdure-clad mountains of the Coast Range lay slumbering in the bosom of Mother Earth until the renewed activity of Cretaceous age forced them to the surface. This is as far as we can go geologically. This treats simply of the primitive formation of the coast and leaves the presence of the immense deposits of gravel, which in many cases overlay the summits of ridges, to be attributed to ancient tributary channels. To this the same old miners do not agree. One will say: "I've mined from the Mexican line to British Columbia and found the same gravel deposits in both directions, north and south. This gravel, I claim, had not been deposited altogether from the many small streams which have their rise in the mountains, but chiefly from one vast river whose bed now forms a portion of the makeup of the Sierra Nevada range. To the objection that this theory will conflict somewhat with past opinions and accepted truths, I may make reply that had others made the proper investigations, they might learn different." When we come to gaze over the great width of the Sierra range, it permits of a large number of geological possibilities. To be convinced of any extravagant ideas as to the presence of an ancient waterway of large dimensions, having its main channel through the central portion of the range, may tax the imagination of many who have studied the various forms and deposits of auriferous gravels, but an argument for or against its existence would not read any more inconsistent than the hypothesis which has been launched for consideration from the minds of many learned men on other subjects pertaining to geological science. An "Amazon-like" stream might have caused great denudation and cut into the surface so deep that the crust yielded easily to the dynamical action which was so prevalent in past ages, the result being one tremendous upheaval and the lifting of the gravel and other debris deposits which had accumulated during the life of this mighty river far up into the mountains and diverting its immense discharge into new and virgin channels.

In giving consideration to the theory in question, if we entirely disregard the idea of the presence of such a waterway we leave the long epochs which embrace the Jurassic age previous to the Cretaceous without any main river system, such as is represented by the Sacramento and San Joaquin rivers of the present day.

In speaking of the ancient gravel beds the title of "old channels" is customary with most people, simply attributing the deposition to the smaller mountain streams and thus scouting the idea of any great proposition that may have existed in past ages.

If one accepts as a fact the elevation from the direction of the pole during and preceding the first Glacial period, an immense body of water could have been discharged southward during the long period it took before a complete subsidence to the primitive level occurred, thus giving cause for the supposed large stream which may have had its rise in the far north with a southward course through the interior of the primitive formation of our present Sierra Nevada range.

HYDRAULIC MINER.

RED LIGHT is not the lowest kind visible to the eye. When a body is heated up it emits first a "gray" glow and then a red glow. Herr Lummer finds that this gray light is perceived by the "rod" formation and the real light by the "cone" formation in the nervous structure of the eye.

An Expert in a Hole.

Under the above heading the Cairns *Morning Post*, Queensland, Australia, publishes the following, which is not wholly new but well told: "Several smart mining 'experts' have been trying on a little game with the holders of good copper or tin properties in the Herberton or Chillagoe districts. Their mode of operation is very simple. They go to the holders and say, 'Look here, my name carries weight down south, and if you don't let me into this mine I will send word down that will prevent you selling.' One or two miners have been soft enough to bite, but in at least one case an expert was badly taken down. Two men were sinking on a big lode of copper not 100 miles from Calcefer, when an 'expert' came along. Both miners were on top at the time, and to them the 'expert' unfolded his mind. 'Well, yes! and if we let you in you will boom it along?' they asked. 'Of course,' replied the expert. 'I will do whatever I can for you, and as the Blank Syndicate are already nibbling at your claim, I can get appointed to examine and report on the mine.' 'Well,' replied the miners, 'you had better have a look at the reef as she is in the sink, and then you will know what you are doing.' To this proposition the expert acceded, and was lowered down the straight shaft 40 feet to the bottom. He put in a quarter of an hour knocking off bits of the lode with a gad, and after gathering them up to put in the bucket, he discovered that the oildrum had gone to the surface. In response to his cries of 'lower away,' one of the owners of the claim looked down the shaft and asked the would-be-expert what he wanted. 'I want the bucket,' replied the man in the sink. 'Oh, you do, do you? Then you are likely to want it for a long time.' 'Why, what's up?' anxiously queried the expert. To which the man on top replied, 'Your game is up and the bucket is up. And what's more, it is going to stay up.' Then a long confab took place between the expert and the miners, with the result that at the end of an hour or two a pen, ink and paper were lowered to the bottom by a long cord, and the expert sat down in the sink while he wrote as follows: 'I, _____, herewith admit that I threatened Blank and Blank to blackmail their copper mine unless they consented to give me a share in said mine; that in consideration of their giving me such share I would manage to get engaged by the Blank Syndicate to report on such mine; that I would boom it for all it was worth, and that I would engage that my report would result in their obtaining at least 100 per cent more for their property than they would otherwise obtain from the Blank Syndicate. I also admit that I am a blackguard, a thief, and a liar, and am unfit to associate with the honest miners on the field. Signed Blank Blank.' When this document reached the surface per medium of the cord before-mentioned, the unhappy expert was hauled safely to the top, but his stay on the Chillagoe field was a short one. He left hurriedly for the south by the Cintra on Saturday."

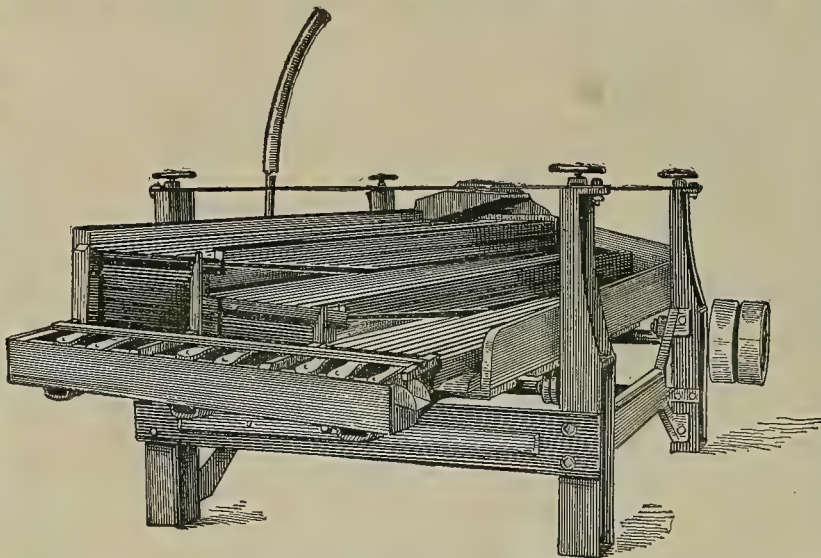
The Duty on Lead Ores.

The San Francisco MINING AND SCIENTIFIC PRESS, discussing the duty imposed on lead ores and pig lead by the United States government, does not hold out much hope of the duty being removed or even modified. Though not put plainly forth, the PRESS leads it to be inferred that a Canadian export duty on lead ores would not be advantageous to Canada, and we are treated again to the flat and stale argument that "under our existing tariff"—that is, the United States tariff—it pays the Canadian miner better to ship the ore across the border than to smelt it at home. The PRESS leaves this part of the question there without any attempt to make this very abstruse matter plain. It then goes on to say that American miners would be pleased rather than otherwise to have the Canadian government put an export duty on the ores referred to. Probably so; but the owners of smelters and refineries would not. However, that is not the question. Probably if the duty should be imposed the PRESS would sing another tune. What Canadian mine owners have to consider is not what will prevent United States smelters and refiners from deriving most of the profit, but how best they can act to derive the full benefit of the working of their properties without being subject to tariff exactions. It has been the stock argument of interested persons that the natural market for Canadian ores and lead products is the United States, but when a natural market imposes restrictions which are all in its own interest, that market becomes an unnatural one for the foreign producer, and it behooves him to look around for a more profitable one. By treating their own ores in their own country, and exerting themselves to find a market, mine owners in this province can place themselves in a much better position than they are in now. There are markets in the east—Canada and Great Britain—and in the west—China and Japan—which will take all the lead products

Canada can give them, and trade in these directions would not be restricted in any way. To relieve their present disabilities the mine owners have matters in their own hands. Concerted action on their part will secure them the protection which should be theirs by right.—Nelson, B. C., Miner.

The Bartlett Concentrator.

There is always something new in the mining world among the appliances. This time it is in concentrators. F. L. Bartlett of the American Zinc-Lead Co., Canyon City, Colorado, has brought out a new concentrating machine, in which he reverses the usual



THE BARTLETT CONCENTRATOR.

order and removes the finer material first, and using less water and more agitation. The Parke & Lacy Co., 21 and 23 Fremont St., San Francisco, represent the concentrator on this coast and will send anywhere, upon request, a full description, how it is set up and run, etc.

E. LEPIK of Warsaw, Russia, has invented an apparatus to take the place of the valve for eliminating the water particles from steam during its passage from the boiler to the cylinder. It depends for its action upon the principle of centrifugal force. The steam is passed through a turbine fixed in the inner part of the drum. Owing to the centrifugal tendency caused by the turbine, the water particles are separated from the steam and descend through a tube into the water of a boiler, the dry steam passing through another tube into the engine cylinders. The steam pressure being less than the pressure within the boiler causes the steam to flow through the turbine into the drum, and, passing through the turbine channels in a tangential direction towards the circumference of the drum, causes the centrifugal force to take effect on the particles of steam. This force produces a tendency in the water to describe large circles, thus collecting on the walls of the cylinder, while the steam, being lighter, acquires a rotating motion in the middle part of the drum. Then in the dry state the steam passes through the tube into the engine cylinder.

THE presence of gold nuggets in a river bed has been regarded, apparently, in some quarters as a mystery, which a Slavonic chemist named Zsigmody has now "solved." He shows "that gold itself can exist in a soluble form. By acting on a slight alkaline solution of a gold salt with formaldehyde and submitting the product to dialysis he has succeeded in obtaining gold in a colloidal condition, in which state it is soluble in water and may be precipitated by the addition of common salt. It is probable that some of the gold in quartz reefs exists in this condition. It is washed out by the rain, carried away in solutions by the rivers, and deposited in the river gravels wherever there is anything containing salt to cause its precipitation. In the course of ages a large nugget may in this way be formed."

THE rule laid down by the U. S. Land Department as to what constitutes mineral land is that whatever is recognized as mineral by the standard authorities where the same occurs in quantity or quality to render the land in question more valuable on its account than for agricultural purposes, is mineral within the meaning of the mining law. The term "valuable minerals," since the passage of the Act of May 10, 1872, has been defined by that department to include borax, and alkaline earths, sulphur, alum, asphalt, fire clay or kaolin, gypsum, limestone, building stone, and also all lands containing valuable deposits of stone that is useful for special purposes, and petroleum or oil lands.

An Eighty-Mile Power Transmission.

In last week's issue was noted the fact that in California long distance electrical transmission is receiving unusual attention, more especially, at present, in the southern part of the State. In these days of electrical progress the California enterprises are considered worthy of prominent notice in every technical journal. In the issue of the 15th, among other long-distance projects, was instanced that of the Southern California Power Co., which is designed to transmit electrical power to Los Angeles, Cal., a distance variously stated at from 80 to 81½ miles. This is believed to be the most important

electrical power installation (as regards length of transmission) so far undertaken in any part of the world, and is now nearing completion.

The station is located about eight miles from the town of Crafton, Cal., and consists of four 1250 H. P. Pelton wheels, direct connected to the shafts of General Electric generators, 750 K. W. each. The wheels are 82 inches in diameter, operate under 700 feet effective head, and run at a speed of 300 revolutions per minute. There are also three 24-inch Pelton wheels, capacity of 75 H. P. each, running at 1000 revolutions per minute, direct connected to exciters.

The water supply is taken from the Santa Ana river and Bear creek—the point of diversion being at the junction of the two streams. It is thence conveyed through canal and flume about 17,000 feet, a large portion of this distance being tunneled through solid rock. From the terminus of the canal to the power station, the water is carried in two 30 inch steel pipes, each 2210 feet in length, which discharge into a receiver at the power house 30 inches in diameter by 100 feet long. The receiver is made in two sections, connected in the center by a 30 inch cast steel gate. Each pipe line connects with a section of the receiver at right angles by lateral steel branches. The upper portions of the pipe lines are riveted sheet steel and the lower portions lap weld—the latter being one-half inch in thickness.

The transmission line is eighty miles long, composed of two circuits of No. 1 B. & S. gauge medium hard-drawn copper wire, supported on triple petticoat porcelain insulators, and is intended to carry a pressure of 33,000 volts. The power generated is to be transmitted to the city of Los Angeles, and used for running an extensive system of tramways, as also for lighting and general power purposes.

The hydraulic part of the work has been furnished by the Pelton Water Wheel Co. and the electric equipment by the General Electric Co.

Fuller's Earth.

TO THE EDITOR:—Referring to an item on Fuller's earth as having been found in Kern Co., Cal., in last week's issue, I have personal knowledge that there was found about three years ago, several miles east of Tallahassee, Florida, a large body of Fuller's earth, which was being mined and shipped in considerable quantities soon after discovery. The principal use for it, I believe, was in purifying refined petroleum. A SUBSCRIBER.

San Francisco, Oct. 18th, '98.

Accuracy Appreciated.

Just one word for the MINING AND SCIENTIFIC PRESS, published weekly in San Francisco. It is not only the oldest and best mining paper in the West, but it speaks of the mines at Victor, when the mines in question are at Victor, and does not, as many of the Colorado papers do, mention everything as "at Cripple Creek."—Editorial in Daily Record, Victor, Colo., Oct. 12.

A SQUARE INCH of cast iron will carry about one-half as many lines of force as a square inch of wrought iron. A square inch of mild steel will carry from within 10 to 15 per cent of the lines of force of wrought iron without involving the use of heavy magneto-motive forces.

DAVID McCULLUM, New Brunswick, N. J., claims to have discovered a substitute for Para rubber. He says he can manufacture a rubber substitute that will cost but 9c a pound, whereas genuine Para rubber costs \$1 a pound.

Coast Industrial Notes.

—Palo Alto, Cal., has voted to issue \$40,000 sewer bonds.

—Near Chino, Cal., are daily quarried 20 tons limestone.

—Hawaii, U. S. A., proposes to quadruple its sugar output by 1902.

—The Northern Pacific Railway is completed to Hoquiam, Wash.

—The McCloud River, Cal., Railway is being extended to Bartles.

—Washington estimates the total hop crop of the State this season at 30,000 bales.

—Spokane, Wash., Portland, Or., and San Francisco are now connected by long-distance telephone.

—Pasadena, Cal., proposes to put in a large pumping plant and develop 1000 inches of water to sell.

—The \$20,000 Colton, Cal., 6% 20-year average gold water bonds have been taken in Los Angeles at 107.88.

—The Snoqualmie (Wash.) Falls Power Co. are going ahead with the work of piling and wiring part of the route.

—Nearly 100 men are employed at Point Wilson, near Port Townsend, Wash., on government fortification work.

—The Sugar Trust is reported negotiating with the Hawaiian planters for their sugar crop for the next three years.

—The Union Oil Co. of California proposes to operate a pipe line from the Calleguas ancho to Ventura, twenty miles.

—The largest salmon cannery in the world is at Blaine, Whatcom county, Wash., with a daily capacity of 384,000 one-pound cans.

—Myrtle logs are shipped from Marshfield, Or., to San Francisco by S. R. Davis for the Union Iron Works for blocking in the new dry dock.

—Four lime kilns are kept steadily burning at Roche Harbor, Wash. A shipment of 8000 barrels of lime was recently loaded from that point.

—The San Francisco & San Joaquin Valley Railroad will pass into the hands of the Atchison, Topeka & Santa Fe Railroad about an. 1st, '99.

—Blair & Barnes, Valley Center, Cal., are bottling rattlesnake oil. They recently captured 60 snakes in one den. Each snake nets them 75 cents.

—The Tacoma, Wash., Mill Co. has an order for 1000 M feet of fir lumber for shipment to Hamburg, Germany, and includes 200 M feet bips' decking.

—The San Francisco Harbor Commissioners will charge the California State Board of Trade \$115 per month for its new quarters in the Ferry building.

—The Mt. Whitney Electric Power Co. is diverting water from the Kaweah river, Tulare, Cal., to furnish power and light to Visalia, Tulare and Porterville.

—Yield of dry wines in California this year is estimated 8,000,000 gallons, as against 27,000,000 gallons last year. Sweet wines, it is figured, will show one-half the production of '97.

—The Northern Pacific will build a short line between Missoula, Mont., and Pasco, Wash., making a cutoff and saving over 100 miles of distance in the line between St. Paul and the coast.

—The report of the director of the Geological Survey upon the production of crude petroleum for the year 1897 shows that California yielded 1,993,411 barrels, an increase of 1.98 per cent over that of 1896.

—Total tonnage of beets delivered at the Chino, Cal., factory this season is 35,000 tons. The season closes November 15th with a probable total of 50,000 tons. The sugar content of the beets averages 14 per cent sugar.

—The Fulton Engineering and Shipbuilding Works has sued the Alaska-Yukon Transportation Company for \$12,233.13, balance due for labor and materials furnished in the building the steamers J. W. Scammel and James Eva.

—On the Mariposa, from Sydney, N. S. W., to San Francisco, on the 20th inst., came \$3,670,000 in gold, English sovereigns—a total of gold from Australia to San Francisco, since Aug. 6th, '97, of \$32,352,729. Talk about the Klondike!

—Pres. Horace G. Burt of the Union Pacific Railroad states positively that the Union Pacific will not absorb the Union Pacific, Denver & Gulf, nor any part of it. The Julesburg Line has already passed into the control of the Union Pacific.

—At Roslyn, Wash., the Northern Pacific Coal Co. in March, 1895, employed 409 men and paid them \$14,335.20, an average of \$35 per month to the man. During March, 1898, this company employed 679 men and paid them \$42,365.45, an average of \$63.10 to the man.

—The Carbonado, Wash., coal mines shipped 35,000 tons during September, beating all previous records. Roslyn had held the record with 30,000 tons. The Carbonado mines, owned by the Southern Pacific Railroad Co., are running full time and employ 600 men, averaging \$3.29 a day wages.

—During June, July, August and September, '98, there were shipped from Washington 8028 cars lumber. The increase in lumber shipments from Washington has been more pronounced this year than that of shingles. The first nine months of '98 show 133,424,000 feet, as against 92,464,000 feet in the corresponding months of '97.

—D. E. Brown, general agent Pacific Railway and Steamship Co. Hongkong, says the Oriental trade of the last five years should more than double in the next five years, owing to increased transportation facilities

and to the close relations that will have to exist hereafter between this country and the Orient, as the result of holding the Philippine islands.

—The British ship Alcides, which sailed from San Francisco for London on the 17th, carried 11,203 cases salmon, 64,441 cases canned fruit, 10,000 gallons wine, 425,534 lbs. beans, 33,013 cents barley, canned asparagus, sardines, beeswax and cascara bark, California products, valued in all at \$307,578.

—The Union Pacific now controls a majority of the Short Line stock, but the road will continue to be operated as an independent system. In 1884 the Union Pacific regarded the Oregon Short Line proper as a poorly paying investment. The net earnings then were only \$288,639.42. The earnings for the last few years have been above the million mark, which has caused a rise in the stock.

—The monthly report of the Oil Producers' trustees at Los Angeles, Cal., for September was issued last Saturday. It says 23,286.28 barrels of oil were sold during the month; 85,236.28 barrels are stored. The amount received per barrel at the wells was \$2.27 cents. Expenses, \$726.05; average cost of selling, 3-10 cent per barrel; net average received, 79.17 cents per barrel; cost of storing, \$118.72; net amount remaining for oil sold, \$17,356.48.

—The Atchison road has 6479 miles; the Northern Pacific system operates 4553 miles. The cost of operating the Atchison is 72% of the Northern Pacific 47%. The cost of carrying passengers on the two roads is practically the same, 0.23c per mile. The Atchison for the year ended June 30th, '98, spent \$1192 per mile for maintenance of road and structures and \$671 for maintenance of equipment. The Northern Pacific spent \$700 per mile for maintenance of road and structures and \$384 for equipment.

—One of the results of the survey of the mouth of the Yukon river this summer by Capt. Pratt of the Coast and Geodetic Survey is to add an area of 2500 square miles to Uncle Sam's domain. Capt. Pratt found that the south mouth of the Yukon emptied into Bering sea, twenty-five miles farther west than has been supposed. In addition to this, it was found that the whole coast line from Cape Dyer almost to St. Michael is farther west than is shown on the maps.

—Near San Diego, Cal., an enormous bed of vein of lepidolite (lithia mica), 60 feet or more in width where best exposed, contains rubellite (pink tourmaline) in large amounts. As a source of lithia and potash this deposit must soon take first rank commercially. It is now being worked as an open quarry, and 1,500,000 tons are estimated to be available. Much of the rubellite has been distributed to museums. Tourmalines of gem quality were first found during the present year, being all of the red variety. Black tourmalines are frequent, but green tourmalines occur only sparingly at that locality.

—There are in California six counties which sustain a local tax rate exceeding \$2—Mariposa, Mono, Plumas, Sierra, Trinity and Tuolumne. All are mining counties in which a large amount of money is expended annually in repairing and maintaining roads. There are in the State eighteen counties which sustain a general rate of over \$2—that is to say, a tax rate of over \$2 when the State rate is included. The highest rate is in Sierra—\$3. The lowest rate is in Fresno—county tax, 56 cents; total for State and county \$1.05. High tax rates in the mining counties have always been a feature of California government. The amount of assessable property in these counties is small and great difficulty is experienced by assessors in getting taxes. In some mining counties there are large quantities of Government land which cannot be assessed, and to procure money for the maintenance of government high values is placed upon property worth holding.

—Steamship men say there will be a change in the pattern of Yukon river steamboats built in the future, as the patterns heretofore have not been suited to that stream. The boats now in the trade from St. Michael to Dawson are represented as being too slow, wide and unwieldy. When recent traffic on the Yukon began, agents of men going into that business went East to get models of the craft best adapted to that use. They went to the Mississippi river, and it is supposed, decided that the stern-wheelers used there were the very type wanted, as there are none but stern-wheelers on the Yukon and most of them have all the objectionable features of the ancient towboats that plied between St. Paul and New Orleans thirty years ago, and are now used to tow lumber rafts. The development of the trade up the Alaskan stream has been so rapid that none but the best service will be satisfactory. There are now 112 steamboats plying inward from St. Michael, with a total tonnage of about 17,800 tons, of which 42 have 16,800, and the remaining 70 are average of but 15 tons each. The largest boat on the river is the steamer Sarah, the property of the Alaska Commercial Co., with a register of 720 tons.

—The White Pass & Yukon Railway Co., an English corporation, has organized to operate a railway from Skaguay to Fort Selkirk, Northwest Territory, a distance of 380 miles. The Pacific & Arctic Railway & Navigation Co., a U. S. corporation, is building the road from Skaguay to the international boundary line. From thence to the dividing line between British Columbia and the Northwest Territory the road will be built by a British Columbia corporation called the British Columbia Yukon Railway Co. From this point on the British Yukon M. T. & T. Co. will do the work. The construction work on the three systems will be carried out by the Pacific Contract Co. The survey work was commenced last April and track-laying began in Skaguay in June. The gauge of the track is 3 feet; weight of steel, 56 pounds per yard in T-rails, laid upon sawed ties, 6 by 8 inches by 6½ feet. Almost the entire section from

three miles beyond Skaguay is rock, with some heavy cuttings. There will be one 500-foot tunnel. The heaviest gradients will be 3.9 per cent, obtained without a switchback. The maximum curvature will be 16°. The road starts at the wharf in Skaguay. The first sixteen miles of the road are completed and the balance of four miles to the Summit is under construction.

Recently Declared Mining Dividends.

Republic mine, Washington, 3 cents per share, \$30,000; payable Nov. 10.

Empire State M. Co., Idaho, 10 cents per share, \$7500; Oct. 15.

Elkton Con. M. & M. Co., Colorado, 2 cents per share, \$25,000; Oct. 20.

Breece M. Co., Colorado, 5 cents per share; payable Dec. 11.

Montana Ore Purchasing Co., Montana, \$10,000; Oct. 20.

Boston & Montana, \$4 per share and \$1 extra per share, \$750,000; payable Nov. 21.

Homestake M. Co., South Dakota, 25 cents per share and 25 cents extra, \$62,500; payable Oct. 25.

Yellow Aster, California, dividend for September paid Oct. 15, \$20,000.

Alaska Treadwell G. M. Co., Alaska, 37½ cents per share, \$75,000; payable Oct. 28.

Alaska Mexican G. M. Co., Alaska, 10 cents per share, \$18,000; payable Oct. 28.

American Nettie mine, Colorado, 12 cents per share; Oct. 22.

Associated G. M. Co., Colorado, 1 cent per share, \$15,500; Oct. 10.

Gold Coin, Colorado, 1 cent per share, \$10,000; payable Oct. 25.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CONTINUOUS HOT AIR SPRING AND VAPORIZER.—M. L. Cooper, Modesto, Cal. No. 612,158. Dated Oct. 11, 1898. The object of this invention is to provide an apparatus which is especially useful in the production of heated air, either plain, medicated or charged with a vapor which it may be desired to employ in the treatment of the mouth, nose or ear, and to furnish a graduated supply thereof through a suitable non-conducting passage and tip or nozzle through which it may be applied. It consists of an open-bottomed casing having a socket fitted therein adapted to be supported from a burner, a heater in the upper part of the chamber above the burner, a discharge pipe connected with the heater having a flexible conducting pipe, a discharge nozzle, a handle-piece through which the flexible pipe passes, an air supply pipe and a chamber interposed between the supply pipe and discharge for the reception of any material with which it may be desired to charge the air.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING OCTOBER 11, 1898.

612,377.—FANCH PLOW—J. B. Brite, Tehachapi, Cal.

612,158.—HOT AIR SPRING—M. L. Cooper, Modesto, Cal.

612,311.—POPCORN MACHINE—F. E. Cubbison, Los Angeles, Cal.

612,317.—MIXING MACHINE—P. F. Dundon, S. F.

612,131.—BUDDING KNIFE—T. J. Henderson, Elena, Cal.

612,243.—SEPARATOR—R. W. Jessop, S. F.

612,256.—ROOF BRACKET—M. Mattson, Sellwood, Ogn.

612,362.—LEMON SQUEEZER—E. D. Middlekauff, S. F.

612,361.—ELEVATOR—J. H. Moon, Portland, Ogn.

612,173.—RETURN BALL—H. E. Newton, Los Angeles, Cal.

612,277.—CULTIVATOR—W. H. Sayer, Adams, Ogn.

612,142.—TREE PROP—L. D. Schaffer, Redlands, Cal.

612,369.—HOT AIR FURNACE—T. Walker, Oakland, Cal.

29,481.—DESIGN, TYPE—G. F. Schroeder, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Commercial Paragraphs.

THE Lacy Manufacturing Company of Los Angeles are about to erect a large oil tank for the Pacific Coast Oil Company at Ventura.

THE American Stoker Co., Denver, Colo. have equipped the Silver Lake mine at Silver ton, Colo., with their stokers.

A VAN WRE centrifugal pump, driven by a Foss engine, is raising 80 inches of water 35 feet on the L. R. and Lee R. Mathews place, Pomona, Cal. Both pump and engine were furnished by the S. W. Luitweiler Co. of Los Angeles.

Recent Mining Incorporations.

The Mother Lode M. & E. Co., San Francisco; capital stock \$50,000, subscribed \$24,000; P. R. Klein, G. F. Weeks, J. C. Rice, W. A. Cross, G. L. Smith.

Phoenix Lake G. M. Co., San Francisco; capital stock \$100,000, subscribed \$25; G. R. Gibson, F. H. Gibson, R. W. Carter, T. E. Jewell, S. Gardner.

New Books.

"Handbook of Engineering Laboratory Practice," R. A. Smart; 12 mo.; pp. 290; intended primarily as a manual for the use of students in experimental work in hydraulics, steam engineering, etc., conveniently arranged. Jno. Wiley & Sons, New York City; \$2.50.

Personal.

CHAS. BUTTERS is visiting the Comstock. M. TURNER becomes Supt. Rawhide mine, Sonora, Cal.

M. SMITH succeeds W. Moorhead as Supt. App mine, Sonora, Cal.

B. F. THORNTON becomes Supt. Gray Eagle Con. Mines, Yreka, Cal.

W. F. DETERT, Supt. Zeila mine, Jackson, Cal., is in San Francisco.

C. M. ROOT becomes Supt. Gentle Zephyr G. M. Co., Volcanville, Cal.

T. T. LANE, a mine operator of Chihuahua, Mexico, is at Ely, Nevada.

I. G. SHEPHERD is installing hydraulic machinery at Quesnelle Forks, B. C.

P. KERVIN has been appointed Supt. Con. Cal. & Va. M. Co., Virginia City, Nev.

W. MOOREHEAD succeeds C. P. Grimwood as Supt. Dreisam mine, Soulsbyville, Cal.

ROSS E. BROWN left on the 18th for a sixty days' business visit to London, England.

J. EDY, Supt. Pine Hill G. & S. M. Co., has returned to the mine from San Francisco.

D. W. FRANK DRAKE, Sonora, is the Tuolumne Co., Cal., agent for this publication.

W. C. PAIRAN, owner Sophia mine, Gold Hill, Oregon, has returned from Portland.

H. A. COHEN of Mercur, Utah, is examining mining properties at Buffalo Hump, Idaho.

W. K. ROGERS of the Oregon Bonanza mine, Grant's Pass, Oregon, is in San Francisco.

T. JAMES, Supt. Shorty Hope mine, Grant's Pass, Oregon, has returned from Portland.

E. W. MENDANHALL, Gen. Mgr. Selby mine, Diamond Springs, Cal., is in San Francisco.

C. D. LANE, San Francisco, is visiting his Fortuna mining properties near Yuma, Ariz.

C. A. BROCKINGTON, part owner Orleans mine, Grass Valley, Cal., is in San Francisco.

C. A. HAMILTON, San Francisco, is examining mining properties in Calaveras county, Cal.

M. L. RODGERS, Supt. Mt. Gaines mine, Hornitos, Cal., is taking a two weeks' vacation.

C. N. STEWART of the Scottish Mining Trust of London, England, is in San Francisco.

A. MORGAN, Supt. Baltic mine, Sly Park, Cal., has returned from San Francisco to the mine.

J. FARREN, Supt. Glasgow & Western M. Co., Golconda, Nevada, is in Salt Lake City, Utah.

THOS. COUCH of Butte, Mont., is examining the Gold King quartz mine near Grant's Pass, Oregon.

W. H. MCCLINTOCK, Supt. Philadelphia mine, Sonora, Cal., has returned from San Francisco.

A. L. BEGIE, Supt. Mt. Pleasant mine, Grizzly Flats, Cal., has returned from San Francisco.

J. DERN, Mgr. Mercur mine, Mercur, Utah, is examining mining properties at Cripple Creek, Colo.

W. H. RADFORD, Supt. La Grange hydraulic mine, Weaverville, Cal., has returned from San Francisco.

J. H. KINKAD has resigned as Supt. Occidental Con. mine, Virginia, Nev. He is succeeded by A. T. Eager.

L. McDONALD, Gang Gulch, Cal., part owner Bloss & McClary mine, Trinity Center, Cal., is in San Francisco.

F. PANTER, owner Evening Star mine, Whitehouse, Cal., has returned from several months' sojourn in Germany.

J. B. WHEELER of New York City is visiting the Plumbago mine, of which he is principal owner, at Alleghany, Cal.

F. T. SUTHERLAND, interested in the dredger near Biggs, Cal., is examining mining properties near Leland, Oregon.

P. HOLLAND, Trinity Center, Cal., owner and operator of an extensive gravel property near Abrams, is in San Francisco.

THEO. E. SCHWAB, mining engineer of Denver, Colo., has returned from a professional visit to the Salmon river country, Idaho.

W. I. SMART of New York, who spent several months examining mining properties near Sierra City, Cal., is in San Francisco.

D. M. KENT, San Francisco, secretary Mayflower G. M. Co., Forest Hill, Cal., is at the mine making an examination of the property.

J. J. OTT, the pioneer assayer and mining man of Nevada City, Cal., is taking a six weeks' vacation in San Luis Obispo county, Cal.

THOMAS S. NOWELL of Alaska says that that district should have a representative in Congress and the protection of adequate land laws.

A. WARTENWEILER has returned to San Francisco from Copper Camp, Cal., where he has been examining copper mines for the Rothschilds.

D. McVICHIE, Supt. Golden Gate mine, Mercur, Utah, has been appointed Asst. Gen. Mgr. of the property. He is succeeded as Supt. by F. H. Pelliar.

J. H. NEFF of Colfax has been re-elected president Morning Star M. Co. On the 8th prox. he will be elected to an even more responsible position.

H. C. CALLAGHAN, who used to be Supt. Eagle Bird mine, Nevada Co., Cal., but who has for some years been in charge of Australian properties, returns on the next steamer.

L. R. POUNDSTONE, Supt. Oro Fino mine, Shingle Springs, Cal., is in San Francisco. He reports that work in the mine will be resumed and the 30-stamp mill started so soon as water can be had.

The Future of the Earth.*

According to the ideas of astronomers, the earth was detached from the solar nebula, and, after being a "miniature sun," was condensed by cooling. Losing its heat by radiation in space, the fiery globe became covered with a solid, dark crust. The solid layer then acted as a barrier to the radiation of the molten mass beneath, for rock has a feeble conductive power. The sun, then, is the sole source of heat that has supported, and that yet supports, the terrestrial surface. On the formation of the solid crust, the water vapor diffused throughout the atmosphere condensed little by little, and water accumulated in the first depressions of the surface. Thus were formed the first oceans, in which life was soon to manifest itself in the most rudimentary organized forms. While these forms went on to develop into more perfect types, distributed uniformly over the globe, the cooling of the earth continued; foldings resulting from its contraction appeared on the surface, and its internal activity showed itself, at intervals, in various regions in the form of volcanic eruptions. The earth's profile thus became more accentuated by the elevation of mountains and the lowering of the first oceanic depressions. It is probable that vegetation then appeared on the first continents, whose temperature must have been tropical. But the outline of the surface did not depend solely on the contraction of the earth's crust, but also on erosion, due to atmospheric agencies. While the contraction, by lateral folding or vertical depression of layers, raised or lowered considerable portions of our planet, erosion produced an inverse effect, since by the action of rain, ice, and variation of temperature it disintegrated the rocks and reduced them to powder, which it transported and heaped up in the depressions of the crust. Consequently contraction accentuates, or at least preserves, in one form or another, the relief of the surface, which denudation is working to obliterate. The resultant of these two opposite agencies gives us the form of the globe at any given moment.

In the course of geologic time contraction formed mountain chains. The first mountains, which were as high as those of to-day, have in great part disappeared by erosion; there remain only fragments, which the study of geology alone enables us to identify. As cooling continued, climates became differentiated, and to the lower plants and the invertebrate animals succeeded higher forms: fishes, reptiles, birds, mammals, and finally man. The human species had not yet appeared on the earth when the Pyrenees, the Alps, the Carpathians, and the Himalayas were formed. These are a part of the same mountain chain, whose relief is in great degree preserved, because it is the most recent chain and the action of time has altered it least. As long as contraction shall continue there will be mountain chains, a very accentuated relief, continental masses, and consequently an easy flowing of waters to the sea. But when by cooling the crust shall become sufficiently thick and solid to prevent lateral folding, mountains will no longer be formed, and then, as denudation alone will act, it will level the surface little by little. Then, by the partial filling of the oceanic basins, by the greater and greater difficulty of flow (due to lack of slope) of water toward the sea, the continental masses will be divided, by channels of greater or less size, into true archipelagoes. At this time there will be on the earth no more water surface than at present, but this water will be differently distributed. Nothing shows that at this period, far in the future, life will be impossible on the earth. Nevertheless, although the essential elements of air and water will not be lacking, cold will certainly bring about a change in the character of life, and a partial disappearance of living creatures from its surface.

M. Dollo asks whether some other planet may not have already reached the stage that we have just predicted

for our globe? There is one, in fact, the planet Mars, of our own solar system. After the earth shall have reached the phase represented to-day by Mars, what will become of it? Instead of consisting of a crust and a fluid nucleus, it will be completely solid. It will then absorb into its crevices the whole of its air and its water. This will easily occur, for experience shows that for this it will be sufficient to be only one-third as porous and only one-hundredth as full of fissures as the granites that are now traversed by millions of veins of harder rock. These fissures, which can no longer be filled with molten rock from the depths of the earth, will be occupied by water. If life has not already ceased by this time, it will then be no longer possible. And after this? Afterward, the fissures will increase as the mass contracts further, and the earth, cracked, dislocated, and finally broken into pieces, will rush through space as a shower of meteorites. The fissures observed on the moon's surface and the meteorites that fall on our globe enable us to believe in such a future state for the earth. Such, briefly summed up, are the series of phases through which our globe has passed and probably will pass.

Jeffrey Columbian Separator, Screen and Bolter.

Herewith is illustrated the Jeffrey Improved Columbian separator, which has made a record in the cement industry, and has also gained favor in kindred industries. It is substantially



JEFFREY COLUMBIAN SEPARATOR, SCREEN AND BOLTER.

built of hardwood. The screen frame is connected to eccentric rods and is confined at its corners by special nut and screw device, the vibrations thus keeping it in a live state. The screen frame is adjustable, so that it can be set at various degrees of inclination, to suit the material handled.

The manufacturers furnish several endorsements from substantial concerns who have used it.

E. S. Godfrey, C. E., has used the Columbian and states he has "screened ground whinn rock (quartzite) to 100 mesh, and at the rate of three or four tons per hour—in fact, more than it is possible for any pulverizer to grind. Have also screened phosphate (pebble) to 60 mesh at the rate of five or six tons per hour." And this he considers below the capacity of the screen, although all the mill would grind. This machinery is now made by the Jeffrey Manufacturing Co. of Columbus, Ohio.

In investigating pitchblende to find why the activity of the Becquerel rays is not proportionate to the amount of uranium present, a rule holding in general for compounds of uranium, M. P. Curie has isolated a new substance which appears to be a new metal. It is, according to the *Comptes Rendus*, thrown down with the bismuth sulfid and partly separated by heating in vacuum to 700° C., the sublimate obtained having 400 times the activity of uranium. The spectrum, however,

emits no characteristic lines. The name of polonium is suggested for the new substance, from the country where the pitchblende was found.

Is Darwinism True?

W. S. PROSSER.

NUMBER IX.—CONCLUDED.

Notwithstanding this, it is the essence of Darwinism that all new parts grew gradually through many generations. Hence "survival of the fittest" could have had nothing to do with such new devices, because they could not have come into action until perfected—could have been of no advantage in the struggle for existence while they were not, while yet growing and rudimental.

Packard says "this rapid multiplication of different types went on without those checks which operated in later times. There was a comparative absence of competition and selection." That is strange. Evolution of new forms is taught by Darwin to be the result of competition and selection; yet here we are told that the multiplication of new forms is most rapid in the comparative absence of these. Truly this Darwinism is a queer thing.

The survival of the fittest is imaginary; species survive at their average. In wild nature there is little or no struggle for existence between those of a kind; food is usually to spare, and the numbers of any species are limited by outside enemies, and the average escape these enemies as well as the best. In plants the survival is governed by locality and chance princi-

fatherly wisdom? The attention of evolutionists is kindly invited.

As some bacteria can live in boiling water, it is possible that they were the real first of living creatures.

Starting from the fact (first noted by Adam) that no two individuals are alike, Darwin assumed that these differences were of all degrees, and tended to increase, and he argued that therefore one species could easily slide into another, and that into something else, till a gnat could change into a racehorse if only given time enough. That is to say, an impossibility is quite easy if time enough be allowed and the process be away off out of sight. Darwin's experiments on domestic pigeons and dogs remind me of a boy whittling a stick. He does not know what he is trying to make, but hopes he may blunder onto something grand. But please note that evolution in nature would be properly represented by the knife and the stick securely locked up. That a dead rock, or a living worm, could invent and construct a telescope or an eye, a piano or an ear, a wing or a steam engine, is unthinkable, whether in a day or a thousand years. As well say 3×3 might equal 11 if it had time enough.

The chances for the human race to grow two stomachs and a pair of wings are billions and billions greater than for the "primordial germ," or even an oyster, to have invented the eye, or leg, or wing. The homo, with all his knowledge, all foods and conditions at command, cannot evolve a new tooth, or a single hair in a bald head.

Of course, I highly honor Darwin, Wallace and other earnest and gifted workers in science. They worked for truth, and the highest tribute to them is to believe that they would be the first to discard their theories if shown to be erroneous.

As the sum of the whole matter, I do not hesitate to affirm that evolution by means wholly natural is impossible; that natural selection, or survival of the fittest, as an evolutionary force of importance is imaginary; that Darwinism, or Lamarckism, as an attempt to explain anything is a failure; that in the forms of organic life there is, in past or present time, a series, practically complete, consistent, and adapted to its environment; that the genesis of each of the series must have been the direct act of an outside and very intelligent power, yet such genesis might have been, probably was, usually, under the veil of the flesh, might occur to-day before our eyes in any new birth; that hence, for common working purposes, no great harm

may be done if we speak of the process as natural; that to this one large exception should be made, and that the homo is not, even to this extent, lineally descended from the animals; that, by parity of reasoning, all human races may have descended lineally from one, but yet, by the originating power, were differentiated into several radically unlike kinds; and that for working purposes the present theory is necessarily superior to Darwinism as more flexible, and as involving less waste of time in absurd explanations. Finally, I invite any candid mind to fix the two theories clearly in mind and then to read descriptions of the serial forms of any genus of animals, and decide which is the more reasonable.

M. HEISE, after calculating the temperature of explosion and the efficiency of various safety explosives, finds that the temperature of explosion has no direct bearing on the safety of explosives. His results were as follows:

| Explosive. | Temperature of Explosion, Degrees C. | Force of one Kilogramme of Explosive, Kilogrammes. |
|------------------------|--------------------------------------|--|
| Carbon dynamite..... | 1821 | 332,000 |
| Dahmentite..... | 2064 | 341,000 |
| Roburite..... | 1816 | 230,000 |
| Westphalite..... | 1806 | 274,000 |
| Gelatine dynamite..... | 2394 | 491,000 |
| Dynamite..... | 2207 | 427,000 |

THE specific gravity of the earth has been found by Dr. C. Braun to be 5.52765—the earth weighing 5½ times that of a globe of water the same size.

* Condensed—Public Opinion.

Mining Summary.

ALASKA.

A. Wing of the Seattle assay office says the office has received \$4,300,000 from the Klondike and that he has a letter from the San Francisco office in which the statement is made that \$3,600,000 has been received there. Farnsworth, from Kotzebue sound, where he went last April on the schooner Marlon in San Francisco, says her voyage north in fifty-seven men aboard was something terrible. For days they were cooped up in bath hatches, with only canned meats to eat, the seas washed over the Marlon's deck. Farnsworth's party became disgusted with the prospecting late in August and returned to Kotzebue, where they found 800 hungry and the most penniless prospectors living in tents stretched along the beach for half a mile. Farnsworth says not one in ten had money to pay his return passage and not one had supplies for the winter. Neither food nor work was obtainable. Among them were several dozen women and children who were suffering for food. One family had been living on rice and pickled pork for ten days. The tents men were suffering from typhoid pneumonia, without any attendance but mustard plasters administered by their mates.

Rant, the government official in charge of the Lake Atlin district, says that the town has been taken away from T. J. Watson by the Government, by the declaration that the country for five miles around Atlin is a government reserve and no one can buy or sell land there. Lots will be leased on the reservation, it is said, for \$250 per month, and money thus secured used for municipal purposes in the townsite. A trail is being cut from Skaguay to the new gold fields, 92 miles distant, while they are 173 by Bennett and the steamers. A fair idea of the distance from Skaguay to Lake Atlin by way of the trail may be had from the following distances of the different places: Skaguay to Brooks' Camp, 25 miles; Brooks' Camp to river of no name, 15 miles; down river of no name, 8 miles; river of no name to Taku Arm, 10 miles; Taku Arm to Golden Gate, 5 miles; continuation of Arm to Portage, 14 miles; from Lake Atlin, 8 miles; Lake Atlin to recovery on Pine, 8 miles; total 92 miles. The entire distance from Skaguay to Taku is almost due east. At Golden Gate the trail turns to the right and then leads to recovery, a distance of 31 miles.

Recent Dawson arrivals say: "The benches will be the making of Klondike. The recent discoveries in that line of claims were the Dominion benches. Gold was found in wonderful quantities almost along the whole creek. Wages are much lower than last year. I think \$8 will be the prevailing scale this winter. It may go as low as \$7. On one day forty men were at work for 65 cents per day, instead of \$1.50, as last year. The big ones, as a rule, will not be worked this winter. One reason for this is that all the mine owners are on the outside enjoying the fruits of their labors. Hundreds of small ones will be opened up and many new creeks will be added to the list of producers. This winter's development on the new claims will determine the extent of Klondike's richness." The steamer Roanoke has arrived from Michael; thence October 8. When she left there were only three steamers there, the Highland, Protection and Garonne, which were all in a day or so for San Francisco, Seattle and Victoria respectively. They had only a few passengers. All of the Yukon river steamers had gone into winter quarters. The Roanoke brought down about 350 passengers and gold dust estimated at \$1,500,000.

B. Tyrrell, who was commissioned by the British Government to report on the geological formation of the Klondike has returned to Ottawa. He started in May last over the Dalton trail. Prof. Tyrrell gave the following sketch of his trip: After working over the Dalton trail to the Klondike, I visited every mining camp of importance. I think the country has vast riches, which will take some time to develop. With the exception of one or two creeks they have simply scraped the surface of that district so far. I believe it is purely a placer mining region, but I also believe that it will prove permanent. Next year I have no doubt the gold output will be double of this year's. It has cost an enormous sum to develop the mines even on rich creeks like El Dorado and Bonanza. Fortunes were made in this work. Miners were getting \$15 a day and the lumber and wood necessary to carry on mining operations cost the miners small fortunes. Now everything is different. There are plenty of men in the country to do the development work on the mines, and, with cheaper living, wages are down to a figure at which owners can go right to work with the work of seeing what the mines are worth. When I left Dawson there was a movement on foot to pay miners \$100 a month aboard them. Some of the principal mine owners were in favor of this. Only two creeks have been worked to any extent, El Dorado and Bonanza. Creeks like Hunter and Dalton and their tributaries have not been worked fully, although they are known to be rich.

ARIZONA.

The Vekol mine in Pinal county is shipping twenty cars of concentrates.—At the Harbinger mine work on the 40-stamp mill has begun. The World's Fair mine in Pima county is a lead and silver producer, and the shipping receipts show close to 1000 ounces per ton. In the Dragons the Middlemarch Copper Co. is opening up properties and from a ton jacket turned out considerable bullion. Cuprite Camp near Bisbee has fourteen claims. A shaft is down 115 feet and drifting has been done 100 feet from the 100-foot level. C. Fenner is Supt. Republican: The Cherry Creek G. M. Co.

of Yavapai county is reducing the ores of the Etta mine with a 10-stamp mill. The large vein produces ore ranging from \$15 to \$40 per ton.

The Mojave County Miner hears that the Cedar Valley M. Co. will soon begin work on their Cedar Valley property on a large scale.—At the Pay Roll, Juno, Silver King, Minnesota and Schuykill mines in Mojave county steam hoists are to be erected.

Yuma Sun: The Planet-Saturn mine at a depth of 800 feet has cut a vein of ore which is said to be high grade.—The Marshall copper mine has been purchased by the Live Oak Copper M. & M. Co., which is controlled by capitalists of New York.

Journal-Miner: M. S. Taft is developing the Sterling and Binghamton mines in Big Bug district. He has five carloads of ore on the dump for shipment as soon as the railroad to that country opens. He has a shaft 135 feet deep and 200 feet of levels, most of the openings being in ore, which is copper running 35 per cent, containing gold and silver.—E. F. Gage and others bought the McNary property in Copper basin. The claims are opened up and show a fine body of ore.

Belt: Supt. Amster has increased the force at the Continental mine near Globe to push development. A diamond drill will soon be used to prospect the property to the depth of 1000 feet.

Phoenix Republican: Two cars of heavy machinery have arrived at the Spenszuma mines and five cars more are en route. They are working forty men in developing and improvement work, and expect to double the force. They are putting in a combination smelter and milling plant that is expected to handle 500 tons of ore per day.—The development of the new gold finds in the Canyon del Oro near Tucson continues to hold out with depth. In one of the Purcell group the vein is over 3 feet wide of solid ore.

Florence Enterprise: At the Jack Rabbit mine in Pinal county a 10-stamp mill is being built.

Mojave County Miner: From the Colorado river near the old Senator mill come reports of the finding of big gold deposits. Over 2400 acres of gravel have so far been located. The most extensive deposits are twelve miles back from the river, but all the ground can be worked by hydraulic process. W. Walker brought two ounces of coarse gold taken out while prospecting with a drywasher. The men on the ground with drywashers say they can make good wages in the small gulches. The best ground is too far from water to be worked properly by machine. The whole north end of the Cerbat range, where the river cuts its way through, is said to be gold bearing. Only the coarse gold can be saved in the machines, the fine going over the tailboard. So far as prospected, the ground will yield from one-half to one cent to the pan. The great body of gravel is low grade. Men have already looked the ground over with a view to putting in a big plant on the river.

Yuma Sun: The McNary mine, in Copper basin, Yavapai county, has been sold to E. B. Gage and others, and a large force will be employed to push development on the property.—At a depth of 200 feet, 5000 pounds of ore from the Good Hope mine, Yavapai county, runs 6.6 ounces in gold and 3.7 per cent copper; dry: the net return being \$105.87 per ton.—A carload of high grade ore is taken out monthly from the World's Fair mines, in the Harshaw district. On Sept. 27, twenty tons were shipped, which returned over 1000 ounces of silver, \$6 in gold and 23 per cent lead. A 10-stamp mill and three concentrators handle all of the fine grade ore not shipped. Development has reached 400 feet depth, and the veins are from 1 to 20 feet in width.

CALIFORNIA.

Amador.

Ledger: Joyce & Watkins are opening a mine near Jackson. They have a 4-stamp mill, which is being operated at a profit by steam power.—Near Drytown the Centennial mine has been unwatered by a company represented by L. A. Gross. The intention is to sink the shaft an additional 200 feet and thoroughly prospect it. The shaft is down about 300 feet.—The Loyal Lead for many years has been many times bonded, but no results have been obtained. Now an agent is buying up the shares, with hope of reopening the property, in connection with the North Gover.—The Gover mill was burned last week, together with the retort house. The fire was supposed to be of incendiary origin. This is the third mill burned in that neighborhood in a short time—the Bunker Hill of forty stamps, the Cosmopolitan of thirty stamps and now the Gover of twenty stamps. All of these were idle when destroyed.

Dispatch: In the north shaft at the Kennedy mine about 350 feet needed retimbering and the work is about half done. During the progress of this work all the ore taken out of the mine is hoisted through the south shaft. It will be about six weeks before the work is completed. The engine and boiler for the mill are in place, and will be ready to run next week. The mill is dropping forty stamps, and the ore yields the usual average.—In the Iron Bound mine, near Volcanville, unwatering the shaft is progressing.

Record: The Balioi G. M. Co., Sutter Creek, elected C. F. Bishop Pres., R. L. Cheney Sec., S. R. Porter Supt. The mill will start up in a short time.—Two hundred tons of ore are being hauled from the Lincoln mine, Sutter Creek, to the Zeile mill for crushing. It will probably pay between \$30 and \$40 per ton. Mgr. Voorheis expects to have a 40-stamp mill on the Lincoln by next spring.

Butte.

The Oroville, Cal., Water Co. has forty men enlarging the Miocene ditch and laying a pipe line under a 300-foot pressure to supply the town with power for electricity. The ditch will carry 2500 inches of water.

Register: The Mt. Ida quartz mine, near Oroville, milled 100 tons of ore that yielded

\$600. The ledge is 6 feet in width. The tunnel taps it at 300 feet.—At the Carlisle mine, near Enterprise, work will soon be resumed.—The New York M. Co. has sixteen men building a ditch near Brownsville.

Marysville Appeal: The lease to H. P. Stow, Supt. Gold Bank and Golden Queen mines, near Forbestown, has expired on the latter property, though it is presumed that it will be renewed.

Calaveras.

(Special Correspondence)—E. K. Stevenot, M. E., is running a tunnel into Chaparral Hill, near Angels camp, to tap the chimney of gold ore discovered in a shaft sunk on the Rothschild, Vanderbilt and Chaparral Hill group of quartz mines, on the mother lode; the tunnel is in 20 feet, and indications favor a strike soon.—A strike was made this week in the Big Bonanza mine between Chaparral Hill and Angels camp.—At the Melones Con. group of quartz mines the development work is being pushed ahead with great activity and fine results are obtained. The repairing and enlarging the canal and flumes of the Union water ditch, which brings the water into Angels camp and vicinity, has been finished and the mines of that locality will be supplied with plenty of water shortly.

Angels, Oct. 15th, '98.

In the Ford mine at San Andreas at the 700-foot level two ledges have been crosscut and drifted upon, showing a large body of low-grade ore, with a rich streak of quartz which will bring the value to a reasonable figure. The company has decided to erect a 10-stamp mill and operate it on ore from the upper levels, and make tests in other places in the mine to demonstrate the advisability of erecting a mill of greater capacity.

The action of the Carson Creek M. Co. directors in voting J. H. Dickinson \$37,000 for services in selling the property to W. H. H. Hart for \$115,000 is sought in the Superior Court to be set aside by W. H. Porter, who alleges "fraud and conspiracy," as the purchase of the mine involved no payment of money by Hart.

Citizen: Lloyd & Allen, at the Shot Gun mine near San Andreas, are sinking a new shaft.—Work has been resumed at the Macomber mine at Jenny Lind.—Mitchler & Co. have begun operations near Murphys on their mines, the Ozark, McGowan and Dena.—The Gwin mine at Mokelumne Hill is working full time.

Prospect: The Ford M. Co., San Andreas, will build a 10-stamp quartz mill, to be completed the first of January.—At the Paragon a 4-foot vein of ore was found last week in the upper tunnel.—F. Grove has bonded his Black Wonder mine to San Francisco people, who will develop the property.—The Lightner mine, which was flooded recently by a break from the old works, has been unwatered and the company will resume operations as soon as water for power can be had.

Chronicle: At the Machu mine, in the West Point district, the shaft is down 130 feet. The lead at the depth of 70 feet and also at 130 feet averages from 2 to 12 feet in width. The ore ranges from \$7 to \$9 per ton. Ten stamps are in operation. Wm. De Witt has a bond on the mine, and under his supervision operations are conducted.—The Defender mine at West Point has a shaft down 70 feet on an 18-inch ledge on high grade rock. They have a 4-stamp mill and propose to increase their facilities.

El Dorado.

(Special Correspondence).—On that part of the mother lode between the Cosumnes river and Weaver creek, a distance of ten miles, there is much activity in mining. The shaft of the Crown Point is being sunk at the rate of 25 feet per week. The East Mother Lode mine is being worked from the tunnel, and I understand they have flattering prospects for a mine. The ledge is from 12 to 15 feet wide.

At the Griffith Con., in Diamond district, they have completed a 20-stamp mill, to be operated by electricity. The power is obtained from the Cosumnes river, 4½ miles distant, under a pressure of 1000-foot head. They have 7000 tons of high grade ore on the dump ready to be milled, and it is claimed they have a large amount of ore practically in sight.

At the Larkin mine, Diamond Springs, they have cut the ledge on the 400-foot level, which is said to be as good as the vein on the 300-foot level, which is 7 feet wide. The management claim it will mill \$40 per ton.

The Margurite, which joins the Larkin on the north, was sold to Eastern people during last week, who have incorporated under the name of Margurite. They are now in San Francisco purchasing machinery, preparatory to sinking a shaft on the property 1000 feet deep.

The Ribbon Rock claim, in the same neighborhood, has been bonded to Salt Lake people, and development upon the same was commenced last week.

At the Gold Note mine, twenty-six miles east of Placerville, they are working about seventy-five men, and things are looking prosperous in that vicinity.

At the Barnes mine, Shingle Springs, they have the water out and shaft retimbered to the 250-foot level.

Near El Dorado, Richards & Clark are erecting a mill on what is known as the old Field claim. They have a large dump of high-grade ore, and the mill will be started on the same the coming week.

At the Landecker gravel mine, near Placerville, Thos. Clark has struck it rich; he is taking out gravel going as high as \$20 per ton.

At Poverty Point J. Melton is building a 15-stamp mill, which is expected to run about Nov. 1st.

At the Gold Bug mine, situated in the town of Placerville, high grade ore is being taken out ready for the mill, besides occasionally some very rich ore is brought to the surface. Placerville, Oct. 17th, '98.

The mill at the Eagle King mine, Grizzly Flats, idle for some time on account of water scarcity, has resumed work.—The U. S.

J. B. Selby to hydraulic near Diamond Springs.

Georgetown Gazette: Stone & Leahy of San Francisco are opening up a mine at Volcanville under a bond. The company will be known as the Gentle Zephyr G. M. Co.

Inyo.

The Meneva M. & M. Co., made up of Pittsburg, Pa., business men, incorporated under the laws of New Jersey, will operate in mines in the Pahump and Teopas neighborhoods. C. C. McCarthy is Pres. and W. W. Hammond is Sec. and Treas. It is said that \$1,000,000 is to be invested in developing the properties in Inyo county, Cal., and Lincoln county, Nev.

The Halbert interest in a group of mines in Pleasant canyon, Panamint mountains, has been sold to M. Godmark for \$7735 cash.

Kern.

Los Angeles Review: The Black Hawk mine in the Stringer district has large bodies of low grade ore, as well as considerable high grade.—The Baltic mine has been leased to miners, who are taking out ores and shipping to Koehn's mill.—The Gold Coin mine is worked by the owners, Mann & Co., who are taking out ore. They have a ledge of 2 to 24 inches. They are upraising from the 180-foot level.—The Merced mine is rapidly gaining depth. They are taking out ore running \$200 a ton.—The Winnie mine has a number of tributaries working. Most of them are making good wages. The ores are rich, but the veins small.—The Buckboard mine has a large body of low grade ore, with some high grade. They are down about 180 feet.—The Keyton, near Randsburg, has struck sulphurets at the 330-foot level, but they have not yet ascertained what values the new strike carries.—The Little Butte mine has reached a depth of 530 feet and shows a large body of sulphurets ore. The extent of the ore has not been determined, nor has the value which can be saved, nor the best mode of treating them. The ore bodies here in many instances are spotted, and to an uninitiated person the ore-bearing sand is almost identical with the ledge matter.

Mono.

Bodie Index: The Standard Con.'s accounts for September show receipts of \$34,800 and disbursements of \$21,500, leaving a balance of \$13,300 to be added to the surplus of \$32,742, making a total of \$96,042 on-hand. A former Debris Commission has granted a permit to foreman of the mine said it was but a jumble of old timbers in worked-out ground, but the mine continues its profitable output.—The Dunderberg property will be sold at sheriff's sales on the 24th. Legal entanglements have tied up the property, but it is locally stated that after the sale operations will be resumed.

Napa.

Calistogian: The Napa, Etna and Great Western mines near Calistoga shipped 830 flasks of quicksilver in September, seventy-two flasks less than were shipped in August.

Nevada.

Wm. Campbell tells the Grass Valley Union that he has just had completed a crushing from the Norambagua mine of Forest Springs, which paid \$75 a load and that "there is plenty more of the same kind in sight."

Union: Near Grass Valley the Holbrook mine struck gravel that proves of good quality and quantity.

Transcript: At the Eagle Bird mine, Maybert, as soon as winter sets in, a large force will be put on.

Herald: The Superior Court has ordered a receiver appointed and a survey made in the case of Andrew & Ellison vs. G. Fletcher and the Reddik M. Co. at Nevada City. The plaintiffs owned the Reddik claim and bonded it to Fletcher, who bonded it to the Reddik Co. Plaintiffs claim failure to keep contract on part of defendants and demand the return of the property.

Transcript: The new bedrock tunnel at the Malakoff mine, North Bloomfield, is in 600 feet, leaving 200 feet to be run to tap the channel. It is expected the work will be completed in six weeks. The ground has changed to a soft quality, and the Burleigh drill has been temporarily dispensed with.

Placer.

Colfax Sentinel: The extensive river mining operations at Cash Rock mine, near Forest Hill, have come to a sudden close this season. During the rainstorm Oct. 2nd a cloudburst precipitated a volume of water on an area of about 200 yards up Dardanelles canyon. This, added to the flow of the river, carried away a large portion of the flume of the Cash Rock Co., and owing to the lateness of the season, operations have been discontinued until next spring. Before the cloudburst fifty men were employed. A log dam 160 feet in length held the water in the river, which was conveyed by a large flume 600 feet.

Plumas.

Plumas Independent: Near Buck's Ranch a San Francisco company is building a quartz mill on the Kellogg claim.—W. De Long, who for some time past has been preparing for heavy mining operations on the North Fork, near the line of Mineral Tp., has done a large amount of work, and at heavy expense for labor, machinery and other material. His company is composed of business men of San Francisco, who are determined to conduct matters to a finish. They have a dam completed that will stand the highest waters of the North Fork. They have the river bed dry, and are getting out rich gravel.

Riverside.

Crawford & Bowles, at the San Diego mine, in the Chuckawallas, have begun further development.—Supt. Clark of the Chuckawalla M. Co. says these properties will resume as soon as reduction works to treat the ore are in place.

San Diego.

Work has been suspended temporarily at Deer Park because of the dry season. The

mills are obliged to shut down, though the miners continue to take out ore.

San Diego Union: The Escondido G. M. Co. has sued out an injunction against the Duquesne G. & S. M. & Co. of Colorado. The complaint asks for a temporary injunction to prevent them from disposing of certain property, the appointment of a receiver, and the return of a deed in escrow.

The **San Diego Union** says that the Helvetia mine at Julian has been sold to a Denver Co. and arrangements made to drain the lower levels of the mine and outfit for a test of its ores. If it proves satisfactory they will buy the property and begin extensive improvements. It has lain idle for seven years and was filled with water. The output of bullion from the Golden Cross mines at Hedges for September is reported at \$48,000. Receiver Pauly says this will enable him to reduce the company's indebtedness \$23,000.

San Bernardino.

Shipment of ore from the mines of the Peacock Co., near Latic, has begun.

Shasta.

Democrat: The 10-stamp mill at the Spanish mine, Lower Springs district, is running night and day. Fifteen men are employed at the mine. Capt. Taylor and F. Deakin of San Francisco are owners. The Princess Hydraulic M. Co. have settled litigation with J. K. Williams over a water right which will give the company water to work their mine.

—Reliable authority says that the Bully Choo group of mines in the western part of the county is about to pass to a Scotch company.

Free Press: With the first rain, insuring sufficient water for the purpose, E. P. Conner will start his quartz mill on Salt creek. Considerable good ore is on the dump. At Keswick the smelter plant is being worked to its fullest capacity. The three large blast furnaces are turning out matte. Besides these, there are a number of other furnaces consuming ore. The company is building another large smelter. There have arrived in San Francisco three ships filled with coal and coke for the Mountain Copper Co. and the railroad company is running special trains to the smelter. In the company's railroad yard last week were 100 box cars loaded with coke. All over the smelter yard matte is awaiting shipment. A writ of attachment was filed on the 10th of October by J. H. Wolkotte against the entire property of the Euclid Mining Co., better known as the Gladstone Mining Co., near French Gulch. The amount of the attachment is \$1707.45 and costs. Wolkotte has been acting as superintendent of the property, which consists of a number of claims and a milling plant of twenty stamps. During the past few months many improvements have been added to the equipment.

Sierra.

Transcript: At the Plumbago mine near Alleghany the dam across the Middle Yuba is completed and work is being crowded on the mile and a half of flume. An electric lighting plant is being put in. The machinery of the mine is to be run by compressed air that will be transmitted 6500 feet to the works, which are 1500 feet above the generating plant at the river side.

Siskiyou.

B. F. Thornton has returned from New York, where he sold a three-fourths interest in the Gray Eagle Con. mine of five claims near Yreka.

The company prospecting Yreka creek has finished the work from Shasta river to Yreka and will soon determine as to operating the property. Hunter & Co. at Cherry Hill are taking out quartz and awaiting the rains to start crushing. The miners along the Klamath are working day and night, anticipating the winter storms. The hydraulic miners throughout the county are prepared for successful operations as soon as supplied with water.

Report: J. Camp of Fort Jones sold the Portuguese Flat placer mine on Klamath river to C. C. Gilbert for \$2000.

Journal: The Yreka Co., driving a tunnel in Humboldt mountain, has reached a 7-foot ledge streaked with galena, at 570 feet, and 300 feet depth. The Pacific mine on Klamath river, has been paying big; the output this season will be the best known. The Spengler Bros.' claim at Humboldt is being shaped for winter work.

Yreka Journal: The Pacific mine on the Klamath river has been paying well lately. Several rich spots have been found that the pioneer drifters failed to reach. The Chinese Co. having a lease on the McConnell & Quinn mine at the lower end of the island in the Klamath river near Humboldt have been doing much work. At Benz Bar, Manzanita Bar and other places on the Klamath near Honolulu the miners feel hopeful of good returns.

Trinity.

In the Boulders mine near Carville the ledge has been cut 20 feet, and the wall has not been reached.

The Daly & Eckert mine, near Trinity Center, consists of 120 acres of gravel. The work done this season has been in the nature of equipment. A half-mile flume has been built and water conveyed to a reservoir, giving 300 feet fall. Hydraulic mining will begin in spring.

—Wallace & Mahoney, hydraulic miners near Junction City, are laying a pipe line and will soon be ready for work. Near Doeblinville Rogers & Thresher have cut a 14-foot vein of fair ore.

At Trinity Center a large force is cleaning out ditches and building new flumes for the Bloss & McClary gravel mine. The company will work on a large scale as soon as there is sufficient water. The mill connected with the mine is turning out 15,000 feet of lumber a day. It will require 350,000 feet for the construction of flumes. The Hill mine is sending ore to Delta on horseback over a mountain trail about twenty miles and thence by rail to the Selby smelter.

Tuolumne.

(Special Correspondence).—The Dreisam M. Co., like other properties in this county, is waiting for water to start its mill. The company has been taking out ore in its development work that has more than paid expenses. The Dreisam has been opened exclusively on the installment plan, which method has been quite a success. At the annual election last week the following officers were elected: G. Trittenbach, Pres.; B. Healy, Vice-Pres.; A. W. Livingstone, Treas.; A. Trittenbach, Gen. Mgr.; Geo. W. Gearhart, Sec'y. Soulsbyville, Oct. 17th, '98.

Banner: A spring layer of gravel has been disclosed at Springfield by the Tuolumne G. M. Co. at a depth of 84 feet. They have penetrated it 18 feet. The Wyoming mine, near Yankee Hill, will erect a 10-stamp mill. The Chaparral mine contemplates building a 10-stamp mill. Twenty men are employed at the Densmore mine, Parrot's Ferry.

Magnet: The Golden Key mine, owned by San Francisco people, on Moccasin creek, is being opened by a tunnel, in 400 feet, where it taps the vein. It is being extended 400 feet. At the Mt. Jefferson mine, Groveland, the shaft is down 180 feet on the ledge, the ore showing up well. Water is coming in so fast that a steam pump will have to be put in. Nine men are employed.

Union-Democrat: At the Donella mine near Sonora a new chute has been found. The property had been successfully worked for years, until a slide had cut off the vein, and after considerable work and expense the property was abandoned. Recently it passed to Coude & Co., who cleaned out and retimbered 185 feet of the old works and ran a 60-foot drift. They found a vein that runs from 15 inches to 5 feet. Ten tons of ore plated \$70, and yielded 1 per cent sulphurets running \$200 a ton. At the Rawhide the main shaft has reached 1500 feet. Drifting will be pushed both ways on the vein, which is from 30 to 35 feet wide. The forty stamps will soon be dropping. Everything is in readiness to receive power from the new electric plant. The new hoist will be run by two 200 H. P. engines. The plant will be capable of sinking 4000 feet. The Rawhide has been deeded to the App Con. At the Mt. Jefferson in Groveland operations are confined to shaft No. 2, which is down 230 feet. It is proposed to sink 400 feet. The vein is 7 feet wide, carrying 4 to 5 per cent sulphurets. Ten men are employed. The hoist is good for sinking 700 feet. A 10-stamp mill, to be run by steam, is contemplated. J. N. Meighan is Supt. At the Big Oak near Big Oak Flat, J. G. Moody Supt., the 5-stamp mill is run by steam. In the mine sixteen men are at work. Sinking continues. The vein shows from 5 to 7 feet of quartz. Baumgartner & Co., operating the Concord gravel claim near Springfield, after sinking 64 feet struck gravel, into which they sunk over 5 feet, but have not yet found bedrock. The gravel is said to average well. A steam hoist is contemplated. The Accident, owned by T. Reed, has been bonded to local capitalists, development to begin immediately.

Independent: The Agnes mine, near Sonora, has some good ore on the dump and will sink the shaft 100 feet deeper. At the Junction mine the shaft is 200 feet. The fissure is large. A new 11-inch water pipe line is being laid to operate the hoist and mill at the Bonanza mine. The 4-stamp mill began crushing ore last week with steam power. The shaft at the Eureka Con. at Carters is down 1670 feet and improvements about the mine are in operation, principal among which is the construction of a cyanide plant. Everything will be ready to begin work when water comes. The new 20-stamp mill of the Alameda mine, Jamestown, started last week under steam power. Stover & Shorey, bonders of the Doyle mine, near Robinson's Ferry, are running a tunnel to tap the vein at 500 feet depth; the ore body is from 12 to 20 feet. Kinzer & Co. have eight men working in the Tuolumne river, near Jacksonville. A dam 200 feet in length turns the river. As far as the work has progressed a good prospect is noted. Work has been suspended by the Stockton Gravel M. Co. on their ditch from the middle fork of the Stanislaus river, to be run to the old Philadelphia diggings, near Columbia. The ditch will carry 1500 inches of water, having a fall of 13 feet to the mile. The Brewer and Adams mines, operated by Pickle & Kenney, in the Blacket Creek district, are crosscutting for the pay chute.

Yuba.

Marysville Democrat: At Brown's valley work is progressing in the Pennsylvania and George Smithurst mines. Quartz is taken out of both these claims and the mills are crushing part of the time. Smithurst has only a 5-stamp mill, yet the quartz pays more than the expenses of extracting and milling. In the Pennsylvania some of the quartz is good.

COLORADO.

BOULDER COUNTY.

At Ward the Teller and Davis mines were sold last week to Boston capitalists, who will work them. The Teller has iron ore 2 feet wide that runs from six to fifteen ounces gold to the ton. The price is not made public.

News: The Revenge mine near Boulder made several shipments ranging from \$80 to \$125 per ton. The shaft house and machinery of the Franklin mine near Copper Rock were burned last week. The loss was \$2000. The Standard mine at Springdale has made its second cleanup, amounting to 110 ounces. H. H. Green has started a mill at Sunshine, which, it is claimed, is successfully treating the low-grade tellurium of that section. His process is said to recover from 80 to 90 per cent of the values at a nominal expense, making marketable ores as low as \$9 per ton.

CLEAR CREEK COUNTY.

The Puritan mine near Idaho Springs recently made a shipment of 17-ounce gold ore.

—From the Shakespeare at Freeland several tons are shipped daily. Arrangements have been made for the starting of the North Lamartine near Idaho Springs by Denver capitalists. Thirty tons will be shipped daily. The Edwards mill near Empire, the Silver Mountain and the Conqueror mills handle 500 tons of ore a week.

CHAFFEE COUNTY.

The Jasper mine, near Salida, recently bonded for \$17,500, is working two shifts.

EL PASO COUNTY.

The deal which has been pending for the Lillie claim at Cripple Creek closed last week. The Lillie mine and plant was sold to the Lillie G. M. Co., Ltd., of London, England, for 214,044 shares of stock in the new British corporation—a par value of £1 each.

Three feet of pay ore has been found in the Bonanza King, Cripple Creek, running from \$80 to \$400 a ton. A 100 H. P. electric motor is being installed at the Moon-Anchor to operate the pump at the 600 level. The Pinto at Altman is making an output of nearly 100 tons a week.

Record: Returns from an eighteen-ton shipment from the Matton lease on the Dante at Victor show values of from \$75 to \$200, according to grade. The bond and lease on the Mitchell mine were sold to a company represented by D. F. Campbell, who agree to put up immediately a new plant of machinery, push development for ninety days and pay \$15,000. This is aside from the purchase price of the property, which is \$50,000. The sale of the bond on the Lafayette, a fractional claim, was made for \$60,000 by J. B. Twitchell. The amount paid for the property, over and above the bond, is not made public. The production of the Gold Coin mine for September exceeded 2800 tons. A new hoist capable of sinking 1200 feet has been placed; two large hoists are now in operation, and new air compressors, as well as an addition to the boiler capacity, will be installed shortly. Stratton's mine has not yet started on the promised increase in output, but is shipping an average of forty tons daily, one-half of which is mill dirt and the remainder of smelting grade. The Areqa-Savage on East Beacon hill has been leased for two years to J. Dozier, representing Eastern people, for \$70,000.

Investor: From the Moon-Anchor last week 265 tons were shipped. Of the total, 200 tons were smelting ore and 65 tons mill ore. Simmons & Co.'s last shipment consisted of seven and one-half tons that averaged \$570 per ton, nineteen tons that went \$151 and twenty tons of \$55 ore. Estimates of Cripple Creek's September production show \$1,441,320. This is the largest production for any month since the discovery of the camp.

GILPIN COUNTY.

During September 495 stamps dropped in Black Hawk mills. They handled over 500 tons per day. The concentrators converted 1500 tons of crude ore into 500 tons of concentrates. Lessees of the East Notaway mine shipped to the Black Hawk sampler 20,324 pounds of ore that netted \$1610.46. The shipment previous netted \$1046.90. The values vary from \$29 to \$185 per ton. During September there were shipped from the Black Hawk depot of the Gulf road 336 cars of ore, 5368 tons.

Register-Call: Near Central City the Bon Ton mine has been leased for \$15,000 for two years to W. L. Ireland. The shaft is down 308 feet and the new operator will continue sinking it.

GUNNISON COUNTY.

The silver properties in the Tomichi district employ 150 men and ship considerable ore.

LAKE COUNTY.

Shipments of 130 tons per day are made from the Resurrection properties at Leadville. There are 110 men employed. The ore bodies in the Fanny Rawlins mine are 50 feet wide. The ore is said to net \$100 per ton in gold, silver and copper. There are sixty-five men working. Unwatering the thirty miles of workings in the basin mines at Leadville has begun.

News Reporter: The South Park people have everything in readiness for pushing work on their twenty-mile extension from Leadville to the mines and will have trains handling ore and passengers over the spur by January 1st.

Denver Post: The Iron-Silver M. Co. at Leadville began a few months ago draining this property. The company is a New York concern. Thousands of tons of ore are blocked out that can be mined to a profit, and there is a large territory open for exploration work. During the past two months the pumps have been going steadily, handling 30,000 gallons per hour and draining the levels and drifts which for the past six years have been filling with water. The second level is under control and a big compound pump will be placed in position, which will handle still more water. The Rubie and Minnie lease is showing up nicely and shipments for the last month were about 500 tons of ore, mostly lead sulphides. The Rubie is about 525 feet deep. The property is a part of the Iron-Silver group. It is stated by some of those who handled much of the ore taken out of the Leadville mines last month that the tonnage was about 18,000 tons.

OURAY COUNTY.

The Fowler smelter at Ouray is receiving ore from thirty properties, more than twice as many as at this time last year. The Tom Boy pumping station at Lake Pitanigan, was burned last week, together with 400 tons of coal, and engines.

PARK COUNTY.

The mines in the Hill Top district are sending down 110 tons of ore per day over the tramway. A miner who gathered up the ore spilled from the tramway recently received \$400 for the lot. The Mabel Grace mine, in the Freshwater district, is said to have a 40-

foot body of ore that averages \$8 per ton in gold.

PITKIN COUNTY.

Denver Mining Record: The Smuggler mine at Aspen is again on fire and will probably undergo another siege similar to that of eleven months ago. The fire in progress is above the sixth level and in a smaller slope than the one a year ago.

RIO GRANDE COUNTY.

Denver Mining World: The pumps have been started on the Mammoth mine, near Platoro. As soon as the mine is unwatered two shifts will be put at sinking and drifting under the big body of ore opened up in the tunnel.

SAGUACHE COUNTY.

The Commodore mine at Creede is working a force of about 200 men and is the heaviest shipper in the district. The electric lighting system for the tunnels and ore houses is nearly completed and is a credit to Mr. Moore.

SAN JUAN COUNTY.

The strike in the Anadue mine on Hurricane peak gives mill-run tests of 11 ounces of silver, 12½ per cent copper and \$6 in gold. The Silver Ledge mine at Chattanooga is producing fifty tons of ore a day of an average value of \$9 a ton and about ten tons daily of concentrates.

Silverton Miner: B. D. Smith shipped a carload of silver ore from the Silver Queen mine near Silverton. Next spring a 100-ton concentrator and a tramway will be placed upon the property. The mine produces twenty tons of milling ore to one ton of high-grade shipping ore. The Gold King M. & Co. Co. output in concentrates is sixteen tons daily.

SAN MIGUEL COUNTY.

San Miguel Examiner: The Japan mine and concentrating plant near Telluride are running full capacity and employing 100 men. The mill is treating sixty tons of ore and turning out from fifteen to twenty tons of concentrates every twenty-four hours. The concentrates average \$100 per ton in gold, silver and lead. To this output of \$50,000 per month may be added returns from high grade ore shipped to smelters. Several carloads are shipped weekly and net from \$750 to \$1000 per car. A. G. Kirby has a California canvas plant in operation below the Japan mill, which is successfully treating the tailings. The Nancy Hanks at Saw Pit is added to the shippers from that camp. The Contention group in Bear creek is pending sale to Boston capitalists for \$275,000, and the prospective purchasers are exploiting the property. The Valley View mill, on Marshall creek, is disposing of twenty-five tons of mineral daily. The ore is free milling and runs principally in gold. The ore averages \$15 per ton, yet the mine is said to be one of the best dividend payers, considering the scale on which it operated, in the district. The vein ranges from 10 inches to 4 feet wide and the value is uniform. The 10-stamp mill is connected with the mine by a wire rope bucket tramway 2000 feet long, and every known device has been put in for the cheap handling of the product.

SUMMIT COUNTY.

Journal: After nearly ten years and the expenditure of over \$100,000, the Mountain Pride Co., near Breckenridge, the past two weeks disclosed several ore chutes; the vein varies from 2 to 4 feet, the ore values being two ounces gold, fifteen ounces silver and 7 per cent lead.

The El Dorado mine, at Robinson, is shipping forty tons daily of sulphide ore. It is mined at a depth of 1100 feet.

IDAHO.

Near Wallace a strike was made in the Standard mine of 9 feet galena, 60 per cent which is clean shipping ore, in the first level below the permanent water line in the mine. The strike is 1100 feet below the surface. The ore assays from 67 to 70 per cent in lead, and from 58 to 61 ounces in silver. This is better than the ore bodies above, from which the Standard people have paid their dividend running from \$50,000 to \$80,000 per month. The mine, under the management of J. A. Finch and A. B. Campbell, is employing about 150 men and shipping 300 tons of ore per day. The new ore body will be opened up as rapidly as possible and shipments will be increased. The company has ordered a new hoist, which will be installed about Dec. 1. It will be large enough to sink 2500 feet below the level and will cost \$40,000.

Idaho World: The Tyrannis mine at Ketchum has begun work on a 900-foot tunnel. The pipe line for the Lucky Boy mill will be a mile long. The Bunch quartz mine near Grimes Pass, has a shaft 200 feet. Two shifts are putting a raise from the drift to the surface, following the vein. The ore is big grade in free gold. It is owned by a Texan company, who contemplate erecting a star mill as soon as spring opens. Woodburn Anderson's 5-stamp mill at Grimes Pass crushing high-grade ore from the Pheasant mine. The Wells arrastra is running. Work is progressing at the Morning Star. Some placer mining is still going on along the Upper Grimes creek.

Hailey Times: E. B. Kirby of Colorado examining the Hope group of mines for the company; he has six men to assist him and will take him a week longer to complete his examination. Future operations of the company will be based upon his recommendation. About thirty men are at work on the pipe line for the new Tiptop mill. The pipe is to be laid in a trench 3 feet deep and over 11,000 feet long.

Boise Statesman: The Bedrock Dredge Co. has its dredge at Placerville in operation. It has a capacity of 3000 cubic yards per twenty-four hours. The machinery on the boat is run by five electric motors. The Boise Dredging Co. is building a sister machine to that at Placerville, near Centerville to be completed December 1st. The power

of the Boise Co. on lower Grimes creek furnishing power for the Placerville dge, and will do the same for the Center machine when it starts. Its capacity is H. P. It also furnishes light for the boats at night. The power house is twelve miles in the dredges. The current from the ice-phase generator is carried on three No. 10 copper wires. The pressure used on line is 10,000 volts.

MONTANA.

The Nancy Hanks at Basin shipped nine carloads of ore to the smelter last month. The Mouton mine at Neihart is closed while a concentrator is being built. Experts have examined the mines of Neihart and find that the ore in nearly all the mines can be concentrated.

The dredging plant of the Cooney Placer near Sheridan is making fair progress in its machine, although bedrock has not been reached. A 300-ounce cleanup recently the result of a week's run. The concentrates at the Leiter mill, estimated at 20 tons, will be shipped to East Helena this and winter. They are, for the most part, grade, but carry a high percentage of which makes them valuable for fluxing. The dredging system in use by the Ban-placer companies is a complete success. A result of two seasons' operations one of machines has worked an area 1900 feet by 600 feet wide and 35 feet deep. The mine of Siltes is shipping four carloads of high-grade ore, which it packs four on horseback. It yields gold and copper will pay even under such conditions.

The Anaconda Copper Co.'s report shows it made in working low grade ores. The company's average 4.26 per cent copper, ounces silver and 0.011 gold per ton. The return to the ton of ore treated for year ending June 30th, '98, was \$11.22. The company shows net profits equal to 11.8 cent on the capital stock—\$30,000,000—and a 10 per cent dividends. The report shows of the total expenditure for the year 1900 costs contributed 41.7 per cent, reduction 45.3 per cent, freight charges 5 per cent, refining at seaboard 7 per cent, interest general expenses 1 per cent. The total of extracting metals from the ore and refining them in marketable form was \$7.125.

Placer Miner: The pumps have been started at the Pilot mine for the purpose of expert excavation. If the property passes a company reopen it.

Placer Miner: Development is going on in the Cora mine near Butte, which is under lease by the Montana O. P. Co., though the training order secured by W. J. Ladd, assessor of the Boston & Montana, has opened ore shipments for the present. The ore on the lead from which ore was being mined is 300 feet long and only 55 feet of this is in controversy. J. R. Toole, the expert on the Anaconda Co., visited the Moose Lake district, near Phillipsburg, and inspected copper properties being developed there. He stated that the Anaconda Co. tried to acquire a bond on the property for \$100,000. It consists of a group of claims on all of which there has been considerable development work and the showing is said to be good.

The Silver King mine has opened a vein of ore averaging sixty ounces, the ore body from 30 inches to 5 feet wide. The strike was made at a depth of 178 feet. There are twenty-three men at work.

Indianian: The Lester mine, near Virile City, has been sold to W. A. Clark, who said to have paid \$100,000. It was discovered a year ago; nine months ago it was sold to Helena people, who, after working some time, abandoned it.

Dillon Examiner: The new dredge boat of the Bon Accord Co., at Bannack, last Sunday sank to settle and sank within fifteen minutes. It turned in sinking and lies on the bottom of the creek with one side of the hull totally above water. Mgr. Ball is unable to assign a cause for the accident. Experts are investigating and also arranging to raise the boat. The silver smelter at Great Falls to resume operations with about 175 men—more than at any time since 1893. It is understood the company also contemplates leasing mines in Neihart and Barker.

NEVADA.

Near Wadsworth a quartz mill of ten tons capacity has been erected for crushing ore from mines in the district. J. Smith is leaching the tailings of the old Wilson mill at Pine Grove; made a good cleanup of auriferous, and reports the work resulting satisfactorily.

Near Dayton, R. Logan has made a successful cleanup at his Como mill of 450 tons of free milling grade, enough to pay for mill and bring and leave a profit. In the Golconda copper district at the Adelaide group of mines a mill, smelting and crushing plant has a capacity of 300 tons. The lowest works are on the 250 level. The railroad from the mine to the reduction plant, twelve miles, will be completed by Dec. 1st, when extensive operations will begin. The company employs seventy men, but expects increase that number to 900 in two years. Aurora, Esmeralda county, now has but a few residents employed in doing annual holding work on unpatented mining claims and at Raymond's cyanide plant. Schultz & Pfeiffer's stamp mill, two miles from Aurora, is crushing ore.

The mines at Ione and New Pass are being worked steadily, though with a decreased number of men at the first named place. Ickett & Miller, who recently bought the ranch or Deer Trail group at Pike's Diggins near State Line, are working a good ore and taking out high-grade gold ore.

Another reverberatory furnace has been started at the Golconda plant, which gives three furnaces and two roasters. The Dextr of Tuscarora shipped eleven and one-half tons of ore, amounting to \$6095.93, and auriferous of \$3800, increasing the cleanup for

September to \$21,195. The ore yielded \$526.92 per ton, being 26.65 ounces gold and 20 ounces silver. Sixty days ago a lot of high-grade showed a valuation of 16 ounces gold and 18 ounces silver per ton. Ore of this quality, which appears and disappears in the main body, is not trusted to the plates, and while shipments are made only at long intervals, about \$25,000 has been derived from them since September, 1897. Only ten stamps were dropping in September. At Cherry Creek a company has been formed for the erection of a 100-stamp mill to be built at Chin Springs, the mill and mine to be connected by a railroad or tramway six miles long. About fifty men are employed there. The Glasgow & Western M. Co. has made another payment on the Copper canyon group in Lander county of \$25,000. The Copper canyon group was worked years ago, and was productive of considerable ore. The long haul to market caused it to be closed. Under the present owners it affords employment for twenty miners. The output last month was 200 tons of ore that afforded a good profit, and the company is pleased with its investment.

In the mining camp of Jumbo, on the west side of Mount Davidson, nearly eighty men are working and all are pleased over the prospects. The Bulldog M. Co. of Dayton has found good gravel.

The English company operating the Churchill county nickel mines near Lovelock are reported to have perfected a process of producing nickel salts directly from the ore. The salts are used extensively in nickel plating. There are large resources of nickel ore in the mine.

Silver State: Brim, Deegan & Cowden have sold the Deno mine in Pueblo district, Humboldt county, for \$50,000 cash. The mine is a dividend payer.

NEW MEXICO.

In the President mine, near Elizabethtown, there is said to be a vein of uranium, carrying \$9 in gold and \$3 in silver.

The Hematite mine at Red River has started up, and a stamp mill is promised shortly for that locality. C. B. and J. A. Eddy will send 100 tons of ore from their Jarilla mines to the smelter. The Modoc mine in Dona Ana county has closed down because of pending litigation. The old copper mine at Red River, formerly owned by the Waltham Watch Co., has been bought by Chicago people. A body of shipping ore has been struck in the San Andres mining district, Dona Ana county, by Hopkins & Sherfy, which promises a mill for that district.

The Cocchi Gold M. Co. shipped a seventy-four-pound gold brick, the product of one week's run. The Bland mill is adding two agitating tanks to its plant. Maj. Beaumont of Bland has resumed work on the Ivanhoe, Cap Sheaf and Ivanhoe claims, the first of which shows a lead of quartz 35 feet wide. The Bland and Albemarle mines are working day and night shifts.

Silver City Enterprise: The Pinos Altos G. M. Co.'s properties are being developed prior to the erection of a large milling plant. The probability is that the ore will be concentrated and the auriferous pyrites shipped to the Silver City reduction works. The present mill at Pinos Altos is being used for the experimental work both for concentration and amalgamation. In the Atlantic mine the ore bodies on the lower levels are showing much better in size and grade of ore. The shaft has reached 650 feet. Drifts are being driven on the fifth and sixth levels. The ore on the fifth level is 18 inches in width.

On Pinos Altos mountains are two silver mines, the Silver Cell and the Climax, generally known as the Dimmick mines. The properties produce native silver in large quantities, pieces weighing from 50 to 200 pounds, that run over 50 per cent pure silver. In addition to this there is a vein of lower grade ore running from 50 to 150 ounces of silver per ton. The owners brought down over 2000 ounces of silver last week. The small adobe furnace will be replaced by a water-jacket furnace which will be in operation in sixty days. At Central, M. Ruthenberg bought the St. Helena, "88" and No. 3 mining claims for \$35,000 and put a force at work. The Texas shaft has passed the 450-foot mark in depth and shows a good body of ore. The company's new mill will be in operation within a few weeks. The copper mines of Santa Rita have temporarily suspended operations on account of the small-box scare. It was found difficult to stop the native miners from holding communication with their relatives of the infected districts on the Mimbre. Hence it was considered best to suspend operations for a short time until stringent quarantine regulations can be put in force. A contract has been made by the Carlisle D. Co. with a company to erect a cyanide plant at Carlisle to treat the pile of tailings left by the old Carlisle Co. The plant will have a capacity fifty tons per day to start with and will probably be increased. The pile of tailings is estimated to contain 128,000 tons and the average value is \$6 per ton.

OREGON.

The Swayne M. Co. of Applegate, has been doing a large amount of work and will soon be mining on an extensive scale; 13,000 feet of flumes and 17,000 feet of ditch have been built. Water was turned on this week. Operations have resumed at the Hammersley mine in Jump-off-Joe district. San Francisco capital is said to be interested. M. Stephenson and W. Ireland of Grant's Pass, accompanied by Thos. Crouch of Montana, inspected the Oregon Belle quartz mine in Forest Creek district.

Grant's Pass Journal: S. N. Butters & Co. bought 520 acres of ground near Grant's Pass and will build a three-mile ditch and run 1000 feet of tunnel. Part of the property will be worked by elevator and a portion by hydraulic process. E. W. Roberts of Oakland, Cal., who bought the Ida quartz mine, has put men to work on it. It is locally reported that good ore is being taken out at the Mattern

mine, of the Ashland group. The E. & E. mines, at Bourne, are employing 100 miners. A 1000 foot shaft has been started. The mill is being enlarged and is to be run by water power. Chapman & Cronk have leased the Tuller placer at Glendale and will work it this winter. The Isabel M. Co. has incorporated under the laws of Oregon, at the head of which are P. S. Anton of Chicago and K. Mallory of Portland. The property is near Glendale. The company will build a 20-stamp mill, with shafting and power for sixty stamps, also concentrators and a chloride plant.

Sumpter News: The Colorado mine, near Sumpter, was sold recently to H. B. Compson & Co. for \$5000. The mine has not had much development. The new owners will put in a complete plant. Five carloads of 16 inch pipe for the electric power plant at Golconda arrived in Sumpter and are being hauled to the mine.

Baker City Democrat: Since the incorporation of the Great Northern M. Co. by Salt Lake people, the management has added to its holdings seventeen adjoining claims and two water ditches and water rights. Included in the ground are eighty acres of placer diggings, which will likely be operated in the spring. It is more than likely that the company will erect a mill in the spring. The Gold Ring M. Co., near Baker City, has a force at development work. Mining operations at Gold Ridge will again be active. Col. Panting has put on twenty men and work will be carried on all winter.

UTAH.

The Galena, at Fish Springs, from the ore body of the 300 level, yields 80 per cent lead, and all of it carries a high average in silver as well as lead. The Martha Washington, at Silver City, which was closed down for several days following the accident in which two lives were lost, has started up again. The drift on the 350 level is pushing ahead on ore. At Tintic the Sioux mill has been making a test run on low grade Swansea ore, from which a car of concentrates was shipped. If the test shows that it can be handled to advantage, the Sioux mill will run hereafter on Swansea ore. The ore is low grade, pyrites of iron predominating.

About three tons of cyanides were shipped from the Golden Gate mill at Mercur last week, said to be valued at \$200,000. The Omaha is showing values running from \$7 up to \$10 a ton.

The ore shipments last week from Park City were 1,710,000 pounds. At Monticello a stamp mill the past three months made a profit for the mine owners of \$200 a month. This is restoring confidence in the mining resources of that part of the country.

During September the Silver King of Park City marketed 2,399,760 pounds of crude ore and 1,855,395 pounds concentrates. The output of the Niagara at Bingham is averaging about six cars of ore a week, which yields 25 per cent lead, ten ounces silver and \$3 gold per ton. Developments on the Silver Lode mine at Mercur have been temporarily suspended. Lowery & Dewitt at Silver City are raising ore that assays from 60 to 500 ounces silver and 20 per cent copper per ton.

Tribune: The Monte Del Rey G. M. & M. Co. in Marysvale are taking out ore assaying fifty-six ounces silver and \$24.21 in gold to the ton. They have a ledge 8 feet wide. Assays from the ledge in the War Eagle in West Tintic, show 175 ounces in silver, 35 per cent copper and \$1 gold. The ore body is extensive and is on the 200-foot level. Recent mill runs on the Midas ore, Deep Creek, having resulted satisfactorily, John Dern, one of the principal owners, says that the erection of a mill will be undertaken next season. What the capacity of the plant will be has not yet been decided on. The ore bodies have increased with development during the year. It will be the first plant of this kind undertaken in that portion of Utah's diggings. At the Honorine, at Stockton, good progress is made cleaning out the long tunnel, from which the prospecting of the ground is to begin; work will continue all winter. The Ophir Con. is loading an average of fifty tons of concentrates daily and the Hercules is shipping crude ore daily. The Silver King is turning a good quality of ore. At the Orient, West Tintic, sinking is to be resumed. Good ore is being taken from the drifts. The Highland Boy at Bingham has material en route from the East weighing 2,050,000 pounds, for its smelting plant, and this is but a fraction of what is to come. More than 100 persons are engaged on the site.

WASHINGTON.

The Republic mine at Washington is shipping ore as usual, the mill being fully supplied, and all the freight wagons available in use. Machinery for the mill is en route from the railroad and will be put in place as fast as it arrives. The shaft on the Bryan & Sewell is down 126 feet. The crosscut on the Little Cove shows 14 feet of ore. The north drift is being driven 3 feet each twenty-four hours. The ledge has been followed for 400 feet.

At Republic, in the San Poil mine, there is 5 feet of ore that is said to average \$45 per ton. The drift is 300 feet below the surface.

FOREIGN.

BRITISH COLUMBIA.

At Rossland another strike is reported in the Le Roi, 8 feet of ore averaging 18 per cent copper, \$50 in gold and 10 ounces in silver. Shipments from Rossland for the week ending October 15th were 3815 tons.

Near Brooklyn the Golden Gate D. Co., which bought the Mountain Chief group of copper claims for \$10,000, has begun development of the property. The manager of the Vancouver group of claims near Silverton reports that the sampling of a carload of ore yielded 362 ounces of silver to the ton. Two hundred tons of Stenwinder ore in Fairview camp yielded \$7 per ton in gold.

Rossland Miner: Moyie City has three shipping mines. The St. Eugene has 2000 tons of

ore ready for shipment. The Lake Shore mine will commence shipments as soon as cars are available. The Queen Bess mines, Slo-can, will, during the sleighing season, make shipments at the rate of 400 tons per month.

The Yellowstone property at Rossland has been sold. It is locally claimed, to the War Eagle people for \$50,000. The Sunshine mine, Lardue, this year has shipped about \$100,000 worth of ore to the American and Kootenay smelters. In silver values the shipments have averaged between 200 and 225 ounces, with about 30 per cent lead and \$3 to \$12 in gold. There is sacked at the mine about 200 tons of similar ore, while on the dump is a quantity of concentrating rock, averaging about \$35.

MEXICO.

In the Pilares de Teras district, Sonora, the Roy mine is making large shipments of ore to smelters in the United States. The ore runs from 400 ounces up to 5000 ounces per ton in silver. R. Bartlett has disposed of his bond on the Santa Gertrudis mine to J. E. Wilbur of California who has begun to unwater the mine.

The Chihuahua Enterprise says thousands of dollars are being invested in Chihuahua mines and the most modern machinery being put in, and that there is every sign that the output from the mines will show a large increase this year. The disadvantages which Americans have had to fight against are disappearing, and chances for American labor and American capital are brighter.

A new mine of galena is being opened up near Zuisamopa, Sonora. El Cobre de Motezuma is the name of a gold, silver and copper mine being operated by G. Price & Co. near Motezuma, Sonora.

Detroit and Milwaukee capitalists have organized the Mexican Smelting & Refining Co. and have bought large mining properties at Sultepec. The property will be worked on a large scale. A smelter, to cost over \$100,000, is to be erected and connected with the mine by a ropeway two and a half miles long. The mine produces silver and manganese ore.

NEW SOUTH WALES.

Australian News: Tin mining in New South Wales continues on the down grade. Competition with the Straits mines, which pay their men in depreciated currency, is gradually killing the Australian industry. In 1881 the output was valued at £568,795. In 1897 it was less than one-tenth of that amount, being only £49,000. There is abundance of known tin country still unworked, but at the present price of the metal it will have to remain in a state of nature until, what is hardly likely, the Malay miners can successfully demand the same wages as are paid to Australians, or on the other hand, till Australian wages sink to the same level, allowing for the superior efficiency of the miners as those paid to the Malays.

NOTICE TO CONTRACTORS.

WATER WORKS.—Sealed proposals will be received on or before 12 M., November 15th, 1898, for the construction and completion of certain additions to the existing water works, owned and controlled by the City of Seattle, to wit: Two gutters, include a gravity water supply from Cedar River, reservoirs and portions of an auxiliary high-service system in the city. The contract to be let will embrace the following general items of construction: Head works on Cedar River, consisting of Diverting Weir, Intake Canal (400 feet long) and Settling Basin. Pressure Pipe to City, 42 inches diameter, 28.4 miles in length; of which 6.4 miles are to be riveted steel and 22 miles to be stave-pipe braced with steel bands 4 inch diameter. High-service Reservoir in City; capacity 16 million gallons. Low-service Reservoir in City; capacity 20 million gallons. Auxiliary High-service Steel Stand-Pipe, 30 feet diameter by 80 feet high, incased in Reinforced concrete. Pumping Main to Stand-Pipe, 13,200 feet 12-inch Kalamain Pipe; 2500 feet 16-inch Kalamain Pipe; 36-inch Stave Pipe, connecting reservoirs, about one mile in length; 30-inch Stave Pipe, 3000 lineal feet waste water discharge pipe. Reservoir; 30-inch Riveted Steel Pipe, 4800 feet length, connecting Low-service Reservoir with distribution system. Changing Cedar River Channel, 60,000 cubic yards excavation. Clearing, Dam and Connections at Swan Falls. Two Gutters, Specials, Valves, etc. The contract to be entered into will provide that payment shall be made for this work only by warrants upon the "Cedar River Water Supply Fund of Seattle," as created and established by Ordinance No. 3464 of the City of Seattle, and the contractor shall have no claim against the city except as therein provided. By said ordinance 75 per cent of the cash receipts of the entire city water system are involuntarily set aside and pledged to the payment of interest at 5 per cent per annum and the gradual redemption of said warrants. In addition to the warrants, which will be issued in payment for the construction of said additions, the contractor is required to purchase at par any and all warrants which shall be drawn on said fund by the city in such amounts as shall be required to pay for any real estate, rights, easements or privileges necessary for the prosecution of the work of construction and the perpetual control by said city of the additions to the water works herein specified, whether obtained by purchase, agreement or condemnation proceedings, and also such warrants as shall be drawn upon said fund by the city in payment of engineering and other expenses necessarily incurred in connection with said additions; provided that the amount of the warrants thus required to be purchased by the contractor shall in no case exceed the sum of Sixty-four Thousand Dollars. Each bid must be accompanied by a certified check, payable to the order of the City Comptroller, for a sum not less than five (5) per cent of the bid, and no bid will be considered unless accompanied by such check. The successful bidder will be required to enter into a contract and furnish satisfactory bond for the amount required by the City Charter and the laws of the State of Washington, within ten days after being notified of the award of the contract to him; failing so to do, the said check and the amount fixed therein will be forfeited to the city. No person is eligible as a bidder who has within two years prior to the letting of said contract made a default in payment of any and all wages or labor performed, or any skill or material furnished pursuant to any such contract as herein advertised, or who within said two years failed to complete any such contract. Special attention is called to Article XXIII of the City Charter, as now in force, relating to "hours of labor," and to Article XIII, Section 31, Subs. 1 and 2, relating to bonds and surety. All bids must be made in accordance with and comply with the plans and specifications now on file in the City Engineer's Office, and in compliance with Ordinance No. 3990. The City of Seattle reserves the right to reject any and all bids. Proposals must be indorsed on envelope "Bids for Constructing Certain Additions to the Water Works of the City of Seattle." By order of the Board of Public Works.

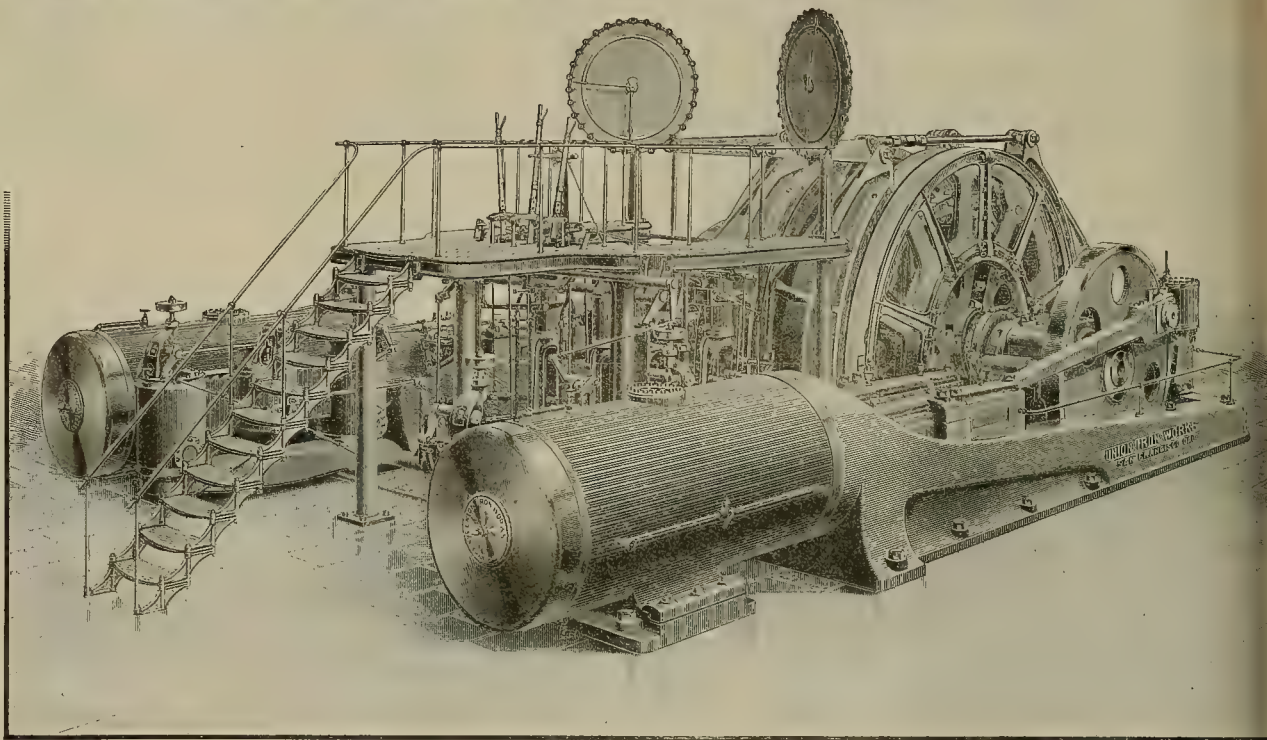
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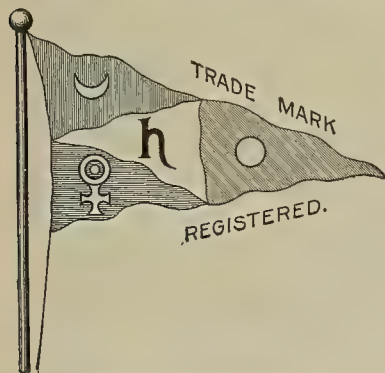
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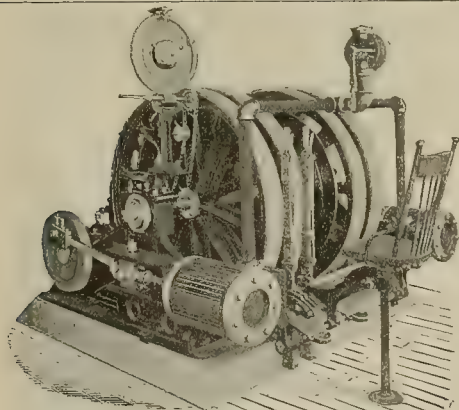


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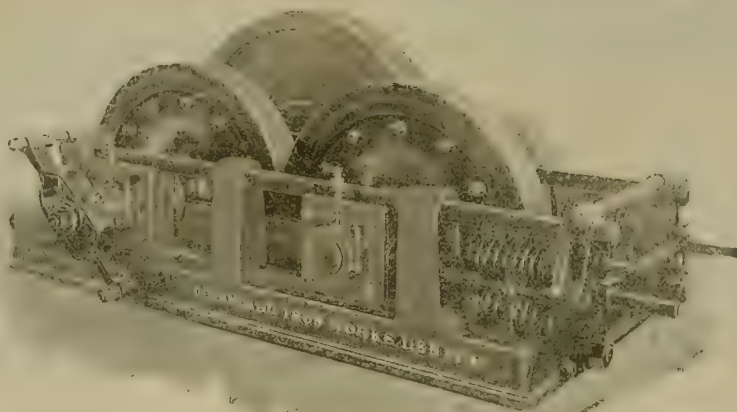
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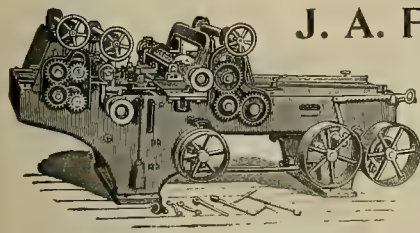
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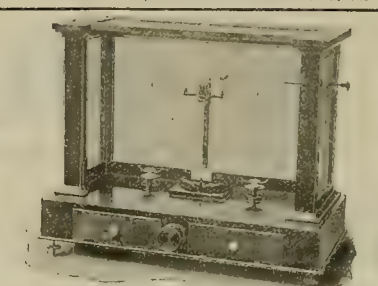
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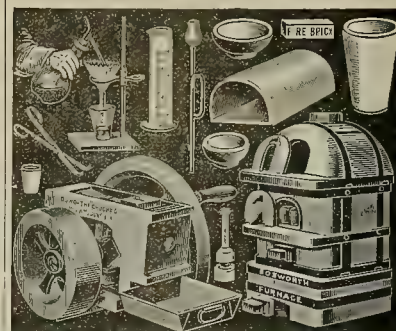
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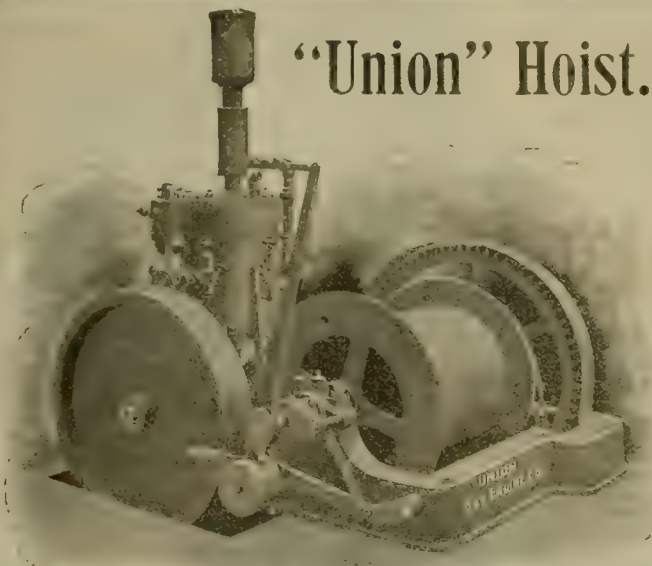
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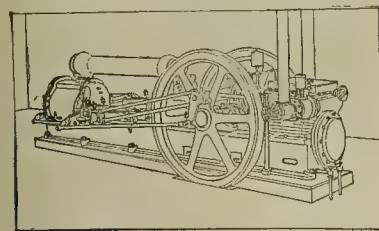
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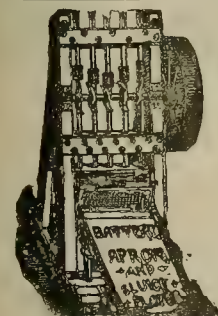
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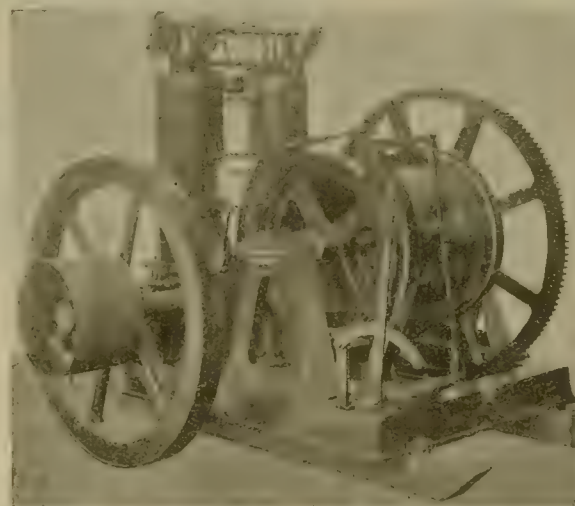
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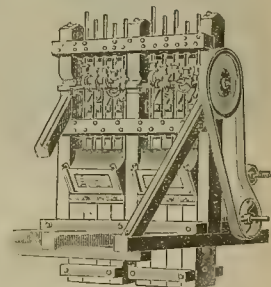
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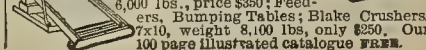
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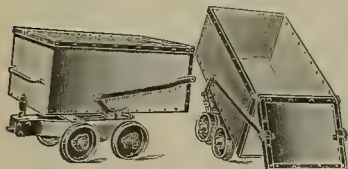
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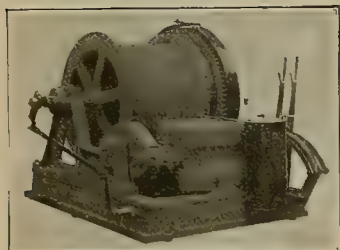
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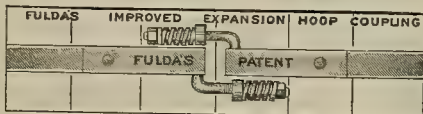
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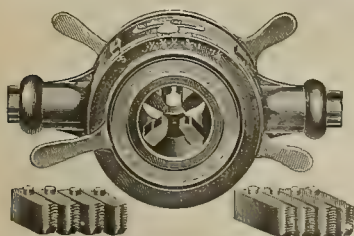
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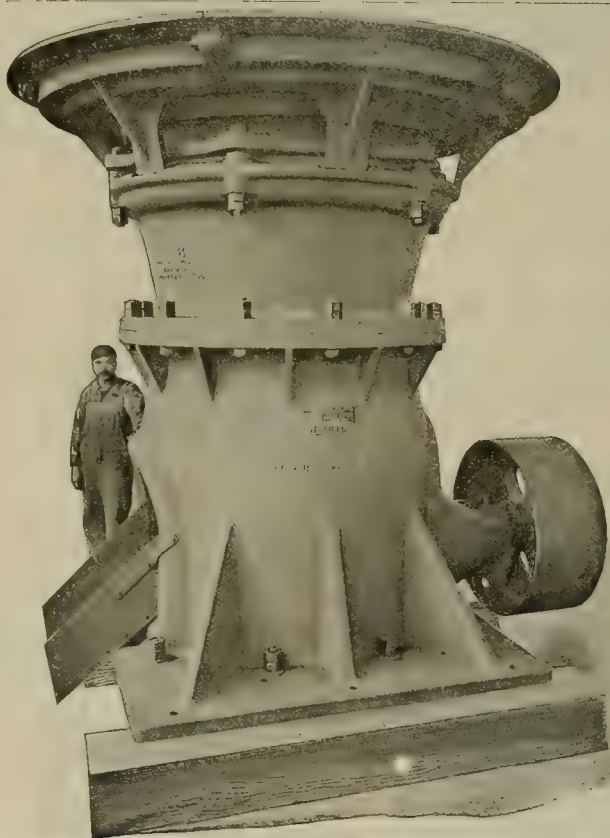
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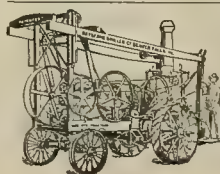
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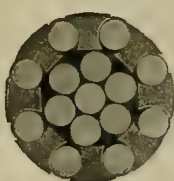
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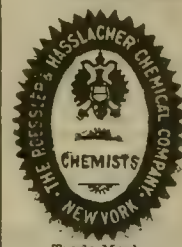
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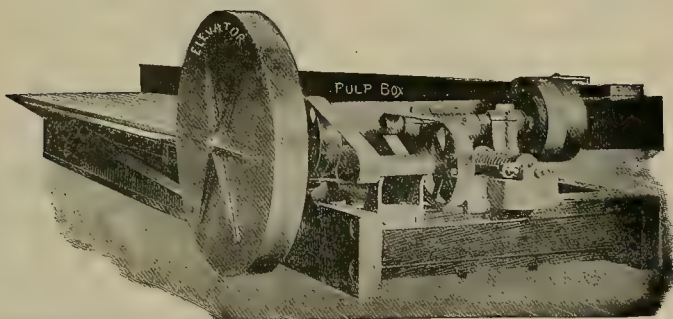
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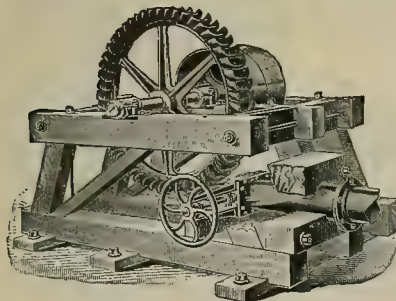
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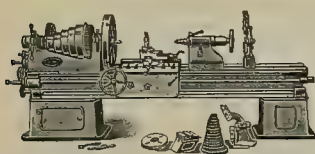
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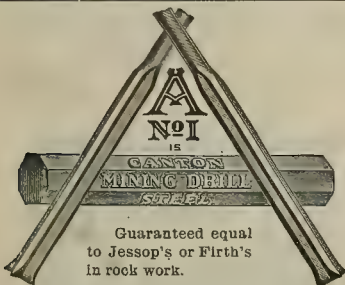
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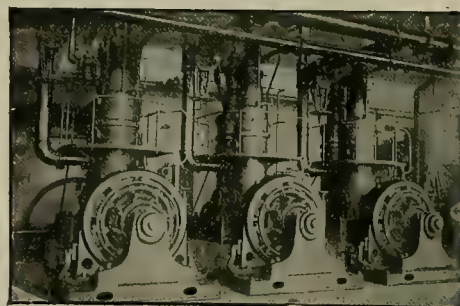
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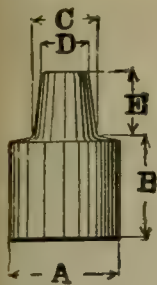
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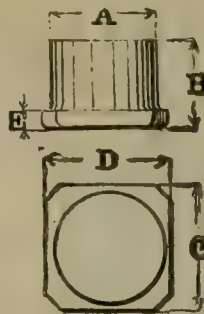
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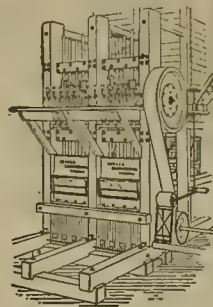


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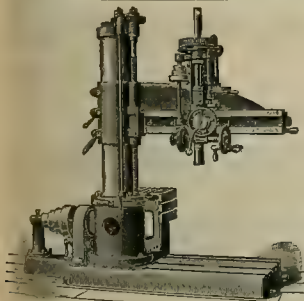
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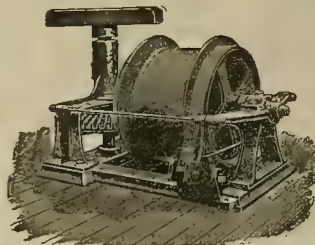
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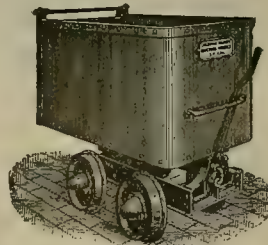
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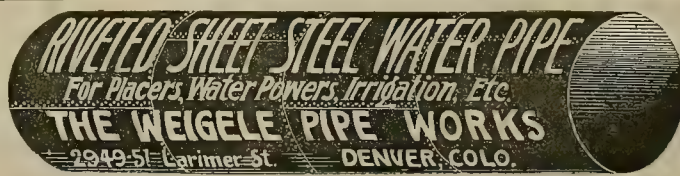
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Engines, Boilers,
Saw Mills, Hoe Saws,
Mill Supplies.

TATUM & BOWEN,

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LEVIATHAN BELTING

WHICH FOR STRENGTH AND TRACTION POWER HAS NO EQUAL.



Especially Adapted for
MINING MACHINERY
AND
MAIN DRIVING BELTS.
It Is Unaffected by Water, Heat or Steam.
EVERY BELT GUARANTEED.
Write for Prices. Samples Free.

Main Belting Co.,
Factory at Philadelphia, Pa. 65-67 Market St., Chicago, Ill.

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Is Acid and Fume Proof.

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| Copper Mines, | ALL | Iron and Wood Work, |
| Cyanide Works, | USE | Tanks, |
| Chlorination Works, | IT | Pipes, |
| | ON | Roofs. |

Manufactured only by PARAFFINE PAINT CO., San Francisco.

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— SEND FOR CIRCULARS. —

TURBINE AND CASCADE WATER WHEEL

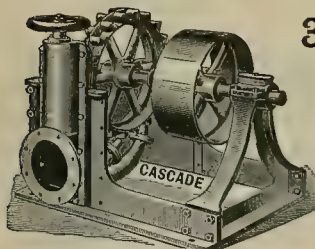
Adapted to all Heads from

3 Feet to 2000 Feet.

Our experience of 33 YEARS building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

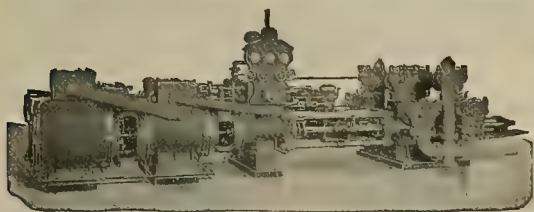
Send for a Pamphlet of either Wheel and write full particulars.

JAMES LEFFEL & CO.
SPRINGFIELD, OHIO, U. S. A.



THE BEST (MINE PUMPS) IN THE WORLD.

We carry in our Denver store a stock of Cameron Pattern Sinkers and Duplex Station Pumps.



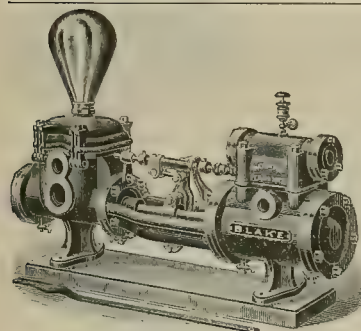
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Write for Catalogue and Estimates.

Jeansville Iron Works Co.,
JEANSVILLE, PA.

Western Office,
Columbia Hotel Building,
1328 17th St.
Denver, Colo.

A. MIDDLEBROOK, Manager



GEO. F. BLAKE M'F'G CO.
NEW YORK, N. Y.

Boiler Feed Pumps,
Tank or Light Service Pumps,
Combined Air and Circulating Pumps,
Drainage and Irrigating Pumps,
Special Fire Pumps,
Independent Air Pumps and Condensers,
Water Works and Power Pumps.

HENSHAW, BULKLEY & CO., San Francisco,
AGENTS.

THE BUCYRUS COMPANY,

DESIGNERS AND BUILDERS OF

DREDGES, STEAM SHOVELS, EXCAVATING MACHINERY,
WRECKING CARS, LOCOMOTIVE CRANES, PILE DRIVERS,
CENTRIFUGAL PUMPS, WITH SIMPLE, COMPOUND OR TRIPLE
EXPANSION ENGINES,

MACHINERY FOR PLACER MINING.
SOUTH MILWAUKEE, WISCONSIN.

Mining Machinery.

Stamp Mills

Of the Latest Improved
Design for

Gold Milling.

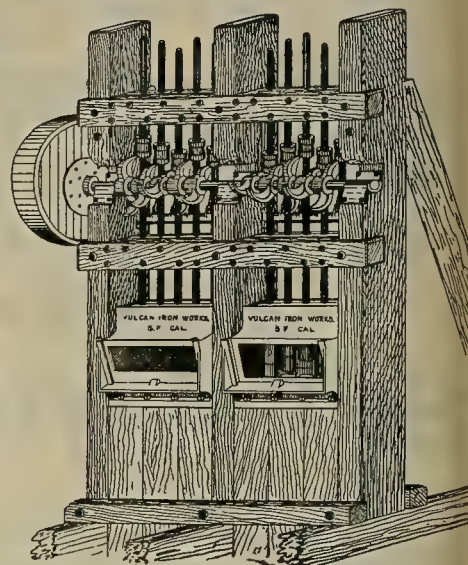
VULCAN

WIRE ROPEWAYS

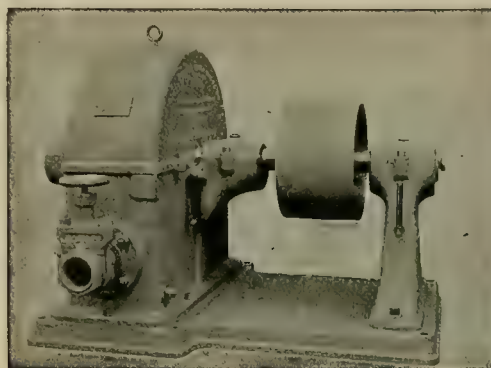
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Vulcan Iron Works,

Office: 505 Mission Street,
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The Pelton Water Wheel Company



Gives exclusive attention to the development and utilization of water powers by the most modern, economic and improved methods.

An experience of more than fifteen years, involving both the theory and practice of hydraulic engineering as relates to power development in its widest range of application, is at the service of its customers.

Nine Thousand
Wheels

Now Running,

Aggregating some 700,000 H. P.

ELECTRIC POWER TRANSMISSION.

Pelton wheels afford the most reliable and efficient power for such service and are running the majority of stations of this character in the United States, as well as most foreign countries.

Highest efficiency and absolute regulation guaranteed under the most extreme variations of load.

The Pelton Water Wheel Company,

121 AND 123 MAIN STREET, SAN FRANCISCO, CAL.

PLACER AND RIVER-BED MINING

WITH THE

Electrically Operated Shovel, or Dredge, and Amalgamator.

Capacity 2,500 to 10,000 yards of gravel per day.

Operating cost 2 to 3 cents per cubic yard.

Extracts the INFINITELY FINE, as well as the coarser gold.

Adapted to all sorts of conditions and every locality.

SEND FOR ILLUSTRATED CATALOGUE AND SAMPLE.

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BENNETT AMALGAMATOR M'F'G CO.,

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Tutthill Patent Water Wheels.

Don't buy any other until you have seen them and investigated their merits. We not only guarantee high efficiency, but obtain it in actual practice. Estimates and surveys made for the installation of Water Power Plants of all sizes and capacities.

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Do they govern? Yes, they do. As a perfect Water Wheel regulator they have no equal. Write for latest report of efficiency and regulation obtained at recent tests.

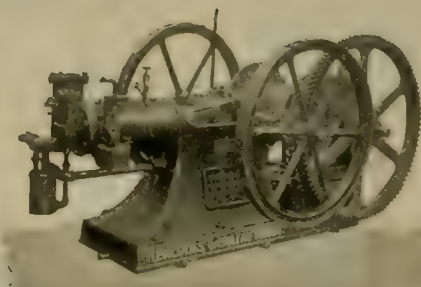
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ORE BUCKETS,
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HERCULES GASOLINE HOIST.

**Oil City Boilers and Engines,
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ELECTRICAL SUPPLIES AND APPARATUS.

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**Judson Dynamite and Powder Co.,
Dynamite and Black Powder,
Caps and Fuse,
Steel, Hammers and Sledges,
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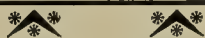
Suction or Deep Well, that throw a STRAIGHT STREAM. No cranks. No air chamber. Water travels a uniform speed. Shows no pulsation. Can be direct connected to engine shaft, geared to motor, or driven by belt. Suction pumps are packed without removing any part. A piston pump with valves. It has no equal for gasoline engines and hoists.

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Mining Timber

WRITE TO=DAY



and let us make an estimate on your next order for LUMBER, SHINGLES, SHAKES and R. R. TIES. We make a specialty of MINING TIMBER and PLANK for Arizona and Mexico shipment.

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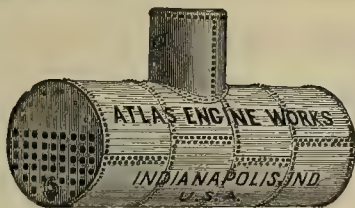
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ATLAS ENGINES AND BOILERS.

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Steam Pumping
Machinery.



MANUFACTURERS OF

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General Foundry
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And All Kinds of
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We manufacture Water
Pipe for

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IRRIGATION SUPPLIES OF ALL KINDS.

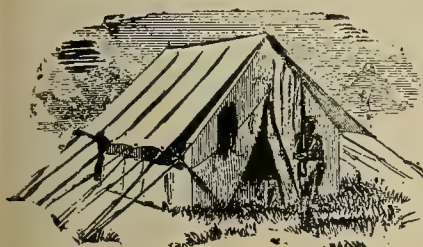
WELL CASING, OIL TANKS,

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General Sheet Iron Work.

Write to us for an estimate on your next job.

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— MANUFACTURER OF —

Awnings, TENTS, TARPULINS, Sails, WAGON COVERS, ORE BAGS, RUBBER BOOTS, RUBBER, LEATHER and CANVAS CLOTHING, Sporting Goods.
Tents and Canvas Floor Covers for Rent. Fancy Awnings for Residences. Camp Furniture.
JOBBER IN COTTON DUCK.

136 South Main Street,

=

LOS ANGELES, CAL.

Market Reports.

The Markets.

SAN FRANCISCO, Oct. 20, 1898.

SILVER.—London, 27½d; New York, 60; San Francisco, 60; Mexican Dollars, 47½¢ @ 47½¢. New York exchange, sight, 17½¢; telegraphic, 20 cents premium.

Dullness is reported in the market for Mexican silver dollars. For nine months ended Sept. 30th Mexican dollars to the value of \$3,438,825 were handled in the San Francisco market, against \$5,437,474 for the same period in 1897.

LEAD.—New York reports "easy," \$3.77 bid, \$3.82 asked. Local, pipe, 6@6½¢; sheet, 6½¢@7¢; pig, 5½¢; bar, 6¢.

COPPER.—New York reports Lake unchanged, \$12.87½@12.90.

IRON.—American, soft, \$21 and \$23 per ton; Scotch, \$23.50.

SPELTER.—5½¢@5½¢.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18¢; Bar, 19¢.

ANTIMONY.—10-10½¢.

BABBITT METAL.—10-12-14—best 16¢.

QUICKSILVER.—Domestic, unchanged, \$41; export, \$37.00@37.50; carload lots, special rates; New York, \$39.50. Receipts of quicksilver at this port during the first nine months of the year were 17,591 flasks, against 12,060 during the same time in 1897. The exports by sea were 4792 flasks, valued at \$175,261, against 5704 flasks, valued at \$132,462, in 1897.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½¢; less than one ton, 17½¢. No. 1* 60% carload lots, 18½¢; less than one ton, 15½¢. No. 1** 50% carload lots, 11½¢; less than one ton, 13½¢. No. 2, 40% carload lots, 10¢; less than one ton, 12¢. No. 2* 35% carload lots, 9½¢; less than one ton, 11½¢. No. 2** 30% carload lots, 9¢; less than one ton, 11¢. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington.....\$8.00 Coos Bay.....\$5.00 Seattle.....6.00 Southfield.....7.50

Cargo lots, Eastern and foreign:

Wallsend.....\$7.50 Cumberland.....\$9.00 Brynbo.....7.50 Cannel.....9.50 Pennsylvania, hd., 14 50 Welsh Anthracite. 12.50 Scotch.....8.00 Rock Springs.....7.50

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.08 per gal.; bbl., \$1.03; pure No. 2, cs., 85¢; bbl., 80¢; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.06; less than 200 gals., \$1.10; in bbls., 4¢ per gal. less than case; Baker's Crystal, \$1.26; China Nut, 52¢; Linseed, strictly pure, boiled, bbl., 44¢; cs., 49¢; raw, bbl., 42¢; cs., 47¢; lots of 5 bbls., 1¢ less; Lucol, boiled, bbl., 39¢; cs., 43¢; raw, bbl., 36¢; cs., 41¢; lots of 5 bbls., 1¢ less. Kero-

sene—Pearl, cs., per gal., 17½¢; Astral, 17½¢; Star, 17½¢; Eocene, 19½¢; Extra Star, 21½¢; Elaine, 22½¢; Water White, bulk, in tanks, 11½¢; Mineral Seal, iron bbls., 21¢; wooden bbls., 23½¢; cs., 26¢; Mineral Sperm, 27¢; Deodorized Stove Gasoline, bulk, 13¢; do., cs., 18¢; 86 deg. Gasoline, bulk, 20¢; do., cs., 25¢; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½¢; do., in cs., 16½¢; Lard Oil, Extra Winter Strained, bbl., 56¢; cs., 61¢; No. 1 bbl., 46¢; cs., 51¢; Neatsfoot Oil, bbl., 65¢; cs., 70¢; No. 1 bbl., 55¢; cs., 60¢; Sperm, crude, 60¢; Natural White, 65¢; Bleached do., 70¢; Whale Oil, Natural White, 40¢; Bleached do., 45¢; Cocoa, cs., 55¢; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25. The Standard Oil Co. yesterday advanced the price of Turpentine 3¢ per gallon and refined coal oils ½¢ per gallon.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31¢ per lb.; carloads, 29¢; in 10-lb. tins 37¢; sulphuric acid, 2½¢ per lb. 66% B.; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½¢ per lb.; blue vitriol, 4½¢ per lb.; borax, refined, 5@6¢ per lb.; chlorate of potash, 9½¢@10¢; roll sulphur, 2½¢; alum, \$1.90@2.00; flour sulphur, French, 2½¢@3½¢; California refined, 1½¢@1½¢; nitric acid, in carboys 8¢ per lb.; caustic soda, in 10-lb. tins 15¢ per lb.; Cal. s. soda, bbls., 65¢; sks., 60¢ @ 100 lbs; chloride of lime, spot, 2.10 @ 2.25¢; saltpeter, 15¢; chlorate of potash, 25¢; caustic potash, 12¢.

CANDLES.—Electric Light Candles—6s, 16 oz., 7½¢; 6s, 14 oz., 6½¢; 6s, 12 oz., 5½¢; 6s, 10 oz., 4½¢; Granite (Mining) Candles—6s, 16 oz., 8½¢; 6s, 14 oz., 7½¢; 6s, 12 oz., 7½¢; 6s, 10 oz., 6½¢. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8¢; colored, 9¢.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.35; cut, \$2.25; 10 to 20d, wire, \$2.40; cut, \$2.30; 8d, wire, \$2.45; cut, \$2.35; 6 and 7d, wire, \$2.55; cut, \$2.30; 4 and 5d, wire, \$2.65; cut, \$2.40; 3d, wire, \$2.80; cut, \$2.55; 2d, wire, \$3.05; cut, \$2.95. In carload lots, 10¢ per keg less.

Mining Share Market.

SAN FRANCISCO, Oct. 20, 1898.

"Buy 'em on the slumps and sell 'em on the jumps" at present seems to be more of a silent precept than an active duty, for, though all the Comstocks are so low that the question arises how much lower they can go, yet very little is done, the business being but a shadow of its former self.

San Francisco Stock Board Sales.

SAN FRANCISCO, Oct. 20, 1898.

9:30 A. M. SESSION.

100 C. Cal. & Va.....67¢ 500 Sierra Nevada.....65¢

100 Ophir.....43¢ 200 Union Con.....19¢

2:30 P. M. SESSION.

100 Con. Cal. & Va.....65¢ 50 Standard.....1.80

200 Sierra Nevada.....63¢

Acetylene Gas.

A handsome new illustrated catalogue will tell you where and by whom the new light is being used, and what the verdict is. Mailed upon application. PACIFIC ACETYLENE GAS CO., 115 New Montgomery St., San Francisco.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from the Excelsior Mining Co., in the Excelsior Mine at Lowell Hill, Nevada Co., to deposit tailings in the North Fork of Steep Hollow; from Toy Kee, in the Fair Play Mine near Seales, Sierra Co., to deposit tailings in Fair Play Ravine; from S. F. Bullard and A. M. Gray, in the Gravel Hill or McCutcheon Placer Mine near Nevada City, Nevada Co., to deposit tailings in Little Deer Creek; and from Elmore Rutherford, in the Plumas Bonanza Gravel Mine near Buck's Ranch, Plumas Co., to deposit tailings in Sherman Ravine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on November 7, 1898, at 1:30 P. M.

A BARGAIN.

Death of proprietor. PETALUMA MACHINE SHOP, FOUNDRY AND PATENTS. Will take city property in exchange. SANFORD BENNETT, 17 & 19 Beale St., San Francisco.

COPPER MINES WANTED

—ALSO—

A Good Dividend = Paying Gold Mine.

Address "MINING ENGINEER," P. O. Box No. 1, ROSLINDALE, MASS.

JEFFREY



Roller, Steel and Special CHAINS
ELEVATORS AND CONVEYORS



COAL MINING MACHINERY.



WIRE CABLE CONVEYORS.

For long and short distance conveying.

THE JEFFREY MFG. CO., Columbus, Ohio.
Send for Catalogue. 41 Dey Street, New York.

Western Branch, Denver, Colo.,
F. R. FIELD, Representative.

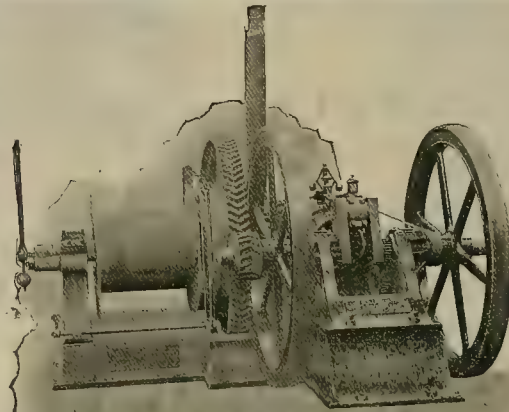
Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.



FRESNO, June 25, 1898.

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gasoline engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LOPE
M. & D. CO.,

Per N. W. Moodey, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

WEST COAST OF MEXICO.

WÖHLER, BARTNING Suc's, Mazatlan (Sinaloa), Mex.

Bankers, Importers, Exporters and Commission Merchants.

Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco.

ORE BUYERS AND EXPORTERS. MINING SUPPLIES.

THE MOST DIRECT AND CHEAPEST ROUTE

—TO—

The Eastern Oregon,
The Coeur d'Alene,
The Kootenai,

Mining
Districts

—IS VIA—

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Oregon & Railroad and Navigation Company's Lines.

For Information, Address
W. H. HURLBURT, or E. C. WARD,
General Pass. Agent, General Agent,
Portland, Or. 630 Market St.,
San Francisco.

Sliver City Reduction Co.,
SILVER CITY, GRANT COUNTY,
NEW MEXICO.

Purchasers and Smelters of Gold,
Silver and Copper Ores.

This Plant is Owned and Operated by the Estate
of the Late Senator George Hearst of California.

J. D. BETHUNE,
(Late Associate Justice Supreme Court.)

**Attorney at Law,
Mining Law,**

PRESCOTT, ARIZONA.
A Valuable Gold Property for Sale.

PACIFIC EXPLORATION COMPANY
Finds buyers or working capital for meritorious
mines or good prospects. Correspondence invited.
W. E. Holbrook, Pres't. L. F. Haskell, Sec'y.
29-30 Chronicle Building, S. F.

SANTA FE ROUTE

The Most Comfortable Way to Travel

ACROSS
THE
CONTINENT.

EVERY day in the year Pullman Palace Sleeping
Cars and Pullman Tourist Sleeping Cars leave
Oakland Mo for Chicago and the East.

HARVEY'S DINING ROOMS

And Lunch Counters Offer Good Food Well Cooked
and Decently Served at REASONABLE PRICES.

THE altitude of the plateaus and mountains
crossed renders the trip cool and pleasant
after the desert is passed. No matter which
way you go the desert must be crossed and there
is less of it on the Santa Fe than on other lines.
It is a popular mistake to suppose it is a hot line.
Close connections are made in Chicago and Kansas
City for all Eastern cities.

Ticket Office, 628 Market St., San Francisco, Cal.

JNO. L. TRUSLOW, JNO. J. BYRNE,
Gen. Agt. Pass. Dept. Gen. Pass. Agt.
San Francisco, Cal. Los Angeles, Cal.

TUBBS CORDAGE CO.

(A CORPORATION.)

Constantly on hand a full assortment of Manila
Rope, Sisal Rope, Duplex Rope, Tanned Manila
Rope, Hay Rope, Whale Line, etc., etc. Extra
sizes and lengths made to order on short notice

611 and 613 Front St., San Francisco, Cal.

M. CRAFTY,
Manufacturer of the Celebrated

Smelter Broom,
1554 BLAKE ST. DENVER, COLO.

INVENTORS, Take Notice!

L. PETERSON, MODEL MAKER.
228 MARKET ST., N. E. Corner Front (Up Stairs), SAN
FRANCISCO. Experimental machinery and all kinds
of models. Tin and brasswork. All communica-
tions strictly confidential.

Mines or prospects operated on contract to purchase,
MONEY loaned, or under lease on fixed royalty or percentage,
PROPERTY loaned, mines, MINING companies organized, their
property exported, financed and managed, MINES, prop-
erty, mineral lands, mining securities, contracts, bonds,
stocks, leases and options bought and sold or negotiated,
EXAMINE mines, prospects and mineral lands as to their
value, method of working and condition of their titles.
Assay and chemical work done.

EDW. N. BREITUNG, Marquette, Mich.
Cable address: Edw. N. Breitung, Marquette, Mich.
McNeil's A. B. C. Universal Commercial. U. S. A.

J. C. GIBSON,
Millwright and Builder,
PLANS AND SPECIFICATIONS
FURNISHED.

Estimates Given on Mills, Hoists, Etc., Complete
or Otherwise, if desired.

2819 California St., San Francisco, Cal.

For Sale: in San Francisco,
COMPLETE ASSAY AND LABORATORY
OUTFIT,

Office furnishings, including Hoskins furnaces,
Certifying balances, chemicals, glass and earthen-
ware apparatus, roll-top desk, bookcases, etc., etc.
At a bargain. Address ASSAYER, Mining and
Scientific Press Office, San Francisco, Cal.

Diamond Drill for Hire.
DRILL CAN BE HIRED. NEGOTIATED
WITH EXPERT TO OPERATE.
DIAMONDS FOR SALE.

Apply to J. A. MURRAY, care of Risdon Iron
Works, San Francisco.

Mine and Mill Superintendent
Will be open for an engagement Nov. 15, '98.
Highest References Furnished.

Can also do Mine Surveying, Mapping and As-
say. Competent to take full charge of a gold,
silver or copper mine anywhere.

As to terms, qualifications, etc., address H. L.,
Mining and Scientific Press Office, San Francisco.

WANTED.

**Position as Mine and Mill
Superintendent.**

Thoroughly practical. Highest references fur-
nished. California preferred. Address L, care of
Mining and Scientific Press, San Francisco.

Assessment Notices.

EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Forest Hill, Placer County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 12th day of September, 1898, an assessment (No. 13) of one-half cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Nos. 1209-11 Claus Spreckels building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of October, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 1st day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. J. CRAWFORD, Secretary.
Office—Nos. 1209-11 Claus Spreckels building, San Francisco, California.

MARINA MARSICANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of September, 1898, an assessment (No. 16) of 2 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 31st day of October, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 21st day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
CHARLES BOVONE, Secretary.
Office—217 Sacramento street, San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of October, 1898, an assessment (No. 21) of 2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of November, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 28th day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
CALVERT MEADE, Secretary.
Office—106 Leidesdorff street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of October, 1898, an assessment (No. 11) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 237 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of November, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 5th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
F. METTMANN, Secretary.
Office—237 12th street, San Francisco, California. The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 22nd day of August, 1898, an assessment (No. 4) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 916 Market street, Room 57, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 3rd day of October, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 31st day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
GEO. W. FLEISSNER, Secretary.
Office—No. 916 Market street, Room 57, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the National Cons. Mining Co., the day of delinquency of the above assessment has been postponed to MONDAY, 1st, 1898, and the day of sale to FRIDAY, November 25th, 1898.

GEO. W. FLEISSNER, Secretary.
Office—No. 916 Market street, Room 57, San Francisco, California.

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DELINQUENT SALE NOTICE.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Riverside County, California.

Notice: There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 16th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------------|-----------|-------------|---------|
| W. H. Bailey, Trustee..... | 260 | 2,000 | \$30 00 |
| W. H. Bailey, Trustee..... | 261 | 2,000 | 30 00 |
| W. H. Bailey, Trustee..... | 262 | 10,000 | 150 00 |
| C. A. Bailey..... | 133 | 1,000 | 15 00 |
| C. A. Bailey..... | 135 | 1,000 | 15 00 |
| C. A. Bailey..... | 136 | 1,000 | 15 00 |
| C. A. Bailey..... | 138 | 500 | 7 50 |
| C. A. Bailey..... | 169 | 2,000 | 30 00 |
| C. A. Bailey..... | 210 | 4,532 | 67 98 |
| R. L. Cheney, Trustee..... | 245 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 246 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 247 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 248 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 249 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 250 | 250 | 3 75 |
| R. L. Cheney, Trustee..... | 251 | 2,500 | 37 50 |
| R. L. Cheney, Trustee..... | 252 | 1,000 | 15 00 |
| W. H. Bailey, Trustee..... | 256 | 3,300 | 49 50 |
| W. H. Bailey, Trustee..... | 259 | 7,300 | 109 50 |
| W. H. Bailey, Jr..... | 147 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 148 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 149 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 150 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 151 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 188 | 2,500 | 37 50 |
| W. H. Bailey, Jr..... | 208 | 4,000 | 60 00 |
| W. H. Bailey, Jr..... | 209 | 532 | 7 98 |

And in accordance with law, and at order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 508 Safe Deposit building, San Francisco, California, on TUESDAY, the 1st day of November, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

E. L. CHENEY, Secretary.
Office—Room 508 Safe Deposit building, San Francisco, California.

To Our Customers and Friends
on the Pacific Coast:

Through frequent complaints made to us, we have learned that unprincipled and dishonest dealers on the Pacific coast have counterfeited our trademark numbers and substituted inferior, spurious goods as ours, when ours were distinctly ordered, thus defrauding the customers and injuring our trade and reputation.

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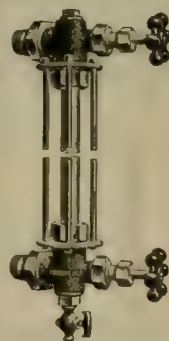
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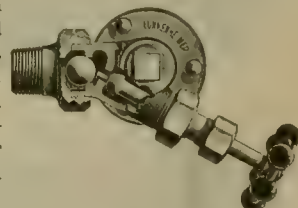
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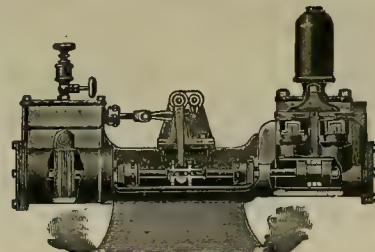
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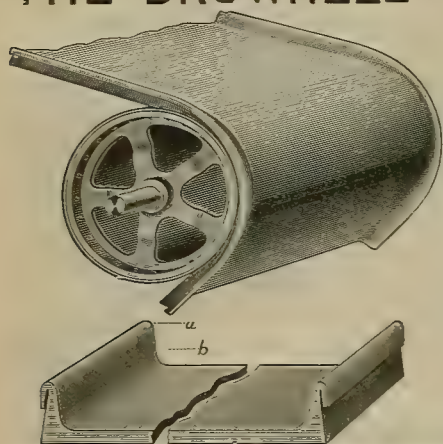
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J. S. BROWNELL, ESQ.—DEAR SIR: Replying to your query of Feb. 15th, will say that I have used your Patent Lip flange belt more than one year, and judging from their appearance after more than one year of hard service, I do not hesitate to say that they are the best belt I have ever used and I take great pleasure in testifying to the fact.

RAWHIDE GOLD MINING COMPANY,
JAMESTOWN, TULUMNE CO., CAL., Feb. 21, 1897.
Yours truly,
W. A. NEVILLS, President.

MR. J. S. BROWNELL—DEAR SIR: I take pleasure in saying that I have used your Patent Lipped flange belt for several years while connected with this company, and I consider them the best that we have used. The quality of rubber in the flange seems to be the best, and we are not bothered with the flange cracking and thereby destroying the life of the belt. At present we are using 14 concentrators, and have in use several kinds of belts. We consider your Patent-Lipped flange the best.

AMADOR CITY, CAL., Feb. 18, 1897.
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By JOHN R. TREGLOAN, Superintendent.

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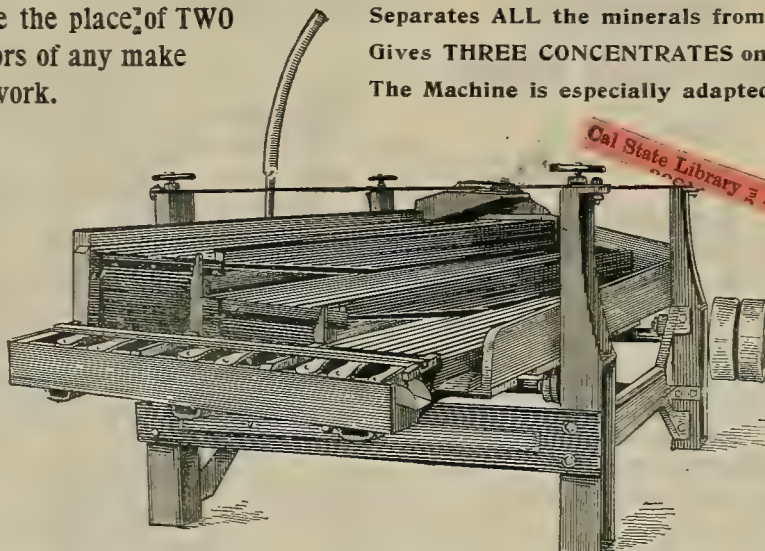
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REQUIRES NO SPECIAL FOUNDATION.



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Number 18.

SAN FRANCISCO, SATURDAY, OCTOBER 29, 1898.

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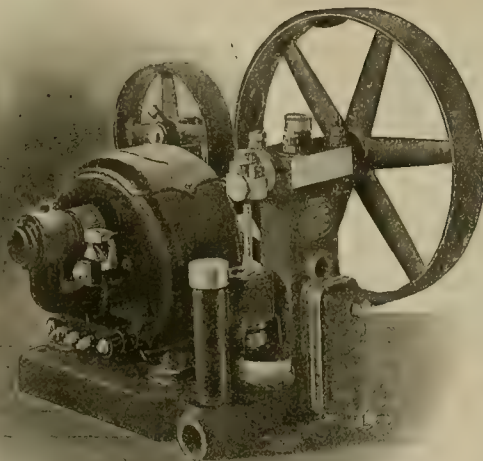
Draining the Comstock.

The movement toward drainage and resumption of deep mining in the Comstock, Nev., lode received a material advance last Saturday, when, at a meeting in San Francisco of the Executive Committee of the Comstock Pumping Association, a contract was ordered made with the Risdon Iron and Locomotive Works of San Francisco with intent to drain the water 500 feet below its present level. The agreement is to supply machinery for such proposed drainage, the plant to be placed in a station on the Sutro tunnel level of the C. & C. shaft. For such drainage the contractors are to receive \$30,000, in six equal installments. No water exists in the Comstock above the 1600 (Sutro tunnel) level, and that will be used as the base of operations. The contract involves the furnishing of apparatus with a daily pumping capacity of 10,000,000 gallons from the consolidated shaft into the tunnel, and its operation till the water is lowered 500 feet below its present level. Payment is contingent upon the lowering of the water. The method proposed is by a water jet working under a head of 2000 feet, discharging through a contracted throat, the vacuum produced by the pressure and velocity of this water carrying a continuous stream up from the flooded levels to the Sutro tunnel, through which it is to flow. Vice-Pres't R. S. Moore with Thos. J. Barbour and F. M. Leland represented the company. G. McM. Ross, H. M. Gorham and W. E. Sharon constituted the advisory board of mining superintendents who recommended that the contract be awarded in accordance with the proposal received. The machine by which it is proposed to do the work is naturally an object of interest to miners everywhere, and is herewith illustrated. It is the well-known Evans hydraulic elevator, built by the Risdon Iron Works, and for several years in use in hydraulic and river-bed mining. Its principal features are the three suctions, one main and two auxiliary, the latter capable of extension with any size pipe to any distance. At the Golden Feather mine in Butte Co., Cal., in 1897, one of these elevators is credited with throwing 18,000,000 gallons of water every twenty-four hours. It is figured that with a head of 2000 feet pressure as proposed, there will be no insuperable difficulty in the daily ejection by this machine of at least 10,000,000 gallons of water from the lower levels of the Comstock.

The magnitude of the work, the very low cost named in the contract, and the comparative novelty of the appliance in connection with that class of work, all tend to make the project one of general interest to mining men. The Risdon Iron Works is confident of its ability to do the work as proposed, and the Comstock Pumping



THE EVANS HYDRAULIC ELEVATOR.



MOTOR AND PUMP FOR TANK USE.

Association which had devoted \$100,000 to the preliminary work of unwatering, etc., are gratified to have a proposition from a responsible firm to do that part of the work at so low a figure.

It will probably be toward the close of the year before active operations will begin.

Electric Pumping.

A compact pumping outfit for house tank and similar service is illustrated herewith, of a type which is in use for a variety of purposes, and especially designed to supply the reservoir tanks of high office buildings and residences, where the pressure carried in the city mains, insufficient to elevate water above the lower stories, must be reinforced by pump pressure. The motor is connected to the pump entirely by bolt, and, no cut gears intervening, the operation of the pump is noiseless. The motor is of the C. A. type—a type designed and manufactured by the General Electric Co. to meet a demand for motors adapted to the direct application of power to small machines. It is built of 2 H. P., 1 H. P., $\frac{1}{2}$ H. P. and $\frac{1}{4}$ H. P. The first three are wound for use on 115, 230 and 500-volt circuits, the $\frac{1}{4}$ being wound for 115 volts only. They are light, compact, occupy little floor space, and by a single change in the position of the bearings may be run in any position. The magnetic circuit is of laminated instead of cast iron, the armature of toothed laminations with coils made up and insulated before application. The motor is mounted upon the base of the pump, making the combination one of the most compact on the market. The motor is stopped and

started by an automatic switch operated by a float on the water in the tank. These pump combinations are built for capacities of 200 and 500 gallons, as required.

THE subject of treating zinc-lead ore is still one of discussion. The communication on page 425 is published for the information it contains. It is only just to say that its writer is in error in his opening assumption. The editorial item he refers to was in comment on a communication from the general manager of an English smelting company to the editor, in which he suggested that his firm could successfully treat that class of ores and gave detailed figures thereon. It was this trans-Atlantic proposition that was deemed "impracticable," an article in a preceding issue from a Colorado miner illustrating by Colorado charges that it would be unprofitable and unnecessary to send such ores to London. The article on page 425 additionally discusses another aspect of the question, throwing light on existing commercial conditions.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....Publisher

San Francisco, October 29, 1898.

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IF, as it now appears, the Leadville, Colo., mines are to be unwatered and work resumed, the resultant tonnage of silver-lead ore will renew the required smelter supply, for which the Cœur d'Alenes, the Kootenay and Mexico have for the last two years been drawn upon.

PATENT COMMISSIONER DUELL has been enabled to catch up with some of the arrears of his office and hopes by July 1st, '99, to have clerical matters so expedited that action may be taken on applications for patent within six weeks from the time of filing. During the session of Congress beginning next December it is proposed to give the U. S. patent laws needed and thorough revision. The presidential commission recently appointed are now preparing their report.

THE "Molly Maguires" of the Cœur d'Alenes, Idaho, have ordered Shift boss Conner of the Standard mine out of the country, with the alternative of murder in case of refusal. His offense is the discharge of incompetent men. Some time ago Whitney was murdered, and before him Kneebone was made away with, for, practically, the same reason—personal dislike. Those thugs control that region, to the shame of Shoshone county and the disgrace of all who uphold or condone such un-American methods.

THE latest "mining boom" is in copper and commercial events justify activity in copper mining. It is constantly appreciating in demand, and consequently in value. Michigan, Montana, Arizona and Colorado are profitably mining copper, and renewed activity is reported along the copper belt of California. Inertia is one of the reasons why California is not one of the great copper producing States of the Union, and it is by many considered strange that a commonwealth noted for the skill of its gold miners should be so apparently backward in the reproduction of operations which are every-day matters in other localities.

THE assertion is made with some show of authoritative statement that the Atchison, Topeka & Santa Fe Ry. Co. has absorbed the new S. F. & S. J. V. R. R. and will be an important factor in California transportation, to the extent of entering San Francisco. If so, it may be of value to the mining industry of California. The A. T. & S. F. shows some desire to advertise the resources of the regions it traverses; it does not seem afraid to confess that gold, copper, silver and lead are found in the regions through which it runs, and does not appear to seek concealment thereof. The dominant railroad corporation in California has constantly done its best or worst to hinder the mineral development of the State. Unlike the railroad companies that traverse all other mineral-bearing regions of this west half of America, the Southern Pacific Co. has always sedulously decried all attempt at advertising California's mineral resources. Should the A. T. & S. F. Co. secure entrance to central and northern California, they will

doubtless do as elsewhere—aid in advertising the mineral resources of the country from which they expect to draw support.

IN war, as in mining, methods differ. In the late hostile discussion with Spain, the U. S. naval officers were chiefly occupied in keeping U. S. vessels afloat and sending Spanish warships to the bottom of the sea. But Lieut. Hobson reversed this plan and grandly aided the United States by sinking an American vessel and now raising Spanish vessels. One is reminded of this difference in methods with the same satisfactory result on reading of a Michigan copper mining company which is "sinking" a 3900-foot shaft by beginning at the bottom and working upward to the surface, and of a "drift mine" in California that is operated through a vertical shaft, the tunnel, in this instance, "standing on end."

AT Los Angeles, Cal., the U. S. Circuit Court is asked to determine in what way petroleum lands in California can have confirmation of title. Petroleum being viewed as a mineral product, oil lands had till recently been subject to entry under the same conditions as placer claims. An attempt to have such lands considered agricultural caused this paper two years ago to go into the subject in an exhaustive way, which resulted in the passage by the Congress of the United States, on Feb. 11, '97, of an act authorizing the entry and patenting of lands containing mineral oils under the placer mining laws. The act, however, omitted to specifically assert that petroleum was a "mineral oil," and this omission is made the basis of a suit regarding title to a tract of oil land in Coalinga, Fresno Co., Cal.

ON the preceding page is outlined the latest project of most present interest to many—the proposed unwatering of the Comstock, Nev., lode, with a hope of resumption of deep mining. The proposition to use a modification of the water elevator system, combining with it the application of compressed air, is an experiment that will be viewed with interest by hydraulic engineers. It is intended that the whole machine shall not occupy more than 3x2 feet in the shaft, the height being, of course, as the height to be pumped. The apparatus is to be built in guides, and lowered in sections of 50 feet. The first lowering and pumping will be from the 90-foot mark below the Suro tunnel (the water is now 30 feet below the level of that tunnel), and when that depth is unwatered the machine then to be sunk to the 140 foot mark, and so on.

RECENTLY appeared a short editorial herein on "the chief present need of the mining world," which has been most extensively copied and commented upon, because of the suggestiveness of the topic, which is of interest to so many. It is interesting to note how different writers handle the theme, according to the standpoint from which it is viewed. So many "needs" are stated that it would be difficult to supply one-half of them with human nature and conditions as at present constituted. Idaho's leading paper says that in Idaho, and probably in every section where new properties are to be opened up, one of the chief needs is a change that will bring claim owners and investors together more readily, and that will prevent legitimate enterprise from being handicapped and headed off by the selfishness of rivals, and proceeds to read a lecture to a certain or uncertain class of men who are found in every mining community who never help but always hinder. It is certain that wholesale conversion of this class to more progressive ways would aid, but, as in numerous other comments elicited by the article referred to, while the needs stated are manifest, none of the writers point out a practical way of correcting the present untoward conditions.

IN some things the "trusts" can give points in business management to miners in showing that success depends largely upon business economy, and that a little waste here and there tends to failure. Probably no business is more perfectly systematized than that of the Standard Oil Co. It is as much their system as their monopoly that enables them to so frequently declare dividends. Nothing is too small to escape notice, and the cost sheets are scanned as carefully as though the very life of the whole business depended upon the saving of a few cents in some petty, particular instance. Recently

the manager of one of the oil refineries was notified from the headquarters of the Standard Oil Co. that he was using too much solder upon his cans. He didn't believe it. He investigated and found that what the tell-tale cost sheets had made clear to the head office was correct. The slots in the machinery feeding the solder had become enlarged and it was fact that slightly too much solder was being dropped upon the oil cans. Another time he received notice that he was using too much paint upon the heads of his oil barrels. The cost sheets had told it, and was true. Little leaks in mine and mill management often represent, if unchecked, in the course of time, the difference between success and failure as legitimate business proposition. The big dividends regularly paid to the stockholders of the Anaconda Copper Co. are largely because of the economical manner in which the ore is handled, as there is not scrap of waste.

ONE of the most prominent present characteristics of the mining world is the reopening and profitable working of mining properties once abandoned but now in many cases dividend-paying producers; this being possible because of cheaper forms of treatment, better transportation facilities, decreased cost of supplies, and a general advance in modes and methods of scientific mining. In many isolated places, where development has not as yet justified the building of a plant of its own, many a little mine would find the custom mill an important factor, a necessary adjunct, but it is not an uncommon case that the custom mill remains "nothing learned, nothing forgotten," just as a generation ago. It is not an unusual experience for a miner to send his little "mill run," hoping to get a few dollars from the clear up, with the outcome that his "dirt" just paid expenses; sometimes the result putting him in debt. Of course, no mill, custom or other kind, can put values in ore, but it is often manifest that use of the man proffered improvements would be of profit to the owner of the custom mill and of encouragement to the miner dependent on it. As matters stand to-day, with right management, the operation of a custom mill offers as profitable a field of industry as mining itself. As a business proposition, the up-to-date running of a custom mill should be a paying investment. Mention is made of the custom mill because it is an important factor in general mine development, and can be made of great value by prudent and progressive management in saving values and handling low grade ores at a mutual profit.

THE annual report of the director of the U. S. mint for '97, presumably accurate, gives first place in the world's gold yield last year to the South African Republic, which is credited with a gold production for the year of \$57,633,861, the United States a close second with \$57,363,000, Australia \$55,684,182, Russia \$23,245,763. Of the United States production, Arizona contributed \$2,895,900; California \$14,618,300; Colorado \$19,014,200; Idaho \$1,710,700; Montana \$4,374,400; Nevada \$2,976,400; Oregon \$1,353,100; South Dakota \$5,964,900; Utah \$1,726,100. The world's gold yield for the year is totaled at \$237,504,800. As compared with '96, South Africa showed an increase of \$13,854,192; Australasia \$10,502,249; the United States \$4,275,000; Russia \$1,709,790. As compared with '96, the United States showed a decreased silver production in '97, the aggregate being for '97, 58,860,000 fine oz., a decrease from the figures for '96 of 4,974,800 oz. Mexico' silver production for '97 was 53,503,180 fine oz., a decrease from that of '96 of 8,256,756 fine oz. The gold yield of Mexico for the year was \$9,436,300. This last is noticeable. When the recent appreciation of gold and depreciation of silver began, Mexican mining men at once realized the profitable nature of gold mining and their peculiarly favorable condition. Mexican legislators gave great concessions to corporations and individuals investing in gold mining, the result being a rise in the gold product of Mexico from \$1,224,621 in '93 to \$4,744,541 in '94; \$6,054,078 in '95; \$7,584,182 in '96; and nearly nine and one-half millions last year. Up to and including '94, for the ten years previous, there was in Mexico an annual average yield of \$55,000,000 silver to \$1,225,000 gold—a ratio of 44 to 1. Taking last year's figures, the ratio of production computed in ounces without reference to coinage value is about 6 to 1.

Concentrates.

A 14-INCH cube of cast iron would weigh 713.44 lbs.

The San Francisco Mint charge for recoining of gold is \$1 for 1000 c.

The world's gold yield in '92 was 7,041,822 fine ounces; in '97, 11,490,348.

In the U. S. mint one pound of copper is added to every \$2000 silver coined.

A NEW 20-mile electric line carries power to the Camp Bird mine at Imogene, Colo.

THERE are \$215,000,000 invested in the mining and transportation of Lake Superior iron ores.

CONSUMERS say that the use of cyanide in Utah during the year has increased 30 per cent.

At Idaho Springs, Colorado, there are ten mills in operation, with a daily capacity of 500 tons.

THE Grass Valley, Cal., *Telegraph* says there are about 800 men employed in the mines of that vicinity.

A "TWO-CYCLE GAS ENGINE" is one in which there is an explosion for each two cycles, or one revolution.

THE system of day's wages is reported to be gradually superseding the tribute system in the mines of Grass Valley, Cal.

THE placer gold at Home Park, Montana, is 896½ fine, and sells at \$18 58 per oz. The heaviest grains rarely exceed 750 in value.

AROUND Georgetown and Silver Plume, Colo., almost exclusively a silver producing region, over 700 men are taking out silver ore.

DYNAMOS are made that can be successfully operated under water, and can be supplied by any reputable dealer in electrical machinery.

A "WET ORE" contains a high percentage of lead or copper; ores carrying less than 5% of either of these metals are termed "dry."

If a thing is not patented all men have a right to make and sell it, to the use of its name, and to every word in the language to aptly describe it.

THE Black Hills *Mining Review* says that with a 10-stamp mill at the Holy Terror, Keystone, S. D., the cleanup of a recent seven days' run was \$42,000.

ON the Fillmore electric street railway line in San Francisco, Cal., for some blocks the grade is 25%, believed to be the steepest of any in the country.

At Keswick, Cal., the ore is an unusually pure iron sulphide, about 5% silica, and runs about \$5.50 per ton in gold and silver, with about 5½% copper.

AN authority on seismic disturbance says that thirty miles below the earth's surface is the greatest depth at which earthquakes are known to originate.

"I HAVE been reading my neighbor's copy, but your paper is a necessity to me," writes a Montana mine superintendent in sending a year's subscription.

ORE rich in copper, silver and gold is reported found abundantly outcropping on the Umatilla claim near Keller, Wash., on the south half of the Colville reservation.

At Alta, Utah, for the first time in ten years, the tonnage output and general prospects justify keeping open the road between the mines and smelters all winter.

TO GET the ratio of expansion in any engine, divide the length of the stroke in inches by the distance from the beginning of the stroke up to the point of cutoff.

ORDINARILY, in the London Mining Stock Exchange when application is made to quote a mine, one-fourth of the total capital must be represented in pounds sterling.

IN the Agatha mine, Gunnison county, Colo., was recently found the first wire gold discovered in that county. The gangue is spar, copper stained, and carries both gold and silver wire.

CALIFORNIA is rich in iron ore. In Fresno Co. are deposits which according to analysis "is unexcelled in quality by any iron mine on the continent." No effort is made to utilize it.

THE Metallic Extraction Works at Florence, Colo., recently bought the dump of the Legal Tender mine, Cripple Creek district, estimated to contain 45,000 tons that is expected to run \$8 a ton.

WHILE clearing away the debris after a blast in the 400 level of the Larkin mine at Diamond Springs, Cal., last week, J. Thompson was killed by a mass of rock falling from the roof of the drift.

THE Mountain Copper Co. at Keswick, Cal., which consumes considerable fuel, has been importing English coke. Last week it secured 15,000 cords wood, floated seventy-five miles down the Pit and Sacramento rivers.

THE brittleness or "crumbly" quality of gold noted by a Colorado correspondent is doubtless occasioned by the presence of tellurium, which in even very small quantity imparts to the ordinarily ductile metal the brittleness of glass.

THE only white metal more valuable than gold known to "Concentrates" is iridosmine, a natural alloy of iridium, osmium, rhodium, platinum and ruthenium. It is found in minute quantities on the shores of California and Oregon.

IN Clear Creek county, Colorado, though there is more gold produced each successive year, the chief product is silver. The mineral output last year was \$782,648.88 in gold, \$860,500.76 in silver, \$54,183.57 in copper, and \$177,893.32 in lead.

THREE years ago the Temple Bar, Arizona, Co. put in considerable machinery which upon trial proved of inadequate power. They kept on working and experimenting, and last week began work washing gravel by direct pressure successfully.

THIS is the nineteen hundred and ninety-ninth issue of this paper. With few exceptions a copy of any issue since January, 1869, can be furnished. All copies before that date are out of print. A complete file of this journal is now valued at a high figure.

NEXT to northern California it is thought that the beach sands at the mouth of the Coquille river, southwestern Oregon, furnish the most likely source of platinum. Samples submitted from there some time ago yielded two ounces platinum to the ton of sand.

A WASHINGTON, D. C., dispatch states that the Mineral Land office records show that there was an increase of nearly 4000 mineral entries during the fiscal year 1898, as compared

with 1897—an indication of the revival in the mining industry. In 1895 but 757 entries were made.

WITHOUT reference to the date of location, application for U. S. patent to a mining claim may be made whenever the applicant can file with the register the certificate of the U. S. surveyor-general that labor or improvement to the amount of \$500 has been put on the claim.

IN Gilpin county, Colorado, though the smallest county in the State, 50,000 tons of ore are crushed a month. The county contains 2500 patented claims. The mineral output of the county in 1897 was: Gold, \$2,086,471.14; silver, \$223,339.74; copper, \$106,952.48; lead, \$67,860.19, a total of \$2,434,623.55.

A "SLUICE-HEAD" is an Australian hydraulic miner's term, and, according to the by-laws of the different districts, represents a quantity of water varying from 19 to 274 cubic feet of water per minute, or from 171,000 to 2,466,000 gallons per twenty-four hours. (An English gallon contains 277.274 cubic inches.)

DESPITE delinquency of co-owners, a part owner in an unpatented mining claim may institute proceedings for patent in the joint name of himself and co-owners without the latter's consent. Patent will not be granted for part interest in a claim, nor can a co-owner be legally compelled to join in an application.

A loss of gold occurs in all placer mining. In hydraulic mining, where the gold is fine, such loss has been estimated at 40%. It has been figured of the total gold product of the California hydraulic mines 60% per cent remains buried in the tailings, and that of this 50% is recoverable, equal to 30% of the original contents.

IN connection with the pumping plant to be operated on the Comstock, Nev., lode, the local water company has offered to supply the necessary water to operate the pumps for \$2000 per month for six months, and renew the contract for another six months if the conditions of the mine do not improve. The water company figures that such supply will cost it \$2300 per month.

ACCORDING to the *Matabele Times*, regarding the prices of mining machinery and its erection in Rhodesia, South Africa, landed in Bulawayo, a 10-stamp mill would cost complete \$7000; a stationary engine and boiler, \$4000; crusher, four tons per hour capacity, \$750, etc. The *Times* says that a 10-stamp mill, with all requisite accessories, can be bought and erected for \$25,000.

"ORE IN SIGHT" may be defined as that contained in blocked portions of the deposit, each of which is so clearly exposed by sections on several sides that the limits, continuity and value of its contents may be determined and relied upon with reasonable certainty. Such ore so exposed may be considered a proved resource, ready for extraction and susceptible of expression in terms of net profit.

IN Dec., '97, the Australian minister of mines offered a premium of \$5000 for the best system of ventilating mines. In March, '98, a Rand, South Africa, and United States competitor were notified that they were both adjudged of sufficient worth to have the premium divided between them, which appears to have been mutually agreed to, but, to date, none of the conditions seem to have been complied with.

IN the Bendigo district, Australia, eighteen mines have found payable gold at a depth of over 1800 feet; the Shenandoah mine is working at a depth of 2756 feet, and Lansell's 180 at a depth of 3169 feet, both on payable gold at those depths. In the Ararat district gold is found in the Magdala Co.'s mines at Stawell at a depth of 2486 feet; at Charters Towers, Queensland, where a reef carrying gold was cut, at 2202 feet.

"THE National Ore Reduction Co. of St. Louis" is announced as "contemplating the erection of smelting works in Nevada City, Cal., and the intention is for each mine requiring it to have a smelter of its own." If the firm mentioned is one of the protean shapes assumed by the notorious Hartzfeldt, it would be in order to subject its claims and contracts to rigid scrutiny before acceptance in Nevada county or anywhere else.

SEVERAL years ago Dr. Warner, the Buffalo, N. Y., patent medicine man, bought the Hillside mine, Arizona, for \$450,000. After making payments amounting to \$200,000 he failed. Meanwhile he had organized a stock company and sold stock. Suit was brought by purchasers of stock to compel reimbursement. One year ago they got judgment. Defendants moved for a new trial which last week was granted by Chief Justice Street of Arizona.

CRUSHING to 30 or 40 mesh rarely gives as high a percentage of extraction (by simple amalgamation) as crushing to 50 or 60 mesh, but the size to which free-milling gold ore should be crushed to yield the most profit is a matter for individual determination. It is more a question of profit than a close saving or high percentage of yield of possible values. It sometimes occurs that there is more actual resultant net profit in saving 85% of the gold in the ore than there would be a finer system that would save 95%.

THERE is always keen but good-natured rivalry among progressive miners. In last week's "Concentrates" it was noted that the Allison Ranch mine, Grass Valley, Cal., was equipped with the combined powers of steam, electricity and water, so arranged that either system could be used separately. The manager of the Banner mine, Oroville, Cal., notes that he is now installing a water power system, and by Jan. 1st, '99, proposes to be in a position to use steam, electricity, water or compressed air for any part of that mine's plant.

COMPLAINT is made of a mine superintendent who refused to admit visitors. Ten to one he was right. Visitors to a mine are very often a nuisance. They are usually a source of worry and apprehension to everyone around the mine (except themselves) while underground, and rarely realize their real danger or the trouble they occasion. Probably, in the case cited, the superintendent might have been more courteous, but it is equally probable that he saved the visitors from unpleasant experience. "No admittance except on business" is an excellent notice for the entrance to a metal mine.

NOTHING has caused more current comment than the recent statement herein by Wm. Orr, of Salt Lake, Utah, that at a Mercur, Utah, mine silver was being produced at a cost of 23 cents per oz. Immediately upon the receipt of the statement effort was made to secure data and detail regarding such extraordinary production, but so far with no result. The political and commercial importance of the assertion is manifest, and while with the former this paper has nothing to do, the fact that so many of the most pro-

ductive silver mines in the United States are now closed because of inability to make expenses at the current rate of silver lends unusual interest to a direct assertion that in any locality silver can be produced at anything like the price stated. The mine designated by Prof. Orr in his communication of the 11th inst. is the Chloride Point, Mercur, Utah, of which Mr. Gill S. Peyton is manager.

THE Federal Government has reserved large areas of land in the southern portions of California, but for forest purposes not a single acre has been protected north of San Francisco. J. M. Gleaves, the United States Surveyor-General, furnishes the following list of Federal timber reservations in California, all of which it will be noted, are south of San Francisco: San Gabriel, 573,048 acres; Sierra Forest, 4,079,360 acres; San Bernardino, 731,179 acres; Arabuco Canyon, 49,750 acres; San Jacinto, 664,678 acres; Stanislaus, 705,340 acres; Pine Mountain, 1,735,083 acres. The total area thus reserved aggregates 8,538,445 acres.

THE mines of Laurium, Greece, now worked for zinc, lead and iron, are the same mines from which Themistocles drew the silver supply to fit out his fleet and drive back the Persian invader at Salamis (490-480 B. C.) and so lay the foundations of the Athenian hegemony. It is thought that the Phœnicians delved there before the Greeks came; so that the mining industry at Laurium may boast an origin as remote as thirty centuries back, while in full blast to-day. In walking through the French company's great mine at Camerata, in the heart of the Laurium region, one traverses a gallery in active exploitation for zinc and lead close by another worked by the old Greeks two or three thousand years ago. For such a "transient industry," mining seems to evince some permanent characteristics.

WHEN a British Columbia miner's license inadvertently expires, he should post in the office of the mining recorder a notice of intention to apply for renewal, and forward to the minister of mines a statement of the facts in the case, accompanied by a fee of \$5. The minister of mines thereupon issues a new certificate dated back to the time that the first certificate expired. If, between the time that the first certificate expired and the time that notice of intention to apply for relief is posted, any of the applicant's property has been relocated, no remedy is possible. But relocations of the applicant's ground made by others after he has posted his notice of intent to apply for relief are not valid. If assessment work is done on a claim within the year, and the work is not recorded during such period because of oversight or otherwise, the holders of such property are allowed a further extension of seventy days in which to record the work, provided a fee of \$10 is paid. This thirty-day extension is not allowed in which to do the work, but simply to record, and the work must be done within the year as provided in the section before amended.

EUROPEAN metallurgical works essay the saving and utilization of the gas and vapors emitted by the smokestacks, and in place of vitiating the air and injuring vegetation it has become a special science to obviate these evils and derive a profit from them. The question of utilizing such waste gas was recently discussed at the international chemical congress by A. Harp, who stated that the direct neutralization of furnace gases by means of lime, magnesia and other similar bodies was seldom possible. When, however, the percentage of sulphuric acid in the gas would rise above four, the gas would be serviceable for the manufacture of sulphuric acid, or, still better, for the production of the sulphate as used in the preparation of the wood pulps of the paper industry. This sulphate is recovered by liquefying the sulphur dioxide in the gas, which process is now being introduced in the Silesian zinc works by Haenisch & Schroeder. Or, as practiced at the works of Porak Bros., Kienberg, Bohemia, the gas is enriched, if necessary, by burning sulphur in it, cooled, and conducted through lead pipes to a water injector, which carries the gas down to a tank 20 feet below. A centrifugal pump raises the liquid again up to the injector, until the pressure of the gas and air above the water, which can absorb only a certain proportion of SO₂, forces the gas from the tank over into a system of vats filled with milk of lime and provided with stirrers. As the lime dissolves as calcium sulphite, the liquid becomes clearer. The lye, an acid sulphite, is finally drawn off, ready for use.

THE Oregon Legislature, which adjourned on the 15th inst., passed a new mining law, and repealed part of a former State law. There is no change in the required manner of locating placer claims. Regarding quartz claims it requires posting preliminary notice of location upon the vein or lode and record of the same within thirty days from date of posting. Within ninety days from date of posting, the locator must sink a discovery shaft upon the lode or vein at least 10 feet deep. A cut, or crosscut, or tunnel, which cuts the lode at a depth of 10 feet, or an open cut at least 6 feet deep, 4 feet wide and 10 feet in length, along the lode from the point where the same may be in any manner discovered, is equivalent to such discovery shaft. Such work shall not be deemed a part of the assessment work required by the Revised Statutes of the United States. Corners and center ends must be marked by stakes or mounds. Abandoned locations, when relocated, must be taken as original. Former work avails nothing. Every locator of a claim shall have a legal estate therein, thus enabling the locator to maintain ejectment proceedings, which could not be done hitherto. It also declares such claim to be real estate, and makes all transfers and mortgages of either quartz or placer claims subject to existing provisions relating to recording, foreclosure, redemption, etc. The time for redemption under this law, of a claim sold under execution, is limited to sixty days on the part of the judgment debtor. Ditches and flumes are declared real estate, and five years' nonuse, instead of ten, as heretofore, forfeits title and makes the same subject to a new appropriation. The bill provides that the redeemer must pay not only such sum as is now required by the general law relating to redemption, but also such additional sums, not exceeding \$100 per claim, as the purchaser under execution sale, or his assigns may have expended to keep alive the possessory right, with 10 per cent interest thereon from date of such expenditure. It then declares that any and all grubstake contracts shall be null and void unless reduced to writing, with the names of the parties thereto and the duration thereof, and placed on record; that all locations of quartz claims after December 31, 1898, that do not comply with the provisions of the act shall be null and void. Under the former law, recorders of conveyances were not required to pay over to the county treasurers moneys paid for the recording of mining claims.

Loss of Gold in Cyaniding by Volatilization.

Written for the MINING AND SCIENTIFIC PRESS by
MATT. W. ALDERSON.

"Did you ever run an ore containing good values where you made a good extraction—left little in your tailings—and yet failed to have your gold in solution?"

Such a question I have put to experienced cyanid-ers. They have looked at me as if they wondered if cyaniding was beginning to have such an effect on me as sheep herding is said to have on its follow-ers, and have then told me that such a thing was impossible; that if I took the gold from the ore I should certainly have it in my solutions; that if it was not extracted it should show in the tailings. That's what I thought till the logic of events com-pelled me to conclude otherwise.

In the writings of workers in cyaniding loss of gold from various causes is accounted for; but, so far as I am aware, no reference is made to volatiliza-tion. What may be considered the nearest reference to loss is from an opposite cause—reprecipitation. Park, in his excellent work on "The Cyanide Pro-cess" (p. 113), says: "In cases where ores contain considerable proportions of metallic sulphides, solu-ble in cyanide solutions, sufficient alkaline sulphide may be formed to precipitate a portion of the dis-solved gold." A later writer, Wm. Orr, in his ad-dress before the International Mining Congress at Salt Lake City (see MINING AND SCIENTIFIC PRESS, July 23, 1898) ascribes reprecipitation to the pres-ence of carbon in the ore, and says: "I have taken a solution assaying \$11.60 per ton and after circu-lating it through some of this base pulverized ore for twenty-six hours found it then assayed only \$9.20."

At the starting of a new plant, early in 1898, I was brought face to face with the fact that the first cleanup did not begin to correspond in value with that shown by assays. In tracing back to discover the cause, it was found that such gold as could be obtained in solution was dissolved in a very short time. In one hour assays showed \$13.60 in solution, in two hours \$12.80, three hours \$12.30, four hours \$11.60, and so on, until in eighteen hours there was not in solution more than about 50 per cent of the amount there was shortly after the treatment of the charge had commenced. Treatment was arranged to use the smallest amount of cyanide consistent with good work, careful check was kept on the sul-phides, and when they became quite prominent in the solution it was discharged and work was com-menced over again with fresh solution. The theory advanced by Mr. Orr is a plausible one. It is a known fact that carbon is a precipitant and its pres-ence might easily cause precipitation of the gold already in solution, but, as I conceive, only when the solution would be in contact with the ore. At one time, when agitating a charge of tailings hauled from a yard where there were burned trees, I noticed a large quantity of charcoal floating on the surface of the vat. Carefully removing all but a few pieces of the charcoal, those pieces were left till close of agitation and then assayed. They were found to assay over \$500 to the ton. This, I take it, would be called reprecipitation. But the difficulty of which I speak has caused losses of many thousands of dol-lars when the most rigid tests have failed to show reprecipitation—when there was no great quantity of sulphides present; when there was no carbon-aceous substance in the ore; when, in fact, the solu-tion was not in contact with the ore. In reprecipi-tation certainly the escaping values can be found somewhere. If reprecipitation occurs in the leaching vat, then the tailings should run high accordingly. If reprecipitation takes place in the gold vat, then there should be some values in the sides or on the bottom of this vat. In the instances of which I speak nothing of the kind happens, and every proof points to the opposite of reprecipitation, viz., vola-tilization.

In my experience in treating slimes it was contin-uously apparent that an adaptation could easily be made so that the process of amalgamation and cy-aniding would be continuous, and no handling of the ore be necessary after it once reached the mill. I know that Almarin B. Paul introduced the flowing of cyanide solution through the battery at the Calu-met Co.'s mill, and said, "This plan has been in operation over four months, with no discouraging features" (MINING AND SCIENTIFIC PRESS, July 2, 1892). There was no record that this mill continued working in this way for very many months, and no one else seemed to be combining cyaniding with bat-tery crushing, though it naturally presented many favorable features. That, to me, was easily ac-counted for, for slimes were not being handled, and, as nearly everyone used a strong solution of cy-anide, hesitancy would naturally follow in regard to using such a large amount of such strong cyanide-bearing fluid as would be necessary. With the use of milder solutions, the idea of crushing direct in cyanide solution seemed to make more and more of an impression upon cyaniders in different parts of the world. Referring to the fact that in South Af-rica, where water is scarce, the battery water is settled and used over again, a recent writer (W.

Leonard Holms in *Engineering Magazine*, July, 1898) says: "It is conceivable that, through this innova-tion, a radical change may be effected in ordinary milling practice by the substitution of a weak solu-tion of cyanide for water in the mortar boxes. There is apparently no reason why this should not be done advantageously. The quantity of solution in circulation would not amount to more than five or six tons per stamp; there would be no chance for loss of liquor beyond that entailed by causes at pres-ent in operation; a considerable proportion of the fine gold of the slimes would be dissolved with great rapidity in the mortar boxes, owing to the free ac-cess of air to the latter and the intimate contact of each particle with the solution; and, lastly, the solu-tion at the sands cyanide works would not be diluted, as at present, by the water delivered with the tailings. If it were found that the gold was effectively dissolved before the slimes reached the slimes works, the latter could be curtailed in size, as only settling and washing would be necessary in the way of treatment prior to precipitation of the liquor."

Entertaining similar ideas, I naturally sought to so shape my work that when I should make a change from tailings treatment to ore it would be gradual and easy. Larger and larger quantities of solution were used with the charges of tailings, more nearly approaching the quantity of solution which would naturally be expected to be used in treating ore, which, according to authorities and experience, would range from seven to ten tons of fluid to each ton of ore. Assays on this work were always satis-factory, but some of the cleanups were not so good as on the same class of material treated previously. But it was never suspected that the proportion of fluid used had anything to do with producing such a result.

At length the time came when I was satisfied there was no difficulty whatever in the way of direct treat-ment. Securing a lot of ore which usually milled about 60 per cent and the tailings from which I knew from experience could be treated to perfection, I made a run. The assays showed good work was be-ing done, but the cleanup was several hundred dol-lars short of what it should have been. I called in a skilled assistant to go over my work, and we both traced the shortage direct to the battery. More ore was obtained and it so happened that it contained a considerable proportion of quite coarse gold. The result of this run was not so bad—in fact, it was so encouraging that two mills where I had been treat-ing tailings were put at work on ore. Most of the ore used in these runs was such as laboratory tests showed could be handled quite successfully by cyanide alone, but as part of the gold could be saved by amalgamation and a better extraction secured in shorter time when only the fine gold was left for cyaniding, the combined process seemed to be the ideal one. Checks kept on both mills showed they were doing excellent work. The material treated ranged in value from \$3 to \$34 a ton, most of it being in the neighborhood of \$11 and \$12, and the tailings were lower in value than had been expected, ranging from 40 cents to \$1.60. At the end of two weeks, cleanup was made at both mills. At neither mill did the cleanup of the plates and mortar aggregate \$50 in amalgam, and the precipitates and zinc in the ex-tractors were practically valueless, much to my as-tonishment.

I have since endeavored to see if I could find the leak. I cannot say that I know, but I have an idea, though such conclusions as I have formed may be materially modified by further investigations. Based on personal observations and experiences, they have been made principally after the events, and most of these experiences being in the nature of losses one would not care to duplicate them on a working scale.

Considerable work has been done in investigating the effect of oxygen in connection with the dissolu-tion of the gold by cyanide. Not only has it been proven that gold cannot be dissolved in the absence of oxygen (Journal of Proceedings of the Chemical and Metallurgical Society of South Africa, Vol. I, p. 295), but it has also been demonstrated that greater quantity of oxygen is necessary in dissolving the gold from some classes of material than from others. Caldecott says (MINING AND SCIENTIFIC PRESS, Sept. 18, 1897): "In the treatment of most accumulated slimes, however, the gold simply does not dissolve without its application, so that, instead of merely accelerating the reaction, it becomes as necessary for their treatment as cyanide itself." Writing on this same subject, Charles Butters says (MINING AND SCIENTIFIC PRESS, April 16, 1898): "During the op-eration of dissolving the gold in old slimes, oxygen must constantly be supplied. * * * Oxygen is absorbed from the atmosphere more readily by di-lute pulp than by thick pulp, and we have found in actual practice that the gold in a thin pulp dissolves more readily than in thick. The general practice is to have about four tons of liquid to one ton of slimes for dissolving purposes, and beyond this point the thicker the pulp the longer the time for the complete solution of the gold."

In tailings treated by me where four tons of liquid were used to the ton of material, my cleanup was but \$2.25 per ton, where in previous work on the same yard my actual recovery had been \$6 per ton. The

average value of the tailings before treatment was \$7.20 per ton and assays of the residues were practi-cally the same in both instances. The quantity of re-ducing agents in the material was not great, conse-quently there would not be the demand for oxygen needed by the slimes of South Africa; but in what way could a surplus of oxygen have done harm?

Scheidel tells us (The Cyanide Process, Scheidel, p. 9): "Elsner found that gold and silver were dis-solved in potassium cyanide without decomposition of water. The dissolution of the metals is, however, the consequence of the action of oxygen, which, ab-sorbed from the air, decomposes part of the cy-anide." Christy says (MINING AND SCIENTIFIC PRESS, Jan. 9, 1897): "There is danger in using too strong an oxidizer or too much of it. * * * In the cy-anide solution the oxygen and the cyanide of potas-sium may exist side by side in solution (as experi-ment shows) without sensible action on each other, unless the presence of gold determines the Elsner re-action at the point where oxygen, water, gold and cyanide of potassium meet. If a thorough utilization of the cyanide is desired, the action of the oxidizer should be such that the cyanide will be decomposed only under the stimulus of the presence of gold. Under these circumstances the cyanogen will be uti-lized to the utmost. If, however, the oxidizer is a powerful one, capable of attacking the cyanide on its own account in the absence of gold, the inevitable consequence will be a rapid destruction of the cy-anide, just as would be the destructive effect of such oxidizers on the blood."

It will not be questioned that the cyanide solu-tion would be furnished a superabundance of oxygen in the mortar, and, according to authorities, the natural consequence would be a great consumption of cyanide. Instead of this, the reverse is true. The consumption of cyanide in the solutions passing the battery was practically nothing. The most rigid tests failed to show consumption of over one-tenth of a pound per ton on some of the ore, no matter what strength of solution was used. It was the gold that suffered; so, if an excess of oxygen was to be avoided because of its destructive effect, that effect was not brought into play on the cyanide, but on the gold.

All authorities, but one, that I have read, say that there is always a considerable loss of cyanide in the passing of the solution through the zinc extractors. I have never handled a tailing pile or an ore where I could detect any appreciable loss in cyanide from its contact with zinc, and I notice Philip Argall has had the same experience at the works of the Metallic Extraction Co., Cyanide, Colo.: (The Mineral Indus-try, Vol. VI, p. 375). He says: "It is not at all unusual to find the free cyanide higher in the solution leaving the box than on entering; still, it is not the rule. Our experience with solutions of this strength (.53%) is that there is no appreciable loss of cyanide in passing through the boxes. Sometimes the issuing solutions are higher, sometimes lower, while the average shows about the same strength of cyanide in the solutions issuing from the boxes as contained in the solutions entering them."

Now, in battery cyaniding the cyanide passes through all the stages of the process with but slight shrinkage of its strength, and does its work well, for the extraction from the ore is as nearly perfect as one could ask. But the gold goes into the mortar never to show itself again in tangible form. Whether it is decomposed by the oxygen and passes off in a gaseous form, I am not prepared to say; but I know, to my sorrow, it disappears, and I am satisfied the oxygen has something to do with it. In instances where some gold has been held in solution until it has reached the extractor, it has only done so to make its escape there. I have suspended the treating of ore and put tailings through the mill till everything was running all right and the zinc in the head com-partment of the extractor would assay several dol-lars a pound. Commencing with solutions run through the battery again, in a few days such gold as was on the zinc would be gone and the zinc and the precipi-tates would assay from 50 cents to \$1 a pound only. The gold did not pass out with the fluid, for all checks on the effluent of the extractor failed to show even a weighable trace of gold in two assay tons of the solu-tion. Christy tells us (MINING AND SCIENTIFIC PRESS, Jan. 23, 1897): "Water containing dissolved oxygen attacks metallic zinc quite vigorously, forming hy-drate of zinc." During the experiences above re-ferred to, the zinc was consumed more rapidly than usual and half the precipitate was a white substance which was first thought to be lime, but which was proven afterwards to be principally zinc.

Even alkaline sulphides are powerless against the solvent power of solutions in battery cyaniding. Among material brought to one of the mills for treatment was six tons of tailings, containing a very appreciable quantity of alkaline sulphides. On pan-ning same, it was found that they contained consid-erable free gold. So they were mixed with ore and put through the battery. They assayed \$19.60 in gold before treatment and less than \$3 a ton after-wards. The gold all seemed to be caught in the bat-tery (but it wasn't), and, if there was any value to the cyanides and zinc before, there was certainly none after the solutions from this material passed the extractor.

The class of material treated would not be called a

regular pyritic ore. In other words, such iron as it contained was not in cubical form. R. Recknagel, in an article on "Cyaniding Sulphide Gold Ores," (*The Engineering and Mining Journal*, Nov. 13, 1897), throws considerable light on the fact that, in experimenting with natural sulphides, "apparently the same material is acted upon in different degrees of intensity." He says: "The most puzzling fact to me so far has been that the natural bi-sulphide of iron FeS_2 , shows very considerable difference toward cyanide, and the mystery became scarcely more intelligible when I noticed that, quite apart from any admixtures, the kind of FeS which crystallizes in the rhombic system, the marcasite, is always attacked by cyanide to a considerable degree, whereas the isometric iron pyrites is not at all, or very little, acted upon. * * * It is, of course, plain that the substance of the dimorphous FeS_2 cannot be the same in the two different forms, a fact which might readily be implied from the different behavior of the two kinds toward the oxygen of the atmosphere. It is very well known that marcasite very rapidly oxidizes into a proto-sulphate of iron, whereas the cubic pyrite withstands the influence of the atmosphere very much longer, etc." Does not this throw light on the subject? Is it surprising that a material so hungry for oxygen in nature should act peculiarly when suddenly given enough to fairly intoxicate it?

It is not so gratifying to speak of our failures as of our successes, but is it not true that our most valuable lessons are obtained from the former? The outcome of these experiences will lead to a utilization of the forces that have done harm. With certain classes of material, the proportions requisite for good work will be ascertained, and a better extraction secured; with others the time of getting the gold in solution will be greatly expedited. Crushing in cyanide solution will not be a success with some kinds of ore where the usual quantity of fluid is employed. That is certain. On the contrary, nothing can interfere with amalgamating and direct filling, so that the process can still be continuous. I have successfully handled the same ores as those above referred to by amalgamation, as ordinarily practiced, running the pulp into the agitating vat, decanting the excess of fluid, adding the cyanide solution and proceeding as usual.

Zinc Ore in the Mine and Market.

TO THE EDITOR:—In an editorial in the issue of Oct. 8th, 1898, you mention the "impracticability" of profitably treating an ore containing 35 ozs. silver, 14% lead and 35% zinc. The impracticability of treating such an ore is not as apparent as the impossibility of marketing it; and as your Utah subscriber requested information concerning the treatment, I will state that such an ore can be profitably treated if it is of such a character that, by concentration, a separate product sufficiently free from iron and lead can be made of the zinc ore. The two products, silver-lead and zinc, can then be smelted by the usual methods.

Zinc ore, delivered at the smelter, can be roasted and smelted in Missouri for less than \$11.50 per ton. The loss in smelting varies from 10% to 25% of the metallic contents. The Missouri-Kansas smelters lose about 15% in treating ores containing from 48% to 65% zinc. As much as 8% lead is not considered detrimental to zinc ores. Most of the lead remains in the retorts either as globules of lead or is absorbed by the retorts. Lead does not alloy with zinc, and any lead that may find its way into the condensers can be separated from the zinc by refining.

The presence of iron in zinc ores affects the process of distilling by adhering to the interior of the retorts, thereby increasing their weight and lessening their capacity. Both lead and iron may accumulate in the retorts to such an extent as to cause the retorts to break on account of their increased weight.

The large percentage of loss in extracting zinc from its ores is due to the fact that, by the methods at present employed in reducing the ores, the metal must necessarily pass through the state of vapor. Zinc volatilizes at 1200° centigrade, while the oxide of zinc, the ore with which the retorts are charged, reduces at 1300° centigrade; the metal is therefore released in the form of vapor from which it is condensed. The loss in distilling is then caused by: the escape of uncondensed zinc from the condensers; absorption by the retorts; infiltration through the retorts (when new); breaking of the retorts; and unvolatilized zinc remaining in the retorts, due principally to insufficient roasting. Absorption by and infiltration through the retorts can be prevented by glazing the interior of the retorts.

Marketing zinc ores is an entirely different proposition from treating them, and one which, in your issue of Sept. 24th, 1898, "Miner" demonstrates the impracticability of when the ores are mined in the western States.

Seventy-five per cent of the zinc ore of the United States is produced in the Missouri-Kansas district, and it is estimated that the ore marketed there averages 57% zinc. The smelters which treat these ores do not care to purchase an ore that contains

less than 48% zinc and more than 3% iron. Penalties are also imposed upon lead, moisture, "sand," baryta and other extraneous matter. To be marketable an ore must therefore be concentrated to meet the above requirements.

The concentrates are purchased by the smelting companies who visit the ore bins and bid for the weekly output. The price bid depends upon the demand for ore and not upon the market price of metal, nor upon the contents of the ore. The smelting companies assay the ore in order to ascertain the limit to which they can bid, and put the price as far below the limit as possible. The miner can assay his ore if he wishes, but he prefers not to know how much he must lose. The cost of the assay would be only that much more added to his loss.

There are thousands of tons of ore in the abandoned ground, tailings piles and dumps of that district which are unmarketable on account of the high standard which the smelting companies have been able to maintain. As long as these conditions continue to exist the zinc ores of Colorado and other western States will not be in great demand.

Aspen, Colo., Oct. 14th, '98.

METALLURGIST.

The Country of the Klondike.

NUMBER II.

Written for the MINING AND SCIENTIFIC PRESS by RUSSELL L. DUNN.

A placer may be mathematically defined as a function of three variables or the product of three factors. The first of the variables or factors is the existence of auriferous rock in place, or gold-bearing lodes, exposed on the land surface of the earth so as to be possible of sub-aerial denudation. The second is the existence of a sub-aerial eroding force, typically flowing water in a stream channel. The third is time, during which the sub-aerial force is breaking up the auriferous rocks and concentrating their gold content. Each of these is a variable between extreme limits. The auriferous rocks or lodes may be what is called very rich—that is to say, they may carry large concentrations of gold in relatively small rock volumes and may be possible of lode mining exploitation, or, on the other hand, they may carry gold scattered and disseminated in relatively enormous rock masses, so that it cannot be economically exploited in situ. A comparatively little erosion of the first could cumulate an amount of gold in a placer that could only be equalled by a many times larger erosion of auriferous rocks toward the lower limit of unit gold content. The sub-aerial eroding force is great or little, directly as the comparative products of volume of flowing water and unit velocities, the last being a function of the stream grade or fall and its volume. The third variable—time—may be a portion of one of the smallest geological time divisions, or it may be the aggregate of several of the greater geological time divisions. Any one of the three variables, taking its minimum or nearly minimum value, and a placer is impossible. Their varying ratio to each other, no one of them being zero or close to it in value, creates the placers of every degree of richness and condition. The tangible concrete fact of these phenomena, the placer, is the resultant expression of all of them combined. So different from, and even apparently independent of, or opposite to, the other phenomena I have described here as the genesis of it is the placer that naturally enough the popular ideas have evolved, that there is no relation of cause and effect in the existence of a placer, that each new discovery disproves any or all natural laws of placer genesis; that, in short, gold is where you find it. Nevertheless, the popular ideas are wrong, as, indeed, are most of the ideas of gold occurrence and mining that are popularly received as facts. That false ideas persist and with the masses prevail would seem to be a consequence of the twilight mystery that the hopes and aspirations of men ever envelop the winning of gold from the earth. To the individual not on the ground the fact that men in the Klondike knowing nothing of mining as a business have gathered sudden fortune, while many experienced men have missed it, it appears that knowledge of placer mining is a disqualification of success, and that the wildest stories of golden treasure are the truest. On the ground it is different. The possible areas of placers are so small that the existence of gold, even suspected, in the race to secure the ground, he who comes, whether he will or no, has no opportunity to test or choose, but must claim first what is not taken before him and, after taking, test and prove. The getting a claim at all was a matter of good traveling, in which all were on an equality, and in the blind grabbing naturally many men with no knowledge of mining got the placer ground, and others who had knowledge got nothing. The stories of the ten who were lucky are much published, but a discreet silence hides the stories of the ninety who got nothing.

As above stated, the Klondike placers are of the common type, auriferous stream beds of stream erosion. Their development has demonstrated the substantial accuracy of a description of their probable extent and character given in a paper prepared by the writer and published in the MINING AND SCIENTIFIC

PRESS of August 7th, '97. Of the entire extent of the stream valleys only a fraction has been found to be certainly placer. There is a sharp disappearance of gold values at the upstream end, a gradual tailing out at the downstream end. Some of the tributary gulches have been found to be gold bearing, others have been found to contain no gold at all. "Bench" claims, so called, have been found on the whole rather richer in gold than the stream valley placers. They are "old channel" cuts described in the paper referred to, and logically should be anticipated to be richer than the existing bottom cut. I am advised that gold has in Quartz creek only been found in the "old channel" cuts, and not at all in present bottom cut. The "old channels" and the bottom channel that is auriferous have been found to be sharper in grade and more direct in course than the present flowing stream. A section of the placers nearer the upstream than the downstream end has been found the richest. The evidence that the placers are undisturbed pre-glacial deposits is conclusive. The upstream ends of the placers have a definable relation between themselves. All of these general statements have been substantially verified during the year past since their publication. In the matter of the genesis of these placers, they are, I consider, most largely of Neocene origin. The large deposits from which the placers are formed may be of Paleozoic age, or possibly as late as the Jurassic, in the latter event corresponding in age with the lodes of the Alsek and coast regions. In either event, though the formations have been part of the land surface of the earth since Paleozoic times, I am inclined to the opinion that until the Neocene period the regional elevation was such that there was comparatively little sub-aerial erosion. I am also of the opinion that there has been no alteration in the orographic movement, that it has been persistently "uplift," and that its present condition represents its maximum uplift. I am advised that the watershed summits within which the auriferous stream beds lie are not more than 1500 feet higher than the corresponding stream bed points. Whatever this difference is, more or less, it is approximately the maximum depth of erosion of the country. Very probably it is more than the depth of the erosion of the lode sources of the gold. The relation of the placers to each other is such, and the concentration of gold values close to the upstream ends of the placers and in the higher placers is such, that I am of the opinion that the lode gold values are concentrated rather than disseminated. Two of the variable factors that make the placer are proximately known directly, the time period of erosion and the erosive energy, which are expressed together by the depth and extent of erosion. The lodes have not been found yet, but given the richness of the placers, the resultant of the three factors, and the extent of the erosion, which is the product of two of the factors, the third factor is proximately determinable as a lode system of not only concentrated gold values, but rich gold values. From all the descriptions of the topography of the country and the placers that I have, I can see no reason to anticipate failure as the conclusion of the search for them.

The placer development made will not make a permanent industry. While the present methods and appliances of working are wasteful and extravagant in cost beyond all reason, another season should see modifications and changes which would admit of the working of much lower grades of the deposits. Still, even the last will be worked out rapidly. I see no reason to anticipate over five years' life to the placers now known or such as may be yet discovered adjacent. The deposits are too shallow and superficial to last against the furious energy with which they are worked. If the district is to have a future it will have to be based on the lode sources of the gold that are as yet undiscovered.

[Since the preceding was written the report of an auriferous quartz discovery in the Klondike has been made. The lode is reported to be rich in free, visible gold, 16 feet wide at the point of discovery, rotten, honeycomb in character and carrying galena and other pyritic minerals. The location of the discovery is at the head of Lombard creek, the first tributary of Dominion creek towards McQueston, and almost on the trail leading to the latter place. It is well up on the dome or divide between Dominion and Hunker creeks. Its discovery is a confirmation of the statement made a year since that such lodes would be found the source of the gold at the upstream end of the placers. In its general description it corresponds to the purely deductive description arrived at from the consideration of the phenomena of the placers which I have made in this paper.]

What has generally been referred to as "Shorty Creek District" is in the singular isolated mountain mass of metamorphic Jurassic slates lying west of Lake Deser-Dee-Ash, 150 miles inland from Pyramid harbor and accessible by the Dalton trail. Lying far off the natural routes to the Klondike district, it is comparatively little known and explored. Shorty creek itself is a small, torrential gulch tributary to a larger stream known as Khasha river. It is in the latter and one of its branches above Shorty creek, known as Alder creek, that the known placers exist. Shorty creek, though gold bearing and the locus of the first discovery, does not seem to contain com-

mercial values. Khasha river and Alder creek are torrential streams with considerable waterflow. The stream bed for several miles is auriferous and there are fragments of an older gravel-filled channel at a higher elevation which is also gold bearing. The source of the placer gold has already been traced to lodes. Khasha river is the most easterly stream in the mountain; westward from it are several other streams in which discoveries of placers and lodes were made too late this season to admit of prospecting. The district lies above 2700 feet in elevation and is reached from the coast over passes that have summit elevations of 4300 feet. The difficulty of transportation is a serious drawback to the development of a mining industry in this country. There is no water route possible and nothing apparently to justify the construction of a railroad. Probably the cheapest and preferable inlet to this district will be to take the White Pass railroad and Lewis river to McCormack's Post near the mouth of the Nordenskiöld river, thence there is a good trail up the valley of the Nordenskiöld and from it over an easy pass into the Alsek basin, twenty-five miles south of Lake Deser-Dee-Ash. The snow is off of this trail five weeks earlier in the spring than it is off of the direct coast trail; there are no rivers to cross and no ranges to climb. A good wagon road could be constructed over this route at a small cost, which would likely be justified by the mining in the district. A wagon road from Pyramid harbor would be so costly as to be commercially inexpedient. The district is on the whole not one to which prospectors can go expecting to make a strike in the first season nor even to anticipate very rich mines in. Miners, however, can make fair wages from many claims; incidentally they may discover something worth the attention of capital.

(To be Continued.)

The "Miner's Inch."

In the issue of July 30, '98, in answer to the question "What is a miner's inch of water?" was given a page of illustration, and tabulated statement in which, for the hundredth time, was pointed out the well-known fact that while exact data and results could be given where an exact constant was used, the term "miner's inch" was not an exact, fixed, definite term either in California or other States or Territories, as different water companies and different localities recognized and used different heads above the center of the aperture, the "inch" thus varying from 1.36 to 1.73 cubic feet per minute. With this was given a way of measuring a "miner's inch," in a clear and exhaustive way. The general recognition of its value is exemplified by the fact that in less than thirty days the entire edition containing the article was exhausted, and orders for that number ceased being filled Aug. 25.

Several criticisms have been received, mostly from California mining engineers, and of these some are adverse. One California hydraulic mining engineer of recognized ability deems the time propitious for some settled, definite meaning to be attached to that form of measurement of water, so far as California is concerned, and proposes that the Code Commission which is now compiling and revising the California laws, amend the present description so as to meet what appears to be the general requirements in that direction. He says:

"As usually described, 'a miner's inch of water is that quantity of water which will pass through an orifice 1 inch square in the side of a vessel under a mean pressure of 6 inches.'

"In appropriations of water under Sec. 1415, paragraph 1, of the Civil Code, it reads: 'that he claims the water there flowing to the extent of (giving the number) inches, measured under a four-inch pressure.'

"I would suggest that the Code Commission amend the above paragraph by inserting the word 'mean' after the words 'four-inch' and before the word 'pressure,' so that it would read 'four-inch mean pressure.'

"This is essential, because the size of the orifice is not named in the Code, and the actual or mean pressure is left in doubt. Should the pressure or overflow board remain the same, the deeper the orifice or throat, the greater the amount of water for each miner's inch flowing through it.

"The accompanying two figures illustrate my meaning. In Fig. 1 the 4-inch pressure board remains the same:

With a 1-inch throat or orifice the mean pressure is $4\frac{1}{2}$ inches.
 " 2-inch " " " " 5 " "
 " 4-inch " " " " 6 " "
 " 6-inch " " " " 7 " "
 " 8-inch " " " " 8 " "

"Now, referring to Fig. 2, you will see that the pressure, or 4-inch mean pressure, always remains the same, and that the depth of the pressure board varies according to the size of the throat:

The 1-inch throat requires a $3\frac{1}{4}$ -inch pressure board.
 " 2-inch " " 3-inch " "
 " 4-inch " " 2-inch " "
 " 6-inch " " 1-inch " "
 " 8-inch depth " " no " "

"It is understood, of course, that the 4-inch throat means four miner's inches, the 2-inch throat two

miner's inches for each inch measured horizontally, and so on.

"In Fig. 1, the pressure being greater, each inch of the wider throats means a greater quantity of water proportionately to the size of the throat. Hence when ditch men contract for the sale of water they always specify that the measurement shall be under such and such mean pressure.

"By inserting the word 'mean' it leaves nobody in doubt as to what is meant exactly."

The Code does not define a legal inch of water, merely stating that water (so many inches) may be

turn, there will be a support sufficient to put the proposition through.

In his treatise, Mr. Paul deals with the old lode from its beginning, through its palmiest days, when I, as a boy, roamed among these barren mountains, to the very time when work was finally abandoned. He realizes the cause of this abandonment and probably remembers when the best engineering skill of the time was exerted to its utmost to further development, and when finally, through lack of financial support, all succumbed to the rushing floods. All that existed at this time was the very best obtain-

able; but as I, then a boy, have grown to manhood, just so has the engineering profession advanced and through its modern appliances has again placed the old lode within the bounds of a paying proposition.

To-day, in the "gigantic combination" of which Mr. Paul writes, each one of the twenty-seven companies on the Comstock, from Cedar Hill on the north to and including the Justice on the south, stands ready to give to this enterprise its entire moral and financial support. The condition of these properties at the time work was suspended has been thoroughly investigated, and, upon the recommendation of the various superintendents, the "Pumping Association" is ready to carry the work to a successful conclusion.

It is a fact that even now the same problem of drainage that was instrumental in the

FIG. 1.
Pressure-board of 4" remaining constant, but throat and mean pressure varying.

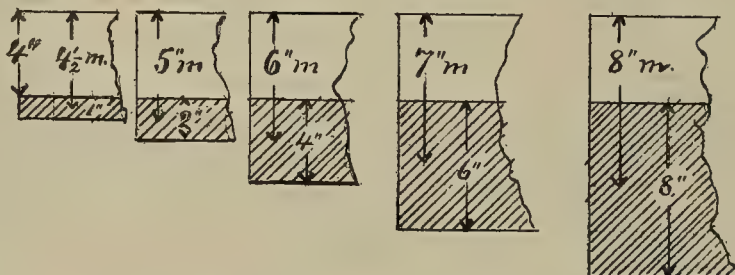
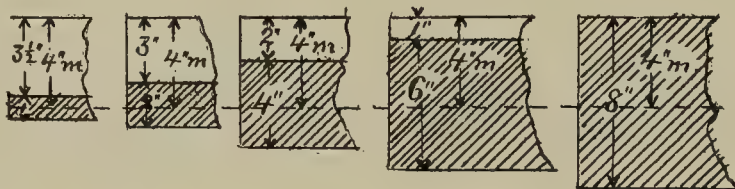


FIG. 2.
Mean-pressure of 4" remaining constant, but pressure-board and throat varying.



appropriated under 4-inch pressure. In the above the four inch mean pressure is not specially advocated, it being simply suggested as being the least change for the Code Commission to make, and less likely to provoke discussion in the Legislature when the report comes up for adoption. Probably were the professional preferences of hydraulic engineers consulted, many of them would favor an inch that is, approximately, about six and one-half mean pressure, as that would give 100 cubic feet of water per hour, which would render it capable of definite comparison for motors, etc.

The Comstock Proposition.

TO THE EDITOR:—In the issue of Oct. 8th is an article by Almarin B. Paul, in which he, from a financial standpoint, doubts the advisability of a resumption of deep mining on the Comstock and in which he further takes the ground that the same amount of money could be expended to a much better advantage upon other "undeveloped Comstocks," believed to exist in Nevada, and, lastly, he confronts us with the all-important question, "Will it pay?"

Granted that there are other Comstocks awaiting development, and also that this great belt comprises but one-tenth part of the mineral resources of the State of Nevada, I still fail to see the old lode in the light of a "has been," and from a scientific mining standpoint, when work is resumed upon a modern business basis, this great enterprise will furnish food for the multitude for a long period of time, and will prove a legitimate paying investment.

By a resumption of work in the deeper levels I do not mean that we can again take up the old and wasteful methods employed at the time these workings were abandoned and continue the development along lines which Mr. Paul rightly styles "the curse of the entire mining industry." New ways and means must be adopted and the old ones abandoned; then with the advent of modern engineering, modern machinery and modern mining methods, it can be made to pay.

Before such an enterprise can be placed in the category of legitimate investments, the element of stock deal, pure and simple, must be eliminated; and then, with the moneyed interests assured of a fair re-

abandonment must be confronted and overcome before work can be resumed; and were the facilities at hand simply those of former days, no reasonable thinking man would hesitate in the assertion that an attempt in this direction would be folly in the extreme. This question of drainage naturally divides itself into two separate and distinct problems, each capable of a solution distinctively its own, and differing materially in magnitude.

The workings upon the Comstock have been carried out in such a manner that the Gold Hill mines are isolated from the middle and north end mines; just so is the problem of drainage and so will be its ultimate solution. During the past two years both of these problems have been thoroughly investigated, and, as a result, plans and careful estimates have been formulated for the entire work.

By the judicious use of the hydraulic equipment available in the Chollar-Potosi and Combination shaft, the work of draining the Virginia mines will be very much facilitated and a very superior showing made from the outset. Of course, this plant would not be adequate for the accomplishment of the purpose in its entirety, but is a good beginning, which will ultimately lead to the drainage of the entire Virginia group of mines.

In Gold Hill the plan as outlined is upon a different basis, is a radical departure from older methods; and is a definite proposition which will lead to a definite result and will, without intermediate steps, accomplish the work of draining the entire south end in a surprisingly short space of time.

The estimates upon this plant have been a revelation to even the most sanguine, inasmuch as the cost is comparatively small, much less in fact than was anticipated, and the actual operating expense, including interest, insurance, taxes and depreciation, about \$3 per horse power (\$4800 per month), as against the enormous figure (\$54,400 per month) formerly paid for an equivalent pump horse power. This fact alone, to my mind, is quite sufficient to warrant a resumption of work in all of these properties, to say nothing of the many other advantages afforded through the extensive use of water power, electrically transmitted. So, after a more thorough investigation of recent developments and the plans as at present outlined, I believe that Mr. Paul will also agree that this enterprise will not only pay, but should be carried to an early conclusion.

Oakland, Cal., Oct. 22nd, '98. LEON M. HALL.

Coast Industrial Notes.

Shipments of oil from the Coalinga, Cal., last average 1000 barrels a day.

The Utah & Pacific road from Milford, has finished seven miles westward.

A new railroad from Perris to Lake View, seven miles long, is to be in operation November 1.

The Sunset mine, near Cumberland, has been bought by the Co-operative Syndicate, for \$30,000. It has four of bituminous coal.

The Pacific States Telephone Co. is the title of the consolidated companies with the line extending from Portland to San Diego, longest in the world.

English engineers are surveying for a road from Batopilas, Sonora, Mexico. It is expected that the new line will have its terminus at Topolobampo on the Gulf of California.

In the bids for extending the north and south jetties at Yaquina Bay, Or., Christie & Heyworth of Chicago are the lowest bidders—\$511,940. There were eight other bidders ranging from \$669,000 to \$847,688.

The proposed extensions of the Mexican railroad, the plans of which are before the department for approval, comprise a line from Durango to Guanacevi and one from Toluca to Guadalajara.

The buildings for the new naval station located on Yerba Buena Island, San Francisco bay. They will accommodate 300 officers. Congress has appropriated \$50,000 for construction.

The Atchison, Topeka & Santa Fe will be running into San Francisco from Chicago before next September, says E. P. Ripley, president of the Santa Fe at San Francisco last Tuesday.

Three carloads of lumber and machinery arrived at Johannesburg, Cal., for the California Borax Co., that is erecting works at Borax Lake. They propose to erect a plant capable of turning out 100 tons of refined borax a month.

Oil developments at Summerland, Cal., less. The Beresford & Hickey new wells are eighteen barrels per day. Experimental operations on one of the Treadwell wells resulted in a flow of eight barrels in forty-four minutes.

The railroad surveying party in southern California is supposed to be working for the Southern Pacific, laying out a new route to California. The Rio Grande Western is thought to accord with a plan to connect with its line between Richfield and Maryvale, Utah, the Great Northern Railway has 500 men working on the Cascade tunnel, in Washington, about evenly divided between the two lines. The progress made is about 2800 feet. The work is in rock; nevertheless, there is a tendency to fall and the tunnel has timbered.

At Vancouver, B. C., on the 26th, was destroyed the Hastings sawmill; 250 men are out of employment. The mill was of a daily capacity of 300 M feet. The machinery was destroyed, as well as the wharf and company mill. The owner is the Royal City Lumber Mill Co., and the loss is several hundred thousand dollars.

The Mexican government has granted a concession for a standard gauge railroad, 150 miles in length, with a large subsidy, to the Ingarran Copper Mining Co., in which the Rothschilds are interested. The railroad is planned to connect the mines with the port of Zihuatanejo, on the Pacific coast, and to be an outlet for copper production.

The Hawaiian sugar crop of 1898 is estimated at 280,000 tons; 180,000 tons shipped to New York and 100,000 tons to San Francisco. There are thirty-nine sugar corporations on the islands, with a combined capital stock of \$44,800. Four of them, representing \$13,000, are California properties; California owns 59% of sugar corporations in Hawaii.

Seven men were scalded to death on the trial trip of the torpedo boat Davis on the lower Columbia river last week. The boat was built by the Wolff & Zwicker Works, Portland, Or. The tubes in the forward end of the boiler had become dry, and nine of them burst out of the steam drum. The boat was making twenty-eight miles an hour at the time of the accident.

The September report of the Los Angeles oil producers' trustees shows 28,236 barrels of oil sold by them during that month, more than twice the quantity sold by them during the preceding month. The quantity of storage, owned by the trustees, was at the end of that month 85,236 barrels. The average price received at the wells during September was 82.27 cents per barrel. The trustees estimate that the shortage for the month in the Los Angeles field will be 65,000 barrels.

Ed. Gunnerson of Melbourne, Australia, tells that Sound mill owners they must greatly improve their process of dressing lumber if they hope to compete with Scandinavian lumbermen of the Baltic sea for Australian trade in finished lumber products. Australia now exports 70,000,000 feet of Washington fir annually, of which Melbourne uses one-third. This, however, consists of rough lumber and heavy timbers. Australia's supply of finished lumber is shipped from Norway and Sweden.

Consul-General Goodnow writes from Shanghai: "I desire to suggest to chambers of commerce and boards of trade of the United States the desirability of keeping on file in their consulates in China, and especially in Shanghai, copies of the commercial directories of their cities. I am often appealed to for lists of firms handling specific lines. For example, a German located at Kyao-chau Bay

asked for a list of lumber firms on the Pacific coast. I have nothing from which information can be obtained. Such inquiries are frequent."

—Mr. C. A. Green, writing from Singapore, says that the trade of that city and of Hong Kong and Shanghai is growing. The cities are great distributive points in which the business is done mainly by English houses, which will not push American goods if they can sell their own. The United States has at present but a very small share in the trade. In Shanghai there are but three American firms; in Hong Kong and Singapore there are none. The merchants are only middlemen, the trade being with the natives, who will only buy what they know and have seen. The report suggests that trade can be built up.

—The net income of the Southern Pacific Co.'s Pacific system of 4985 miles of road was \$363,450 for the year ending June 30th, '98. The total passenger earnings of the Pacific system were \$13,178,314, and the total freight earnings \$28,545,750. There were 20,233,806 paying passengers carried during the year; average distance traveled, twenty-nine miles; paying freight amounted to 8,114,951 tons. The Southern California Railway Co., practically owned by the Atchison, Topeka & Santa Fe Railway Co., has a capital stock issued and outstanding of \$12,824,000, and a total of 471.14 miles of track in operation. It produced a net income of \$341,196 during the fiscal year, the gross earnings being \$2,539,717. The S. F. & S. J. Valley road, with its 277.34 miles of main line and its total length of 318 miles of track, had a net income for the year of \$128,753. The total cost of the average mile of road owned by the company is \$16,925. The Valley road employs 509 persons, at an expense of \$260,322 a year, or an average of \$2.13 a day for each person. It carried during the past fiscal year 64,595 paying passengers and 171,047 tons of paying freight.

—"Duty determines destiny," says President McKinley, thus putting in three words the most sublime sentiment of the century. As duty demands the construction of the Nicaragua canal it may be considered as a matter of destiny from an American standpoint. The war with Spain has doubtless convinced all America that the Nicaragua canal will have to be constructed with all speed—no matter what may be the engineering difficulties and the financial obstacles. In defeating Spain the American Union has become a maritime nation, and by annexing Hawaii and protecting the Philippines she will become politically, as she has always been geographically, one of the powers of the Pacific. Toward the Pacific the balance of the world is now steadily setting. In that vast basin, stretching from the shores of the two American to the China seas and the Indian ocean, are brought face to face the two great races of mankind—white and yellow—each working out its own destiny. Within that great area Britain, America, Russia, France and Germany are contending for supremacy in trade, if not for advantage in territory; Japan is establishing her claim to be ranked as a world power, and China is awaiting a new birth that will revolutionize the West as well as the East; where seven empires meet in the battleground on which will be fought out the great racial struggle of the future, as well as the economic struggle for the present. Where Europe and America impinge on Asia we behold already the beginning of a series of the most interesting problems known to human history. The foremost is the commercial one, because everybody says that but for its commercial potentiality China would not be worth a foreign office dispatch. And a primal factor in the commercial problem is now in the Nicaragua canal.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

- FOR THE WEEK ENDING OCTOBER 18, 1898.
- 612,655.—DENTAL CUPSIDOR—W. N. Avery, San Jose, Cal.
- 612,644.—BASKET—J. A. Bernardi, Salem, Or.
- 612,711.—CLEANING DEVICE—J. R. Dever, Olympia, Wash.
- 612,715.—REFRIGERATOR CAR—E. T. Earl, Oakland, Cal.
- 612,722.—ELEVATOR—C. I. Hall, S. F.
- 612,725.—BRUSH CUTTER—Hastings & Scott, San Jose, Cal.
- 612,585.—FARM GATE—G. G. Kaiser, Johnson, Wash.
- 612,580.—DENTAL ENGINE—A. E. Macdonald, S. F.
- 612,777.—DREDGER—P. H. Mackie, Pasadena, Cal.
- 612,744.—ALMOND HULLER—D. & H. H. Methven, Antioch, Cal.
- 612,535.—PIPE WRENCH—R. J. Miller, Benicia, Cal.
- 612,569.—ECRASEUR—J. G. Moscrop, San Bernardino, Cal.
- 612,432.—MINER'S CANDLESTICK—A. Nissen, Shasta, Cal.
- 612,807.—WINCH—R. H. Postlethwaite, S. F.
- 612,786.—WASH BOILER—A. Rantala, Navarro, Cal.
- 612,574.—BOTTLE—P. J. Scharbach, Woodburn, Or.
- 612,439.—POTATO DIGGER—C. Schoenfeldt, Stockton, Cal.
- 612,618.—PROPELLER—G. Sintz, Seattle, Wash.
- 612,683.—POTATO PLANTER—W. Y. & P. E. Thomas, Ingleswood, Cal.
- 612,582.—WINDMILL—F. C. Thompson, Burton, Wash.
- 612,685.—HANDLE COUPLING—Thorpe & Normant, Fresno, Cal.
- 612,579.—GRADER, DITCHER, ETC.—S. W. Wible, Bakersfield, Cal.
- 612,821.—LAMP BURNER—R. J. Wilson, Seattle, Wash.
- 29,514.—DESIGN, REIN GUARD—H. Anderson, Sumner, Wash.
- 29,519.—DESIGN, CLIPPING HOLDER—C. E. Schwartz, Palo Alto, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Personal.

H. KELLY becomes Supt. Badger mine, Aspen, Colo.

W. S. KEYES returned this week from a visit to Mexico.

E. RAY is Gen. Mgr. Little Johnny mine, Leadville, Colo.

B. DOWNEY, Supt. B. & B. mine, Troy, Montana, is in Spokane, Wash.

W. R. SHILLING has been appointed Supt. Red Rover mine, Acton, Cal.

CAPT. THOS. MEIN is credited with intention to return to the Rand, S. A.

B. F. HARTLEY, Supt. Montauk mine, Newcastle, Cal., is in San Francisco.

C. H. SCHUB, Mgr. Cigale mine, Mercur, Utah, has returned from Chicago, Ill.

J. B. McLAUGHLIN, a mine operator at Iron Mountain, Cal., is in San Francisco.

F. HUSBANDS, Supt. Dalmatia mine, Kelsey, Cal., has returned from San Francisco.

P. ELY, Supt. Esperanza mine, Mokelumne Hill, Cal., has returned from New York.

M. BAMBERGER succeeds J. Dern as Gen. Mgr. Geyser-Marion mine, Mercur, Utah.

N. GAILLES has been appointed Supt. Providence M. Co. in Yavapai county, Arizona.

S. R. PORTER, Supt. Balliol mine, Sutter Creek, Cal., has returned from San Francisco.

SUPR. BRENT of the Ivanhoe mine, Plymouth, Cal., has returned from San Francisco.

C. DORSELY, Supt. Brown Bear mine, Deadwood, Cal., has returned from San Francisco.

H. K. SHOCKEY, Supt. Phoenix mine, Nevada City, Cal., has returned from San Francisco.

B. HOWE, a mine operator of Sarawak, Borneo, is at Mercur, Utah, studying the cyanide process.

J. D. HEARD, managing owner Yreka, Cal., Blue Gravel M. Co., is in San Francisco from Denver, Colo.

PROF. A. VAN DER NAILLEN of San Francisco has returned from a seven months' tour through Europe.

D. KIETH and J. BAMBERGE, Salt Lake City, Utah, are at their mining properties near Bellevue, Oregon.

C. L. BLAKEMORE, Supt. Lituya Bay Placer M. Co. of Alaska, has returned to San Jose, Cal., for the winter.

DR. GEORGE S. ARMSTRONG is the new consular agent at Northport, Wash., to succeed F. R. Blochberger.

PRESTON WOODS, Gen. Mgr. Eaglebird mine, Maybert, Cal., left San Francisco this week for Chicago and Boston.

C. J. KENDALL succeeds W. D. Pinkston as Gen. Mgr. Three Stars mine, Auburn, Cal., and F. Romage becomes Supt.

W. J. SUTHERLAND, Pres. Holmes M. Co., Candelaria, Nev., is inspecting his mining properties at Grizzly Flat, Cal.

J. W. SEARLES, Mgr. of the Diamond S. and Little Chief in Bradshaw mountains, Arizona, is at present in Salt Lake City.

PRES. NEWHOUSE of the Highland Boy mine, Bingham, Utah, has returned from New York and Chicago to Salt Lake City, Utah.

O. O. HOWARD JR. of San Francisco has returned from Trinity county, Cal., where he has been examining mining properties.

L. McQUESTON, "the father of the Klondike," has bought a home at Berkeley, Cal., and will return to Dawson in May, '99.

W. J. CHALMERS, Pres. Fraser & Chalmers Co., Chicago, Ill., has returned home from Coeur d'Alene, Idaho, and Spokane, Wash.

L. L. MEYERS, Supt. Malakoff mine, North Bloomfield, Cal., is in San Francisco, having come to attend the obsequies of H. Pichoir.

ADMIRAL DEWEY, who is interested in several mining enterprises on this coast, is expected in San Francisco from Manila about Dec. 6.

W. M. BAINBRIDGE, formerly Supt. of the Elton mine, Cripple Creek district, Colo., has taken a lease of the Boss Tweed mine in Tintic district, Utah.

GILBERT MCM. ROSS, Gen. Mgr. Comstock Pumping Association, will have personal charge and control of the work of drainage on behalf of the Association.

PROF. SHALER, an Eastern geologist, predicts that in the distant future Lakes Superior, Huron, Michigan, Erie and Ontario will cease to pour over Niagara, and that the four upper lakes will find their outlet at Chicago.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

WASH-BOILER ATTACHMENTS.—August Rantala, Navarro, Cal. No. 612,788. Dated Oct. 13, 1898. The object of this invention is to provide an attachment for boilers which are used for boiling clothes so that the clothes may be kept in position in the lower part of the boiler and prevented from rising to the surface, which is liable to cause the water to boil over during the operation. It consists essentially of an open work frame made of wire or suitable material so shaped as to approximately fit the interior of the boiler and having a handle by which it may be introduced and removed. At one end is a slidable wire frame guided upon parts of the main frame and having a lever and handle by which it may be removed and afterwards locked in position so that when withdrawn the whole device can be easily set into the boiler upon the clothes which are already

in place, then by pushing the lever the slidable portion is forced outward longitudinally and the two ends of the device are thus caused to bind and lock the device firmly within the boiler. Within the ends of the frame are inwardly converging plates which serve to direct the water which boils up at the ends and around the curvature of the boiler toward the center, thus preventing it from being thrown over the top.

GRADER, DITCHER, AND ROAD AND LEVER BUILDER.—S. W. Wible, Bakersfield, Cal. No. 612,579. Dated Oct. 18, 1898. This invention relates to an apparatus which is especially designed for the building of roads and levees, for grading land, for making ditches, and for the various operations which are carried on in connection with the irrigation of large tracts of land. It consists of a triangular frame, of which the apex forms the front, one side being in the line of travel of the machine and the other or hypotenuse diverging outwardly from front to rear. The machine is supported upon wheels at the angles of the frame and is provided with lever mechanism by which it may be raised or depressed with relation to the wheels. A plow is attached to the frame near the front, this plow having no land side. This turns the earth up in the line of travel rearwardly, from this is a series of concave disks centrally pivoted upon the diverging side of the frame, the lower edges so disposed with relation to the surface of the ground that the first of the disks and each successive one takes up and transfers the material which has been turned up by the plow rearwardly and outwardly, thus delivering it at a considerable distance from the line of travel of the plow. In order to resist the side thrust or tendency to push the machine toward the land which is caused by the action of the plow and the disks, a revolving cone is journaled upon a standard so placed with relation to the vertical uncut earth at the side of the furrow that the periphery of the cone rolls against this solid earth and practically acts as a land side, the cone being placed at the rear of the machine.

DENTAL ENGINE.—A. E. Macdonald, San Francisco, Cal. No. 612,593. Dated Oct. 18, 1898. This invention relates to improvements in dental engines. It consists of a hinged swinging bracket arm, a vertical shaft journaled in the outer end thereof, a disk carried by the shaft, pulleys and a driving belt by which the disk is rotated, a horizontal shaft journaled transversely above the disk and a wheel adjustable thereon having its periphery in contact with the face of the disk so that it may be moved from the central point where it is stationary, to either side and toward the periphery of the disk, thus driving the wheel in either direction and varying the rate of speed according to the distance that it is moved from the center toward the periphery of the disk. The wheel may travel upon a feather on its shaft and by means of a parallel traveling clutch and cords connecting the guide of said clutch with a treadle, the wheel is controlled and instantly moved to any desired point to drive in either direction, reverse, or stop the motion instantly.

MINERS' CANDLESTICK.—Antone Nissen, Shasta, Cal. No. 612,432. Dated Oct. 18, 1898. The object of this invention is to provide a miners' candlestick which can be so fixed in the various positions required when in use in a mine that the candle will always remain in a vertical position without relation to the supporting arm, and in conjunction with the required parts are such simple tools as are most generally used by miners in their work, such as the fuse cutter, cap crimper, etc. The invention comprises a bar folded upon itself with parallel separated sides having the bight expanded to form a ring, an elastic sheet metal socket upon one of the ends open at one side, having a projecting thumb-piece, a second bar pivoted between the sides of the first one, near the socket-carrying end having one end projecting exterior thereto and pointed so as to be inserted into a rimber or other support and the other end bent to form a hook which coincides and is foldable within the ring of the first named portion when the parts are closed together. Between the meeting edges of these two foldable bars are formed, first, cutting edges by which the fuse may be severed to the proper length, and, secondly, semi-circular grooves formed in the opposing bars in such a manner that they will receive a cap and crimp it upon the fuse when the parts are closed together.

DENTAL FOUNTAIN CUPSIDOR.—Wm. M. Avery, San Jose, Cal., assignor to the S. S. White Dental Manufacturing Co. of Philadelphia, Pa. No. 612,655. Dated Oct. 18, 1898. This invention relates to a cupsidor which is especially designed for use in connection with dental chairs. It comprises a trap with an open top, a bowl fitting said open top and adapted to be readily lifted therefrom, said bowl having a central opening, a perforated water pipe extending upwardly through the opening having a deflecting or discharging upwardly at an angle and an adjusting screw cap to regulate the supply of water. A litter trap is situated below the discharge opening of the bowl and the same trap serves to prevent the entrance of any gas from the discharge pipe with which it connects. A saliva pipe leads through the side of the trap discharging downwardly interior thereof with a water pipe connecting with the chamber into which the saliva is discharged having an injector opening through which the water is delivered to produce a suctional draft from the pipe and this is provided with a regulating screw by which the amount and force of the jet are regulated. The device may be raised, depressed and its position regulated by means of a double jointed bracket in which the vertical telescopic discharge pipe is supported, and by means of a set screw it may be fixed at any desired point.

Sulphuretted Hydrogen.

Written for the MINING AND SCIENTIFIC PRESS
by A. S. COOPER.

In the quicksilver mines near Williams, Colusa Co., Cal., and in the tunnels driven for water near Santa Barbara, Cal., and in many other places, sulphuretted hydrogen has been very annoying and dangerous to life. At Santa Barbara it proved fatal to two workmen.

It is highly poisonous when breathed in a concentrated form, and when present in the air in minute proportions it is rapidly fatal to the lower order of animals. A single gallon mixed with twelve hundred of air will render it poisonous to birds and one in one hundred will kill a dog. When inhaled it acts directly upon the blood, thickening it and turning it black.

When present in the air of a chamber of a mine it may be instantaneously destroyed by the action of a small quantity of free chlorine. Chlorine manifests an intense affinity for hydrogen. When chlorine in a free state is brought in contact with sulphuretted hydrogen it tends to "draw out," as it were, the hydrogen from its combination with sulphur, forming muriatic acid, free sulphur being deposited, and by this action absolutely destroys the noxious sulphuretted hydrogen gas.

Chlorine gas for this purpose can be generated in the following manner: Chloride of lime mixed with water and exposed to the air in shallow vessels, if possible, upon a high shelf.

This compound is gradually decomposed by the carbonic acid of the atmosphere, and the chlorine, being evolved, falls slowly down from the high places. Owing to the fact that it is a very heavy gas when compared with atmospheric air or sulphuretted hydrogen, it is diffused through the chambers or tunnels. If a more rapid action is required, a little dilute sulphuric or hydrochloric acid may be allowed to drop into the chloride of lime solution from a vessel suspended above it, by means of a piece of lamp wick arranged in the form of a syphon.

Another method is to suspend in the chambers cloths steeped in a solution of chloride of lime, care being taken to avoid excess.

It must be borne in mind that chlorine in any form must be used only as an aid to proper ventilation. It is a necessary condition for health that our mines or tunnels be properly ventilated.

A cloth moistened with alcohol and held before the mouth is good protection against the inhalation of sulphuretted hydrogen.

The acids formed by sulphuretted hydrogen in the atmosphere or an atmosphere charged with chlorine attacks the eyes, causing great pain.

This action on the eyes may be partly avoided by frequently bathing the eyes with a solution of borax in water.

The Oldest Known Rock.

N. H. Winchell, describing the greenstones of Minnesota, considers them the bottom of the Archean scale and the representative of the original crust of the earth formed from the molten mass by the earliest consolidation. The greenstones are divisible into two parts, one igneous and the other clastic, the latter succeeding the former with a confused and apparently sometimes non-conformable superposition, somewhat as surface eruptive rocks might be superposed, in the presence of oceanic action, upon a massive of the same nature at the same place. The clastic portions of the greenstones vary to more silicious rocks, constituting great thicknesses of graywackes, phyllites and conglomerates; and as such they have been converted by widespread metamorphism into mica schists and gneisses, the alteration coming on by degrees, increasing in intensity toward centers of granitic intrusion and toward the great areas of granite and igneous gneiss. Such granite and such metamorphic rocks, as a whole, have been considered the basement rock, the oldest known rocks of the country. But, following up the long known fact

that the Laurentian granite and igneous gneisses cut the schists and sedimentary gneisses and hence are younger, they are thus shown to be younger also than the bottom greenstones. They occasionally penetrate these greenstones and change them to amphibolyte and pyroxene gneiss. These metamorphic schists and gneisses seem to be a representative of the sedimentary portion of the Lower Laurentian of Canada, while the igneous granite and gneisses are as plainly a general parallel of the igneous portion of that series. It follows, therefore, that the Canadian Laurentian is, as a whole, of later date than the greenstones, if the succession is the same as in the Northwest, and that the greenstones should be considered the bottom rock of the geological scale.

These "greenstones" are supposed to represent the primeval crust of the earth. The possibility of the deriva-

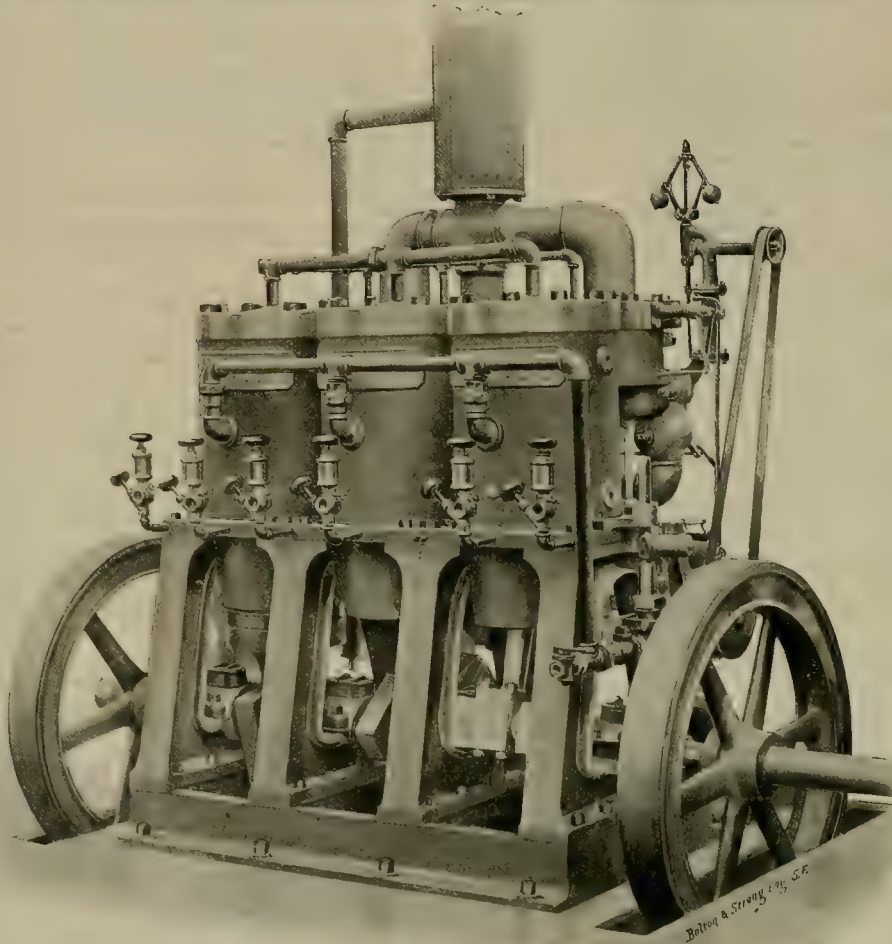
that possibly, owing to the chemical characteristics of potassium, it remained in the earth's atmosphere until the consolidation and also the cooling of the first crust sufficiently to allow the ocean to rest upon it, and that it was then rapidly extracted by the moist, heavy atmosphere that prevailed, being carried into the sea.

A Three-Cylinder Gas Engine.

In December, 1897, the Hercules Gas Engine Works of San Francisco, Cal., built the three-cylinder gasoline engine shown in the illustration for the Alaska Railroad and Transportation Co. The engine was installed at Chilkoot pass, Alaska, and has since furnished the motive power for a Hallidie long service aerial rope tramway over the pass. In this regard it may be mentioned that two companies operating steam-driven rope tramways could not stand

ized for successively igniting an already prepared mixture of air and hydrocarbon (previously heated by the waste gases) on its entrance into the cylinder, or for causing this mixture to explode—that is to say, if the mixture be passed into the cylinder through wire sieves, it will be gradually consumed as it enters, while if instantaneous combustion be desired the sieve or the like is omitted, thus allowing the flames to strike back and the whole of the mixture to be exploded in the chamber provided for it. The first ignition of all must be effected in some other manner in order to provide a combustion product for the second and succeeding ignitions.

With the object of attaining the highest economy, the highly compressed air, which is cooled during the compression, is heated directly or indirectly, partly by the waste gases or other suitable heating device and partly by the highly heated compressed residual products of combustion, and the hydrocarbon is conveyed into this air, ignited and consumed. The direct heating by the residual products is effected by the air necessary for the process being admitted to the compressed residual products left in the cylinder, upon the next stroke, whereupon both gases become mixed. If economy becomes less considered and a greater effect required, the working diagram may be increased by diminishing the compression diagram—that is, by reducing the residues to be compressed to a minimum, so that the air is mainly warmed by the waste gases. For the same object the temperature of the waste gases may be raised to the highest degree permissible for the material—that is to say, the end pressure of the diagram and the diagram itself be thereby increased. It is, however, as stated, preferable not to spare the compression, as the value of the process depends on the temperature of the air before the hydrocarbon is conveyed to it. The preliminary compression also assists the mechanical parts of the machine, as the distributing gear is thoroughly unloaded thereby.



THREE CYLINDER GAS ENGINE.

tion of the alkaline magma from these ferro-magnesian rocks by any of the methods of lixiviation or of differentiation which are currently proposed by geologists who have lately discussed the origin of the igneous rocks is denied. Accepting this ferro-magnesian crust as the rock of the first magma of the earth, argument is made that it could not give rise to minerals consisting largely of a potash base, such as orthoclase and microcline, which constitute the greatest distinguishing element in the alkaline magma, nor could it give rise to the preponderating percentage of silica which accompanies the potash minerals. These characters must have some other source. The potash is believed to have existed in the ocean itself which immediately followed the consolidation of the first crust. Such an alkaline ocean, especially if heated, would hold in solution much silica. Hence followed the precipitation of alkaline silicates, and of excess of silica; hence, also, the alkaline character of the schists and gneisses when its sediments were formed into rock and metamorphosed; and hence, when fused, the alkaline magma. As to the cause of this potassic ocean by which the great stock of the world's potash was stored in the Archean rocks, it has been suggested

the competition and had to quit.

By throwing a latch on exhaust valve stem any one of the three cylinders can be "cut out," leaving two cylinders to do the work on partial load, or two can be "cut out," leaving only one cylinder in actual operation. The economical range of power and speed of engine shown is from 12 to 45 H. P. and 175 to 250 revolutions.

The Hercules people are preparing to build four-cylinder engines of about 200 actual horse power for marine and stationary work.

Attaining a High Ignition Temperature.

A recent invention by G. C. Dymond of Liverpool, England, has for its object an improved process for attaining a very high ignition and maintenance of the greatest economy in hydrocarbon engines, and is carried out as follows: A portion of the discharge gases is left in the cylinder for the purpose of the ignition by a premature closing of the discharge valve, and compressed to twenty to thirty atmospheres (admission pressure). By this comparatively low pressure an increase of temperature is produced from the normal discharge temperature of 350°-400° to 1600° C. This high temperature is util-

If the products of combustion are expelled by means of air at the end of the expansion, with the object of cleaning the cylinder, the air must be heated to a suitably high temperature in order to enable it to be used in place of the combustion products. The interior of the cylinder is, of course, so arranged that the incoming air absorbs rather than gives off heat.

In 1878 the Western Union Telegraph Company's average receipts per message were 38.9 and the average cost 25 cents. The average receipts last year were 30.1 cents and the average cost 24.7 cents. The low point in cost was in 1892, when the outlay per message was 22.3, with the average income 31.6. As 1 cent per message means on the basis of last year's business \$621,737, the difference in cost between the low rate of 22.3 in 1892 and the cost last year of 24.7 means a loss of over \$1,500,000 in the net profits.

In a new feed water regulator a float is placed on the surface of the water, and connected with a rod running to a sliding plate on the outside, which slides across a fixed plate to form an electrical connection as long as the water is low, the current operating a magnet, which opens or closes the valve in the feed water pipe.

Mining Summary.

ALASKA.

From Dawson and the Atlin lake district 185 passengers on the steamer Rosalie report the beginning of winter in the north, ice forming on the lakes of the upper Yukon. Caribou crossing, the connecting water between Lakes Bennett and Tagish, was reported as freezing a few days before the Rosalie left. Winter is also commencing around Lake Atlin. The passengers from that district left Atlin City Oct. 3rd, and say that the creeks were then freezing over each night. New strikes are reported forty miles north of Atlin City, where, it is said, from \$5 to \$6 to the pan is being washed out. A little north of Discovery, on Pine creek, are also said to have been found rich diggings.

ARIZONA.

B. Collins shipped from the Blackfoot mine 343 sacks of ore that averaged \$150 a ton in gold, silver and copper.

Parsons & Co. have leased the Pot Holes gold properties on the Colorado river, near Yuma, and for several weeks have been taking out ore. They started the mill last week.

Eighteen men are employed in the French Gulch copper mine, near Prescott. In the Purcell group, near Tucson, the vein is over 3 feet wide. Garrett & Brown are developing the Middle March property, in the Dragon mountains. At a depth of 200 feet, 5000 pounds of ore from the Good Hope mine, in Yavapai county, ran 6.6 ounces in gold and 3.7 per cent copper, dry; the net return being \$105.87 per ton.

At Chloride grading has begun for the 50-ton concentrator. Taking out ore from the mine will continue. The concentrator ore will be piled up until the mill is finished and the shipping ore sent to the smelter. They are shipping from sixty to seventy-five tons per week to Pueblo. A carload of high grade ore is being taken out monthly from the World's Fair mines, in the Harshaw district. Sept. 27th twenty tons were shipped, which returned over 1000 ounces of silver, \$6 in gold and 22 per cent lead. A 10-stamp mill and three concentrators handle the ore not shipped. The veins are from 1 to 20 feet in width.

Nogales *Vidette*: In the copper group of mines, near Fairbank station, a strike was made of ore that assays 60 per cent copper and some gold and silver.

Yuma *Sum*: Operations at the Little Jessie mine, Yavapai county, have been retarded, pending the arrival of a wire cable for the main shaft. Various companies are figuring on plans and estimates for the erection of the 200-ton cyanide plant. A strike is reported in the Storm Cloud mines, near Prescott, of 6 feet of good rock. Two shafts have been started at the Tennessee mine, Mohave county, and will be sunk 200 feet. Little's group of mines, in the Cerbat section, Mohave county, have been bonded to M. Cushing, of Prescott. A silver and gold discovery has been made south of the Connor and Minnesota mines, Chloride. Official filing of claim locations in the new coal fields, partly in Pima county and partly in Graham, may be begun November 19th. A. L. Grow, of Tombstone, is working twenty-eight men at his mine taking out good ore. Twenty-eight others are working. In the Providence mine, in Yavapai county, thirty men are at work. There are over 400 men at work in the Nacozari district, Cochise county. Placer mining in the Hassayampa country, Yavapai county, is retarded owing to a scarcity of water. Boston and New York capitalists have been investigating the Black Rock properties, in Graham county. The gold mill is about ready for operations on the Belle McGilroy mine, in Mohave county. The Java mine, on Stockton Hill, Mohave county, have been bonded to M. Cushing, of Prescott.

Mohave County *Miner*: Water was turned on last week at the hydraulic plant of the Temple Bar Con. M. Co. at Temple Bar, on the Colorado river. The washing of gravel is by direct pressure. An electric light plant is also in use.

Globe *Belt*: Supt. Amster has increased the force at the Continental mine. A diamond drill will be used to prospect 1000 feet deep.

CALIFORNIA.

Amador.

F. Woodworth of San Francisco is assaying the Pacific dump at Plymouth to see if it will pay to work by the cyanide process.

The *Dispatch* says that work is to be resumed shortly on the Gover mine, near Amador City, under the supervision of H. Eudy of Jackson. At the Spagnoli mine work has resumed; water reached the mine last week.

Ledger: The old Sorocco mine at Pine Grove is unwatered and there is plenty of ore in sight. A hoist has been erected and the owners are talking of putting up a mill.

Record: The Wildman-Mahoney Co. of Sutter Creek has begun work on the new reservoir. There are 2000 feet of ditch to dig and the laying of 4000 feet of iron pipe. The plant will give a pressure of 525 feet at the Wildman mill. The Emerson shaft is down 300 feet. There is still a shortage of water, but half the full number of stamps, eighty, are dropping at the two mills. At the Lincoln mine they have finished hauling 200 tons of ore to the Zeile mill. From indications, it is believed the rock will pay over \$40 a ton. The Centennial mine at Plymouth is giving out contracts, which promises their starting once more. The Wheeler mine has found some good rock. The Bay State mine continues working.

Butte.

Work has resumed at the Gold Bank mine at Forbestown, with 100 men employed.

Oroville *Register*: Three dredgers will soon be operating near Oroville, in Feather river, and four more to be built. T. W. Reece with a big force of men and teams is building

a dam near Whiterock, for hydraulic mining near Oroville. There are thirty-five men employed in the DeLong mine on the North Fork. The company has built nineteen miles of road and two bridges. When they get within 6000 feet of the river they had to let down their machinery with cables, owing to the steepness of the mountains. The company will put in an electric light plant and other machinery and next summer 150 men will be employed.

Calaveras.

At the Gwin mine the pumps have been removed from the old south shaft to the new north shaft. Two pumps hoist water from the 1400 level, each hoisting 700 feet. They are run by compressed air. The mine has good ore in the 1000, 1200 and 1400 foot levels. The 40-stamp mill has been running since Oct. 1st.

Citizen: At the Marshall mine, near San Andreas, a small force is at work, which within two weeks will be increased. At the Sieffert mine good ore has been found. At the Ford mine work continues night and day. The directors have decided upon placing a 10-stamp mill on the property. At the Lively mine both shafts are being worked and thirty men are on the payroll. The clean-up last week was encouraging. The first shipment of one carload of sulphurets was made recently. At the Thorpe the Cal. Expl. Co. has a full force at work. For the Utica mine, Angels Camp, the ditches have been widened 2 feet, the flume improved and sufficient water is assured. At Mokelumne Hill the Esperanza mill will start up next week. The mill will be started and active operations continued.

Prospect: Cuneo Bros. are putting up a 3-stamp mill at San Antonio Camp. Quintero & Co. have bonded the Yellow Aster quartz claim to Morgan & Co. for \$4000, to be paid Nov. 1, 1898. The new company has taken out over thirty tons of ore that runs over \$40 free milling.

El Dorado.

(Special Correspondence).—The prospecting of new properties and the resumption of work on idle mines in El Dorado county has been more extensively followed, pursued with more energy and the investment of more capital within the past eight months than has been the case in the county's history. As evidence of this assertion is the extensive work on the Crown Point group and the Selby property near Diamond Springs, the Hill Ranch mine near El Dorado, the Gold Bug in Placerville and the Gold Note and Philadelphia at Omo Ranch. These properties together employ over 100 men. They are all in a state of development.

Placerville, Oct. 24th, '98.

Work is being done at the Eagle King mine at Grizzly Flats, preparatory to putting up the hoisting works. The property is owned by Melton & Witmer of Placerville.

Republican: The German mine near El Dorado is being unwatered for further operations. A company has reopened the Strahle slate quarries near Kelsey. J. F. Wetzel of San Francisco is Pres. and J. Strahle, Mgr. The business will be conducted on a co-operative plan, partly in cash and partly in stock.

Inyo.

Independent: A group of developed ledges in Beveridge district has been bonded to people representing a Chicago company. Anthony's mill in Pleasant canyon is running on custom.

The O. B. J. mine, in Tuba canyon, keeps the mill at Postoffice supplied with ore. Mgr. Harrison is working sixteen men on the Halbert & Ratcliffe claims.

Kern.

Randsburg Miner: A cyanide plant is to be erected at Cuddebeck lake, to work the 5000 tons of tailings at the mill. Work will soon begin. A small run of ore from the Val Verde mines was made at the Cuddebeck lake mill last week, yielding fair returns. The Eureka mill cyanide plant made a clean-up estimated at \$1200. The mill is running on a 15-ton lot of ore from the Napoleon mine in the Stringer district which will go \$100 per ton.

Los Angeles.

At the Red Rover Mining Co.'s property the mill started up on the 25th of this month. The shaft has been repaired and everything put in shape for a continuous run. The company has good ore.

Nevada.

Sinking will soon begin at the California mine, near Grantville, the new hoist having arrived.

The superintendent's report of the Brunswick mine, at Grass Valley, for the week ending Oct. 22 shows 171 tons milled ore, and 176 ounces of amalgam. Average stamps at work fifteen; average drops per minute ninety-six. The drift on the 700 level is 396 feet, and a drift has been started on the 1000 level. On the 700 are 10 inches of good milling ore. There are sixty-four men employed.

Union: A strike has been made at the Central shaft of the North Star Co. near Grass Valley in which work has been in progress for nearly two years. The theory of Mgr. Foot has been that a shaft would strike the old New York Hill ledge at a depth of 650 feet. The workmen found the ledge at a depth of 640 feet. The ore proves to a certainty that it is the New York Hill ledge. The mining of the river bed near French Corral by Thomas & Curtis closed down for the winter months. The operations have paid well and they will resume in the early spring.

Grass Valley Telegraph: Southern's 8-stamp mill is crushing eighteen tons of rock daily for the Wisconsin mine. On the old Gold Hill mine the new shaft is down over 1000 feet. About fifty men are employed. The Omaha mine employs seventy men and is through three shafts. They are 1700 feet deep on one of these. The power used is water, steam and electricity, the 28-stamp mill, 800-pound stamps, being operated by water, the pumps by steam and the hoist by electricity. On the Pennsylvania the shaft is 700 feet deep and there are about 3000 feet

of drifts. The vein averages 18 to 20 inches in width and the ore, which occurs in bunches, is worth over \$30. The 5-stamp mill, run by electricity, will soon be increased five stamps.

The W. Y. O. D. mine is operating its 20-stamp mill by electricity. The shaft is down 1100 feet. It gives employment to sixty-five men. The Wisconsin mine has a shaft 800 feet deep on a ledge about 12 inches wide. About fifty men are at work, chiefly on the contract system. At the Allison Ranch mine the shaft is 900 feet deep. Both sinking and drifting is being done, and some ore which was crushed on trial paid well. There is a fine Reider pump installed at the 400 level. Pumping and drilling is done by air compressors, the power being steam and water. On the Empire the shaft is 2350 feet deep, and 180 men are employed. The 40-stamp mill is new and there is a new hoist. One notable thing at the mine is the crushing of the ore at the hoist. Two-ton self-tipping skips are used. The galloways-frame is 90 feet high. The Sauvee mine has a 1000-foot tunnel and a 200-foot shaft, and fifteen men are employed.

Herald: The Malakoff mine at North Bloomfield has completed the 800-foot tunnel through which it proposes to work its claim by the drifting process. About Nov. 15th opening up the channel will begin. *Union*: Action has been commenced in the U. S. Circuit Court at San Francisco by the Gold Hill M. Co. against the Peabody G. M. Co. to quiet title to a valuable strip of ground on Gold Hill, at Grass Valley, which is claimed by both parties. Both claims are patented. In case the Gold Hill title to the disputed 235 feet is sustained, the Peabody will contest the former's right to follow the dip of the vein under the Peabody land, on the ground that the ends of Hopkins' patented land are not parallel lines.

Placer.

The Pioneer Co. now employs sixty-two men; twenty-one are at work on the new dam. A tunnel to tap the ledge will be started 570 feet below No. 4 tunnel. The new tunnel will be 530 feet above the bed of the river. A flume 6x7 feet carries the water 900 feet, where with a head of 38 feet it will be used to run the 353 H. P. turbine water wheel. This wheel will operate the 270 H. P. electric generator. The electric power generated will be transmitted to the mine and will be used in operating the 20 head of stamps in the mill, the blower and two compressors. The fiscal year of the company closed Sept. 30. During six months of the year the water supply was very short. During the year were crushed 8367 tons. The figures for the year ended Sept. 30th, 1898, are as follows:

Gross receipts \$18,001

Total expenses 67,688

Net earnings 48,333

Three dividends paid of 14 1/2 each 37,500

Balance 10,833

Leader: Waugh Bros. & Duryea struck a 2 foot ledge near Auburn after a years work in a drift 325 feet. Green & Lusk struck a ledge from 8 to 10 inches wide and are taking out some good ore.

Plumas.

National Bulletin: In the Duncan mining property in Genesee valley the ledge is 8 feet wide. The ore assays \$10 per ton gold, thirty ounces silver and from 30 to 60 per cent copper. Mrs. Gruss contemplates building a 10-stamp mill on the Genesee M. Co.'s property.

Riverside.

From the tailings at the Santa Rosa mine, near Perris, \$400 a week is the usual gold product.

San Bernardino.

The Pacific Coast M. Co. is putting up an ore crusher on the Fleming property, on Old Baldy mountain.

San Diego.

(Special Correspondence).—A Mr. Douglass, a mining promoter of Los Angeles, has been inspecting the Owens mine at Julian and the Elevada at Banner in the interest of Pittsburg, Pa., capitalists.

M. More and another Denver man went again this week to examine the lower levels of the Helvetia mine in the Julian district for Denver people.

The cyanide proposition for treatment of the tailings of the old Stonewall property at Cuyamaca is now well under way, quite a number of men being employed in putting the plant in place. A disinterested person claiming to be well informed says there is some quite rich tailings and ore of an earlier date in a "draw" covered by the tailings of later operations.

A considerable amount of eleventh-hour assessment work is now being done, the \$50 worth of work required as a locating contingent heading off the professional biennial locator.

Mr. Somes of Los Angeles is in San Diego with a view of building a copper smelter. Ten acres of land have been tendered and a cash bonus is being worked up with probable success. Mr. Somes says ample copper ore of good grade is offered to keep the smelter in blast.

San Diego, Oct. 24th, '98.

Shasta.

San Francisco people have bonded the '49 mine at Shasta and are taking out ore that nets \$20 at the smelter. The old Phoenix mine—a large body of low grade ore near Shasta—is being examined by San Francisco people for a foreign company.

Redding Free Press: The system for ascertaining the depth of the ore bodies at Johannesburg, South Africa, has been tried on the ore body at Iron mountain. Borings reveal ore to last 100 years. The scale of operation on which the Mountain Copper Co. is conducted is being broadened.

Free Press: The old Silver King mine near Redding is being reopened and sinking is in progress. Two tons of ore from the Washington mine near French Gulch, taken out by lease, was shipped to the Selby Smelting

Works, San Francisco, last week.—T. E. Johnson bought the East Delta quartz mine in the Dog Creek district for \$1000.—R. M. Moore sold to J. P. Hynes an eighth interest in the Snow Storm, Golden Jubilee and Day Dawn quartz mines in Muletown district.—H. F. Eckert bonded to Small & Dawe the Mascot quartz mine near Shasta. San Francisco and Oakland capitalists formed the Shasta Slate Co., for developing slate beds at Slatis, and a force was put to work last week.—Work has begun on the Andrews & Sperry slate properties. The company will erect machinery at once and begin the manufacturing of roofing slate.

Searchlight: The Stillwater copper claims, held under bond by Lewisohn Bros. of New York, have ceased operations temporarily. A representative of the Eastern capitalists will be here soon to inspect the property.

Mountain Miner: Last Monday the Mountain Copper Co. shipped fifteen cars of matte to their refinery in New Jersey, a total tonnage of 1,138,000 pounds.

Sierra.

(Special Correspondence).—The North Fork Gravel M. Co. at Forest, after years of labor and great expense in running their tunnel, have finally reached the channel and are taking out rich gravel, some of it paying as high as \$4 a car.

Forest, Oct. 24th, '98.

Messenger: W. W. York, owing to the lack of water, shut down the mill at his mine near Downville, but extracting ore continues.

Union: At the Oriental mine, near Allegheny, good progress is being made, and as soon as the machinery is in place the old shaft will be unwatered and sinking begun. The shaft is 600 feet deep; when the mine was running many years ago it was noted as a rich pocket property.

Siskiyou.

The Diesthorst Bros.' dredger on the Klamath river has closed operation owing to the scarcity of water.

A. F. McClain of Tacoma, representing an English mining company, last week bought the R. H. Campbell hydraulic and drift mines in Quartz Valley. Work in these mines has been suspended for some time, but it will be resumed shortly and a large number of men given employment. The property comprises 1500 acres on Sucker Flat, and owns about 8000 inches of water which supplied three giants under 200 feet pressure. The company also owned three ditches, each about twelve miles long. The bank is said to be from 20 to 45 feet high.

Journal: The Eastern company prospecting Yreka creek basin from Shasta river to Yreka has secured an extension for thirty days to prospect additional ground.—The Seattle company which bought the Cape quartz mine on Humboldt had a test crushing of four tons and are satisfied with results.—The hydraulic and quartz miners are fixing up for the rain and snow; and if a favorable season, the output of gold will be large. In the high gulch diggings owners have a large quantity of pay gravel for sluicing.—The Greenhorn blue gravel mine is reported paying well. Water is pumped from the mine into the sluices.

Trinity.

(Special Correspondence).—The effort on the part of a few individuals some eighteen months ago to boom a particular section of this county in a measure reacted upon the would be promoters and indirectly did the county no good. But the perseverance of a more conservative class of men—men who understand mining and fully know the merits of the mining sections of Trinity county—has succeeded in a measure to overcome the effects of the wild rush and its consequent condemnation by the disappointed gold seekers.

Through the efforts pursued by these latter people capital has been persuaded to make experiments and satisfy itself that the county is deserving of closer investigation. The placer grounds are not by any means worked out, but to operate them with method and profit as a rule requires large capital. The county has opportunities for hydraulic and dredging operations. At Trinity Center a company is outfitting the former Bloss & McClary grounds to operate largely after the fall of snows and spring waters, for which large storage capacity is being provided.

At Abrams, twenty-five miles above Trinity Center, an English company is outfitting a drift property on broad plans, and P. Holland, in the same neighborhood, operates nine months of the year with 20,000 inches of water.

At Lowden a company is building a dredger and will give considerable attention to continued prospecting for permanent working of the river.

The construction of the long tunnel at the Brown Bear mine and the workings of this standard property have been previously noticed, and hence no further attention than a mere allusion to this paying property of many years' operations is given it at this juncture.

At Dedrick C. P. Wingate is placing considerable machinery on the Chloride-Bailey quartz properties, on which a thorough system of development is in progress.

At New River a company of San Francisco and New York tobacco capitalists are giving attention to the opening of several quartz mining claims.

The La Grange Hydraulic Co.'s gravel plant near Weaverly of nearly 500 acres and its great tunnel have received extended notice in the MINING AND SCIENTIFIC PRESS, as have the properties of the Cie Francaise at Junction City.

The systematic opening, however, and thorough test being given to quartz properties, and bringing in plants of machinery that are freighted by wagon for nearly seventy-five miles and then packed across mountain trails by ingenious and costly methods, partially demonstrate that capital has faith in mining and is finding properties within the recesses

of the mountains of California in which their investigations, and consequent investment would forborne stability and permanence.

Weaverville, Oct. 24th, '98.

C. B. Wingate, Mgr. Chloride and Bailey mines at Dedrick, is shipping machinery to these mines in quantity, denoting heavy operations.

On Coffee creek, near Carrville, Mrs. R. D. Lawrence is developing two claims and getting good ore, some which is high grade, but not free milling.

Tuolumne.

At the Santa Ysabel no crushing has been done at the mine for a month. Prior to that time, after the water supply failed, the mill was run irregularly by steam, the twenty head of stamps being operated a portion of the time by that motive power. Since the mill was closed there has been continued sinking and cutting under the central ore chute at the 400-foot level. The shaft is now down over 500 feet and will be pushed to the 1000-foot level. Drifting on the 400-foot level is now under the 200-foot level where the strikes in the central ore chute were found.

Oscar Newhouse has sued E. A. Wiltsee, his partner, to compel an accounting for \$75,000 worth of ore said to have been taken from the Providence mining claim. He alleges that the mine is being worked in a wasteful manner, and asks that the partnership be dissolved and that he may be awarded his rightful share of the property.

Mother Lode Magnet: A new mine is being developed near Byrne's Ferry by the Green Spring M. Co.—The 10-stamp mill of the Longfellow M. Co. at Big Oak Flat is running on good grade ore.—At the Grizzly M. Co., near Carters, the shaft is down 869 feet. At 280 feet good quartz is found. On the 350 level a crosscut is being run to cut the ore body.—Drifting has begun at the Mazepa mine at Stent and sinking will be resumed soon.—The Dutch mill at Quartz closed down for lack of water. The mill, ore bins and stopes are full of ore.—A strike has been made in the Putnam mine at Montezuma, the vein varying from 18 inches to 3 feet in width.—At the Shawmut 160 men are employed.—At the Densmore mine, near Columbia, thirty men are employed.—The Old Two mine at Jamestown has been bonded to San Francisco people.—Thirty men were put to work at the marble quarry last week.—In building a ditch sixteen miles long from the Stanislaus river to the Philadelphia diggings thirty men are employed. The ditch will carry 1500 inches of water. It is 4 feet at the top, 2 at the bottom and 2½ feet in depth. It has 13 feet fall to the mile.

Banner: At the Star mine, near Columbia, a number of improvements are in progress.

An English company owning property near Robinson's Ferry began work on a large dam at Horseshoe Bend for power purpose.

Union Democrat: The Standard Co. of Bodie has a bond on the Excelsior mine, near Confidence, and has ten miners at work. A shaft has been started and will be driven to good depth. A hoist is being put up.—At the Grizzly mine, near Summerville, twenty men are at work. The 20-stamp mill will run as soon as water is secured, and the force will be increased.

Independent: At the Peterson mine, Saw Mill Flat, three eight-hour shifts are storing ore to be worked when the rains come. From a 300-foot tunnel a shaft 100 feet has been sunk, where the rock is taken.

Yuba.

Marysville Appeal: In the suit entitled J. C. White vs. Good Title M. Co., Dobbins, Judge Davis has ordered judgment for plaintiff for \$311.12.

COLORADO.

BOULDER COUNTY.

The Enterprise people of Eldora have eighty men at work on the foundation for a 50-ton chlorination mill.—The Mogul tunnel, at Eldora, is being driven 200 feet per month.—The Boston Newmarket G. M. Co. bought the Teller mine, near Ward, for \$5500. They have obtained a thirty-day option on the Davidson claim for \$8000. Each claim is 150 feet wide by 100 feet long.

Ward Gazette: The Adit is shipping 1000 tons of ore to the smelter.—The B. & M. mine sent twenty tons of high-grade ore to the smelter last week.

CHAFFEE COUNTY.

Negotiations are in progress for the reopening of the old Stonewall mine of the St. Elmo district. The mine produced a large amount of ore years ago, but when the railroad stopped running heavy transportation charges compelled it to close.

CLEAR CREEK COUNTY.

The Centennial mine, at Georgetown, has a shaft 600 feet deep. Drifts have been run 900 feet in ore averaging \$40 in gold and silver to the ton, 55 per cent of which is silver and 15 per cent gold.—The Dunderberg has an 80 H. P. plant of machinery, three shafts ranging from 700 to 1000 feet deep and several miles of drifts, and is shipping regularly.

The Cashier mine at Empire, which has a 20 foot vein of low-grade ore, is about to resume operations.

EAGLE COUNTY.

The Eagle River M. & M. Co. of Red Cliff is driving a tunnel to develop 1000 acres of mineral territory. The tunnel is in 300 feet and is to be driven two and one-half miles farther.

Blade: The Battle Mountain district shipped ten carloads of ore the past week and 383 since January 1.

EL PASO COUNTY.

The 80-ton test of the sandstone deposit of Woodland Park, made in the Frisco mill, has proven a success. The ore runs \$4 in gold per ton, and of this the mill saved \$3.72 per ton. The claim is made that the ore can be treated at a total cost of 40 cents per ton. The deposit averages 200 feet in depth.

The Extension G. M. Co. recently bought

the Jefferson lode at Victor, and last week paid off the mortgage of \$18,500 on the property. The mine has 1000 feet of development and a plant of machinery.

The purchasers of the Lafayette, Cripple Creek, are Buffalo, New York, women, who operate under a company known as the Princess Alice. They paid \$80,000 cash. They also bought the property owned by the Seven Hills Co., and the Hillside, on Womack Hill.

Fisher & Co., leasing on the Pinto, average an output of twenty tons every twenty-four hours, and at least half of it is a high grade smelting rock.

Potvin & Vaine at Victor, as the result of an eighteen months' lease on the Christmas, which expired last week, cleared some \$50,000, besides paying a royalty of 20 per cent, leaving a net profit of about \$17,000 each.—The cleaning up shipment from the lease of 120 tons of two-ounce ore made the output for this month 230 tons.—The Bolivia, on Galena hill, Cripple Creek district, struck 42 feet of pay ore in driving their diamond drill on the bottom of their 520-foot shaft at a distance of 250 feet. The ore assays from \$13 to \$64. About \$90,000 has been spent on this property.—At the Gold Sovereign Thompson & Co. are making weekly shipments, returns from the last consignment showing \$50 a ton.

Iowa capitalists bought the Ollie mining claim near Cripple Creek for \$50,000 cash and have begun developing the property.—The Lawson lease on the Longfellow at Victor is outputting from forty to fifty tons of \$30 to \$80 ore weekly.

The Orpha May at Cripple Creek is profitably worked under the leasing system. The Union exacts 50 per cent royalties and does the hoisting for the lessees. A station at 900 feet was started last week.—At the Strong mine the shaft will be put down to the 700-foot level before any attempt at production.

A strike in the Vindicator mine, Cripple Creek, was made in a new vein of 2 feet of sylvanite ore running \$240 a ton. There are seven shafts on the property and six are worked by lessees. All are in ore. The company shipped 1734 tons of ore last month, which had a value of \$57,343.95.

Victor Record: The Virginian claim, near Victor, was recently sold for \$10,000.—From the Half Moon nearly 1000 tons have been shipped this month from the several different leases. The ore maintains a general average of about two ounces to the ton.—The different lessees on the Specimen sent out a total of thirty-eight tons of ore last week with a gross bullion value of \$141,140.—The Anaconda is shipping from three to six cars of ore daily.—The Modoc has attained a depth of 700 feet. Additional boiler power is to be added in the near future.—The Battle Mountain tunnel is 2000 feet in the mountain and has a depth of 800 feet.

GILPIN COUNTY.

At Central City a strike was made on the Topeka mine in Russell gulch. One hundred pounds of ore from the 800 level, run through the mill, gave a return worth \$2000. The vein is a foot wide.

Observer: From test runs made at the New York stamp mill of the capacity of the new 1000-pound rapid-drop stamp, it has been found that it will require four tons of ore to each stamp every twenty-four hours when they are speeded to ninety drops per minute.

The lessees of the A. Y. and Minnie are shipping about 100 tons per day to the A. Y. mill.—Fifty wagons are hauling 400 tons of ore per day from the Ibox Co.'s mines, Leadville.—The Fanny Rawlings mines of Leadville will ship 1500 tons of gold ore this month. The ore is carbonate of copper and copper-iron sulphides. The sulphides are 50 feet thick, 25 feet being high grade. The oxides are 20 feet thick.—The last shipment of ore from the Hap Hazard mine, Lake Park district, returned eight and one-half ounces gold to the ton and some silver.

The Herald-Democrat estimates the output of the Leadville, Colorado, mines for 1898 at \$9,000,000, an increase over the previous year of nearly \$2,500,000.

LAKE COUNTY.

F. F. Harrington has made a contract with the Pueblo Smelting & Refining Co. for 10,000 tons of black iron from his Battle Mountain mine.

MINERAL COUNTY.

Creede: (Special Correspondence).—Cy Warman, the rhythmic rhymist of the Rockies, was in Creede in 1892, and wrote: "It's day all day in the daytime, there is no night in Creede." But that was when the narrow street that followed the curvatures of the Willow Creek gulch for a mile or so was bounded on either side by a solid row of two-story frame buildings and the street itself was aglare from sun to sun. It was also a time when the nocturnal activity of the inhabitants justified his epigrammatic comment. It was a time when silver was 85 cents an ounce and the Holy Moses mine was yielding its richest and best, and it was before any of the now big mines had reached the water level.

Creede, in 1893, like Cripple Creek, in 1894, passed through a conflagration which left the town in ashes. Since then rebuilding has proceeded gradually, and of quite a permanent character. The price of silver, the camp's chief product, slumped to 69 cents and below, and later the big mines were worked to a depth at which the water, coming in, became a burdensome and expensive factor. A month ago Creede's electric light plant was destroyed by fire, and to-night there is none of that glamour which once inspired the poet and charmed the wall-eyed gambler. On the contrary, all the above depressing influences have served to make this old gulch frown when the sun goes down, as it used to frown in the days when the hunter looked for bear instead of silver.

But the price of silver is advancing some. The Nelson tunnel, now in one and a quarter miles, is cutting through Bachelor mountain

to drain the big mines; the electric light plant is being rebuilt; some of the newer mines are producing gold as well as silver; the Commodore mine is now the richest producer of silver in the State, and altogether Creede is in a healthy condition with a tendency toward improvement.

The district is steadily shipping to the smelters from 250 to 300 tons of ore per day. The bulk of this comes from the Commodore, which is worked from three tunnels, one of which is a crosscut to the vein, the other two going in on the vein. The lower tunnel, known as the Commodore, has proceeded three-quarters of a mile; No. 4, which is 500 feet above, is in the same distance, while No. 3, 500 feet higher, goes in 3500 feet. Nos. 3 and 4 are connected by upraises. This property is well equipped and employs about 300 men.

The United Mines Company controls the Argenta, New Discovery and Golden Eagle, end-lining with each other and all on the same vein. The ores are a carbonate of lead, with important gold values as well as lead. A small concentration mill on this property is doing very satisfactory work.

The completion of the Nelson tunnel, which project is in the hands of a company with ample capital, will make it possible for the work to proceed on the lower levels of the New York Chance, Last Chance and Amethyst, which are now flooded with water. However, work on these mines is in progress in the upper levels.

Creede, Colo., Oct. 12th, '98.

Creede Candle: Creede shipped 113 cars of ore last week against 98 for the previous week. The bulk of this was high-grade concentrates.

OURAY COUNTY.

From Ouray 185 cars of ore were shipped in September.

SAN JUAN COUNTY.

Silverton Standard: In the Ben Butler mine at Mineral Point the ore is adapted to both smelting and concentrating purposes. A mill is in contemplation and will be erected next spring. E. Brown is the Supt. and his working force consists of twenty men.—The Toltec mine at Silverton has been thoroughly developed and has a vein that averages 50 feet in width that contains an average value of \$10 in gold per ton. The company contemplates building a 50-ton concentrating mill in the spring. A Hamill is Supt. of the property.—At the Gladstone mine within three weeks the mill will be dropping thirty stamps with a capacity of 110 tons daily.—The output shipped from Silverton is about twelve carloads of ore and concentrates per day. A number of these cars of ore will run over \$1000 each and will average over \$500, a month's shipment amounting to \$180,000, not including retorts and express shipments.—The Tom Moore is a lead producer, the average shipments aggregating two carloads a week.—A carload of ore weekly from the Lacy property of Ice Lake basin is shipped to the smelter and averages thirty-five ounces silver and 71 per cent lead.

SAN MIGUEL COUNTY.

Telluride Journal: The Tom Boy continues its output and is a source of immense revenue to its owners. The cost of operating at the present time is less than ever before, and the values produced much larger. The monthly output is variously estimated at from \$90,000 to a \$125,000. There are eight Huntington mills in the plant and these grind from 200 to 250 tons of ore every twenty-four hours. The ore is free milling, only a small amount of the values is saved in the concentrates. A person who has worked in the mill says that from six to ten balls amalgam, worth from \$800 to \$1200 a piece, are cleaned from the plates in twenty-four hours. The Tom Boy vein is the largest in the district, being from 10 to 16 feet wide, and the ore is easily mined. The mineral requires no sorting. Less than 100 men, a fair proportion of whom are prosecuting development work are employed in the mine.—The Silver Bell is shipping several cars each week.

SUMMIT COUNTY.

The Washington mine of Breckenridge district made a strike of 3 feet of shipping ore that will run \$60 to the ton. Two men are said to have taken out two carloads of ore in ten days.

IDAHO.

The deal involving the Seven Devils copper properties is reported consummated. It involves building a railroad into the vicinity of the Peacock mines, from Weiser, which must be begun within sixty days. The railroad reaches within 3000 feet in elevation from the Peacock. It will be built in part over the grade already constructed and bought for that purpose.

The Bonanza Power Co. has eighty men at work on its water ditch at American Falls in Blaine county.

A correspondent of the Weiser Signal, writing from the Seven Devils copper country, says that in the Peacock mine all of the great ore body exposed on the surface has been taken out and, aside from what has been hauled to the smelter, is piled up near the mine and is said to exceed 7000 tons, which, so far as casual observation can determine, is of high grade. The work gives this property more the appearance of a quarry than a mine—large open cuts, from which ore has been taken out, while the face or breast shows masses of ore still in place. But as no sinking has been done no ore bodies are blocked out, and therefore not even an approximate estimate of the amount in sight can be made. The work done, however, makes the surface showing more remarkable than ever, and indicates that the mine will have the required staying qualities.—The South Peacock is owned by Boston people, and under the management of J. Walton a large amount of development work has been done this summer. The shaft has been put down 126 feet and from workings amounting to 500 feet have been run.

Work is for the present discontinued and the entrance is under lock and key.

The Snowshoe mine near Libby is to be equipped with a 10-drill compressor and six drills. The mill is to be remodeled and the property put in condition for active work. About fifty men are employed. The Snowshoe was recently purchased by the Pacific Northwest Mining Corporation, organized in London with a capital stock of \$1,000,000. H. C. Walters of Spokane, the leading spirit in the new company, engineered the Snowshoe deal and is now Gen. Mgr. of the property. There is a 200-ton mill in operation and the company contemplate the erection of a 600-ton mill as soon as it can be properly located. The lower tunnel of the mine is in 1005 feet and has never been out of ore. The ore is concentrating and carries lead, silver and gold, that in the face of the tunnel carrying 25 per cent lead, twelve ounces of silver and \$12.40 gold.

Idaho World: The Jupiter mine near Idaho City has been bonded for eight months to T. K. Muir, of Portland. A small payment has been made.—McMahon & Shearer have struck a good body of ore in the lower tunnel of the Buffalo mine. They have been at work in this tunnel a year. Three inches of ore will mill \$300 a ton and a vein 12 to 24 inches will go \$30 a ton.

Florence Miner: At Warren, the Iola mine is working thirty-five men and running night and day. There is pay ore in all the workings.

—The Klebold mine and mill has 18 men on the payroll. The pay streak is only 2½ feet wide, but the ore is high grade.—The Good-enough is at work on the mill getting ready for a winter's run. This mine has a good showing and is fairly developed. The tunnel is in 1200 feet and has a depth of 700 feet. The ledge is 8 feet of pay ore.—The Keystone is working two shifts and has a body of good ore. It is working under a lease to Randall & Co. A mill will be placed on it in the spring. The Keystone has been idle a long time.—In the Sunrise the ledge is opened 500 feet and is 4 feet wide.

Idaho World: The dredges at Idaho City and that at Placerville are again running.—Stevens Bros. in the Klondike quartz claim near More have opened a ledge said to be 30 feet wide, of which 8 feet runs \$30 a ton. The remaining 22 feet will mill \$5 a ton.—A Dickinson has opened a 6-inch vein that mills \$150 a ton.

Statesman: A strike is reported in the Friday mine at Willow Creek of a streak 18 inches thick of free milling ore running \$100 a ton.

Helena Independent: A ten years' lease has been completed of the nine-sixteenths interest of the Kleinschmidt Bros. of Helena, Mont., in the Peacock, Helena and White Monument mines of the Seven Devils country. J. Glass is Gen. Mgr. of the company. They will do development work until next spring, when the tramway to carry the ore to the river, will be built. The ore bins will be on the Snake river, which runs three miles from the mine, but which is at an elevation of 3000 feet less than the head of the tramway. The company will utilize the drag of the ore buckets down that 8000 incline for the development of power to run the sawmill and electric light plant at the mine. At Ox Bow the copper smelter will be located. The buildings in which the smelter at Cuprum is constructed will not be moved, but the machinery will be taken to Ox Bow, and with additional machinery and improvements will be used in the construction of the new smelter at the latter point. With the transfer of the smelter will go the name of the former location, Cuprum. The temporary organization of the Northwest Copper Co. exists in Baker City, Or. The bondholders reside in Erie, Pa.

MICHIGAN.

The Osceola is making 900 tons of mineral a month: more than 1,000,000 pounds of ingot copper per month.

MONTANA.

The B. & B. mine near Troy has opened up a large body of good grade galena in No. 4 tunnel which assays an ounce of gold to the ton in addition to the silver and lead values. The B. & B. has nearly 2000 feet of development and is ready to be equipped with machinery.—It is expected that the Twin Bridges smelter will resume within sixty days.

The Anaconda M. Co. bought for about \$1,000,000 cash the town and lumber camp of Bonner, including the saw-mill plant which has been cutting about 40,000,000 feet per annum of pine and tamarack. This will furnish the Anaconda mine with timber for about eight years.

Basin Progress: The Gray Eagle mine at Basin is shipping five carloads of high-grade ore per week.—J. Brady at High Ore spur will ship the old Comet tailings to the smelter. The estimated worth of the dump is \$2,000,000.—Holmes & Dahlgren, in the Gray Eagle mine, have struck a large body of high-grade ore. Two years ago Holmes & Dahlgren were comparatively poor prospectors, but since that time the Gray Eagle mine has made them men of independent wealth.—At the Eva May, which for a few years had a struggling existence, the mill is running night and day to its full capacity. On the 300 level they have drifted for 250 feet on ore 18 feet wide. They have also three other large parallel bodies of ore running in width from 6 to 16 feet. The values are good.

Butte Miner: The Washoe Co. about to build smelters, was organized in '94 with a capital stock of \$5,000,000, of which amount at the time of the company's incorporation 10 per cent was paid up. The company is virtually a private corporation owned by J. B. Haggin and Marcus Daly. In the articles of incorporation their names do not appear, D. M. Newbro, J. S. and O. K. Lewis, J. Gillie and C. F. Booth being the trustees. The properties are the Washoe, Poulin, Pacific, Oden, Limitation, Gold Hill No. 1, east half of Blue

WATER WORKS.—Sealed proposals will be received on or before 12 o'clock November 15th, 1895, for the construction and completion of certain additions to the existing water works, owned and controlled by the City of Seattle. The said additions include, in general, the supply from Cedar River, reservoirs and portions of the main line of the service system in the city. The contract to be let will embrace the following general items of construction: Head works on Cedar River, consisting of a concrete dam, 100 feet high (see page 2); Settling Basin, Pressure Pipe to City, of 48-inch diameter, 28.1 miles in length; of which 6.4 miles are to be riveted steel and 22 miles to be stave-pipe banded with steel bands $\frac{3}{4}$ inch in diameter. High-service Reservoir in City, capacity 20 million gallons. Low-service Reservoir in City, capacity 20 million gallons. Auxiliary High-service Steel Stave Pipe, 30 feet diameter by 60 feet high, incased in Kansone concrete. Pumping Main to Stand-stand, 30-inch Steel Pipe, 10 miles in length. 30-inch Kalameln Pipe, 36-inch Stave Pipe, connecting reservoirs, about one mile in length; 30-inch Stave Pipe, 3000 lineal feet, waste from High-service Reservoir to 18-inch Riveted Steel Pipe, 4900 feet length. Tunnel line, 10 miles in length, to the distribution system. Changing Cedar River Channel, 60,000 cubic yards excavation. Clearing, Dams and Connections at Swan Lake. Two Gate-houses, 100 feet high. The contract to be entered into will provide that payment shall be made for this work only by warrants upon the "Cedar River Water Supply Fund of Seattle," as created and established by Ordinance No. 3590 of the City of Seattle, and that the City of Seattle shall be bound against the city except as therein provided. By said ordinance 75 percent of the cash receipts of the entire city water system are involuntarily set aside and pledged to the payment of interest at 3 percent on the amount of the warrants issued for said warrants. In addition to the warrants, which will be issued in payment for the construction of said additions, the contractor will also be required to purchase at par any and all warrants which shall be issued by the City of Seattle for the amounts as shall be required to pay for any real estate, rights, easements or privileges necessary for the prosecution of the work of construction and the general improvement of the water works hereinafter provided for by the City of Seattle. In connection with said additions; provided that the amount of the warrants thus required to be purchased by the contractor shall in no case exceed the sum of Sixty-four Thousand (\$64,000) Dollars. Each warrant shall be payable to the order of the City Comptroller, for a sum not less than five (5%) percent of the bid, and no bid will be considered unless accompanied by said sum of money. The amount of the warrants to be entered into a contract and furnished as a bond for the amount required by the City Charter and the laws of the State of Washington, within ten days after being notified of the award of the contract, shall be the amount of the bid, and the amount fixed therein will be forfeited to the city. No person is eligible as a bidder who has within two years prior to the letting of said contract made default in payment of any just claim for any money due him by the City of Seattle, or who has been furnished pursuant to any such contract as herein advertised, or who within said two years failed to complete any such contracts. Special attention is called to Article XX of the City Charter, as now in force, relating to hours of labor, and to Article XIII, Section 31, Subs. 1 and 2, relating to bonds and sureties. All bids must be made in accordance and comply with the plans and specifications hereto attached, and in compliance with Ordinance No. 3590. The City of Seattle reserves the right to reject any and all bids. Proposals must be indorsed on envelope "Bid for Constructing Certain Additions to the Water Works of the City of Seattle." By order of the Board of Public Works.

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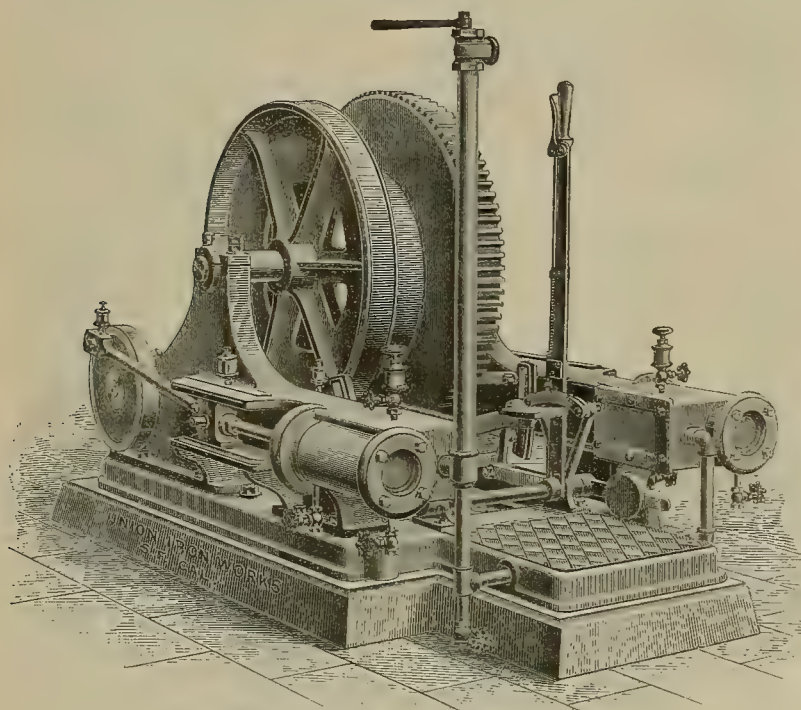


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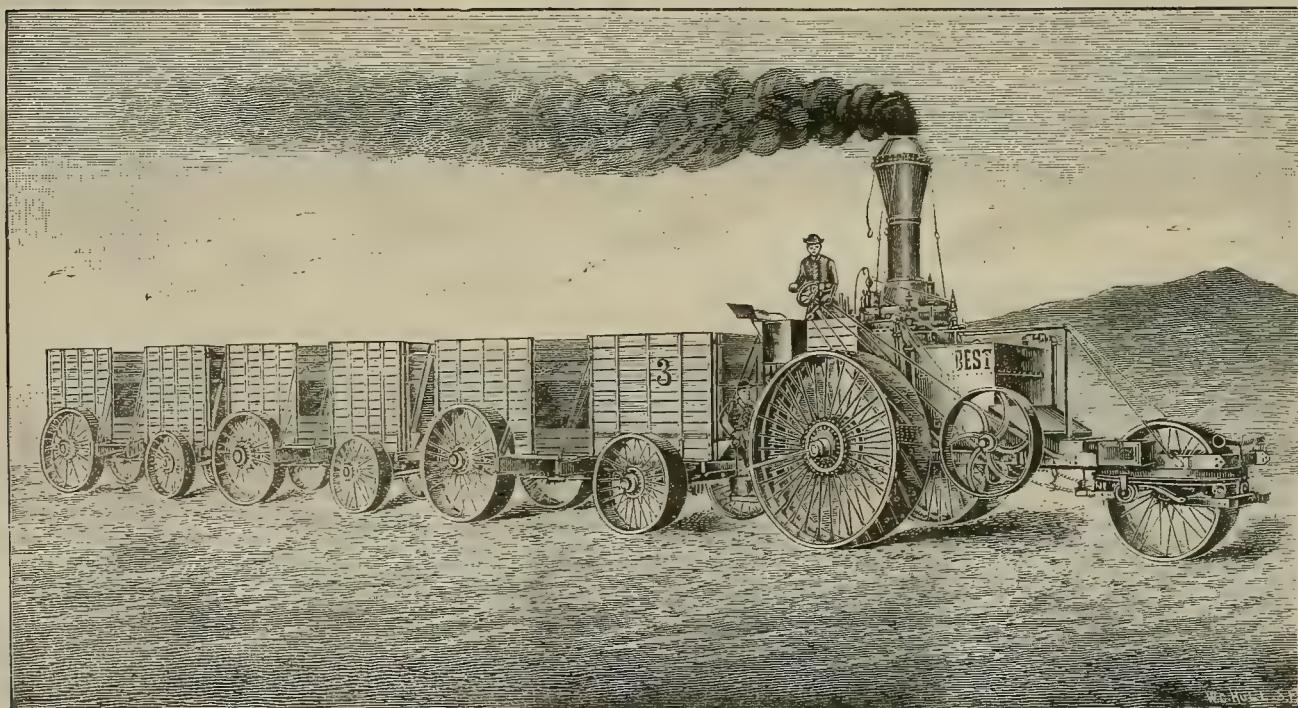
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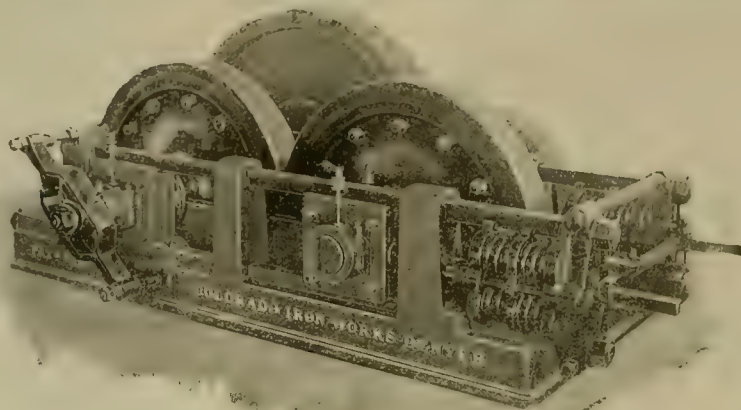
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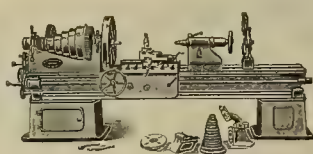
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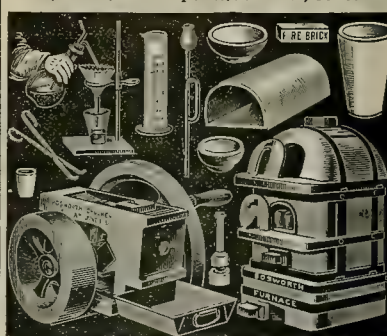
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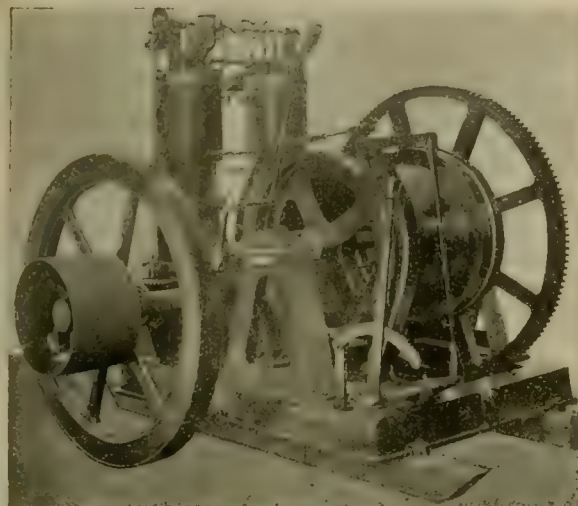
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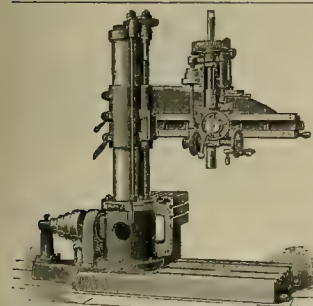
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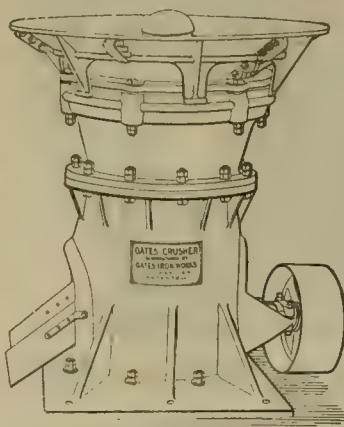
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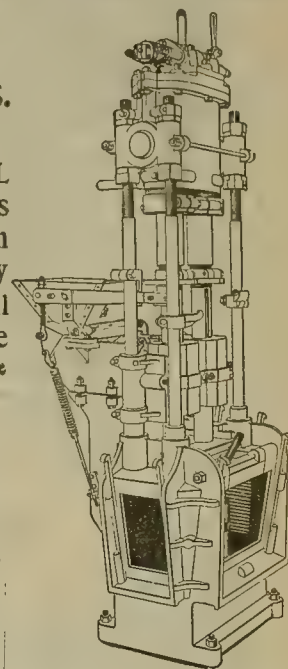


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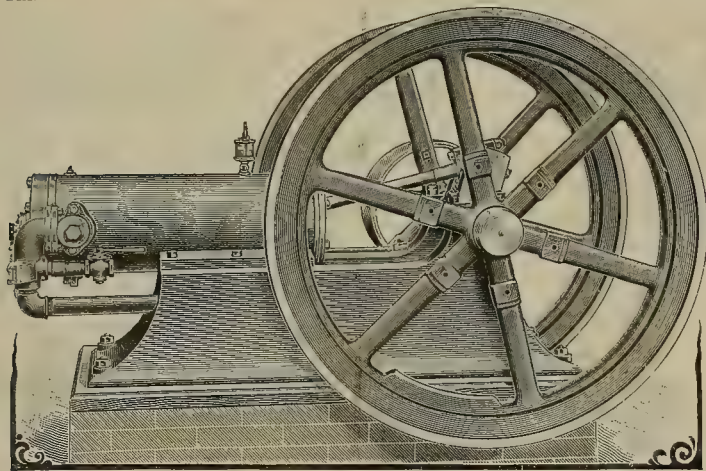
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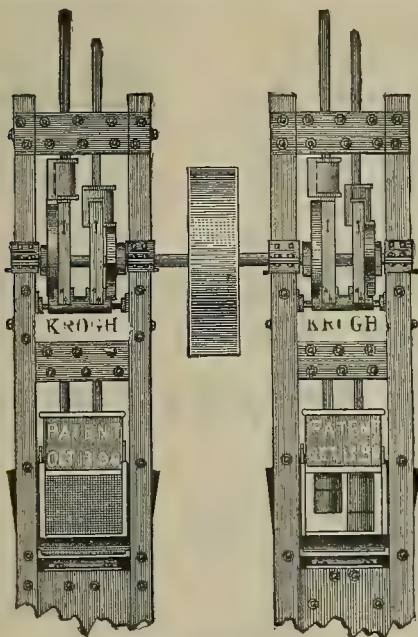
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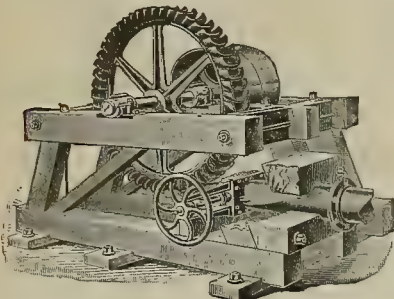
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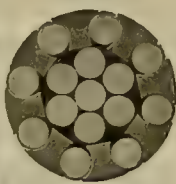
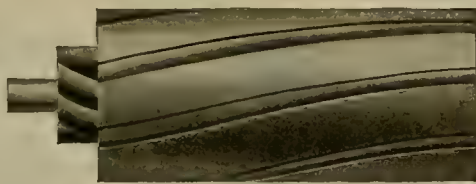
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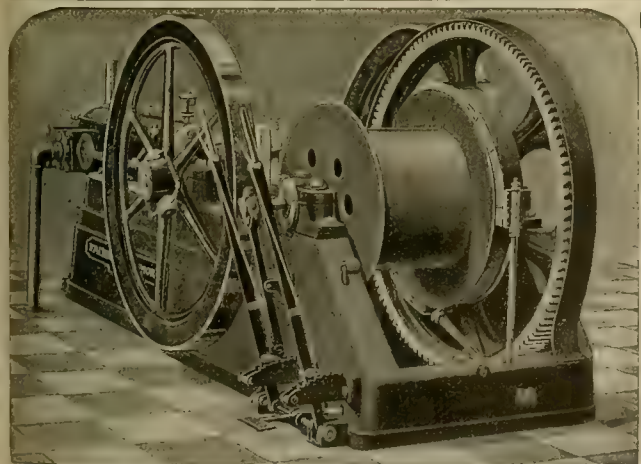
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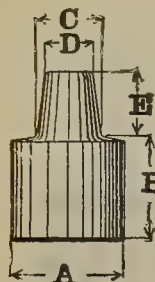
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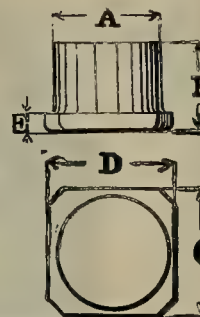
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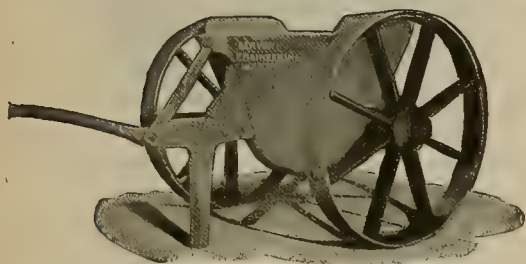
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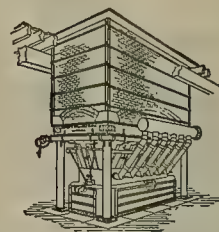
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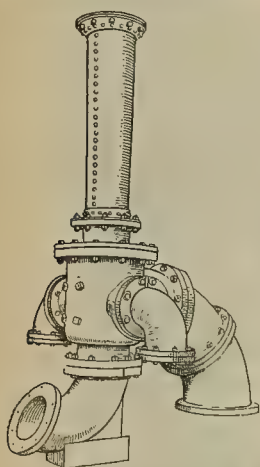


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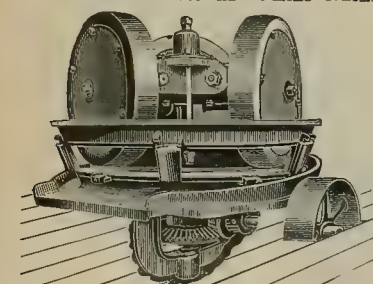
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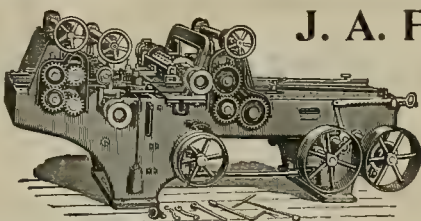
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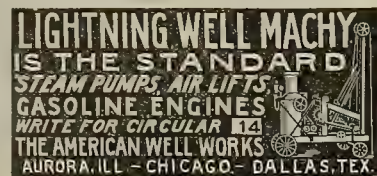
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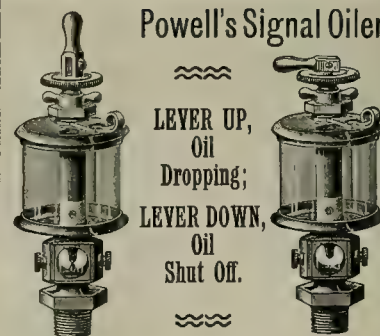
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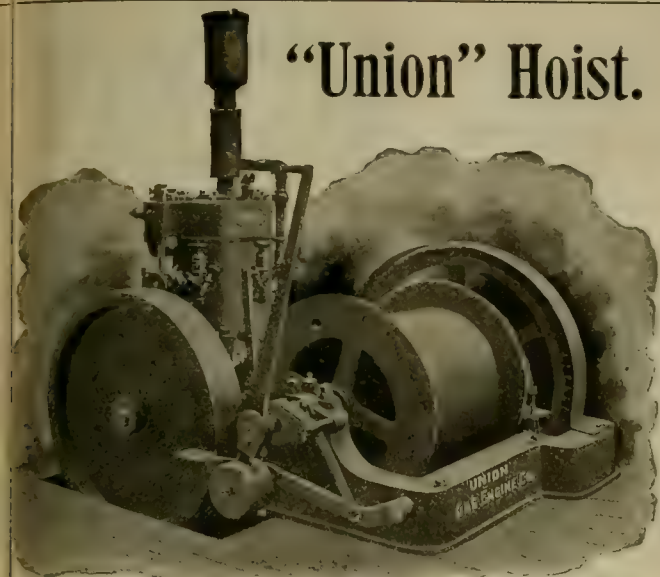
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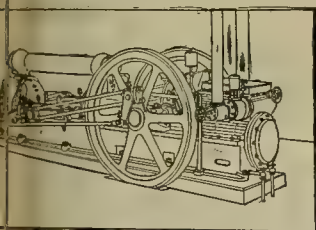
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Rapid stroke. Powerful blow. Easy running. No jar. Long bits changed and hole spooned without disassembling machine. Operated by one man. A guaranteed drill. Will work in any rock or position.

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New York Office, 120 Liberty Street. Cable Address: "Jack Drill" N. Y. ABC Code (4th Ed.) and Lieber.

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Sinks and drives 6, 8 or 10-inch pipe through boulders; takes all the loose material out, including gold, as the hole is sunk. Does the work at a very small cost. Drills water and oil wells and mineral test wells through any kind of rock to 1500 feet. Several sizes.

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The Wilfley Table is fully covered by U. S. patents Nos. 580,338 and 590,675. Infringements will be prosecuted to the full extent of the law.

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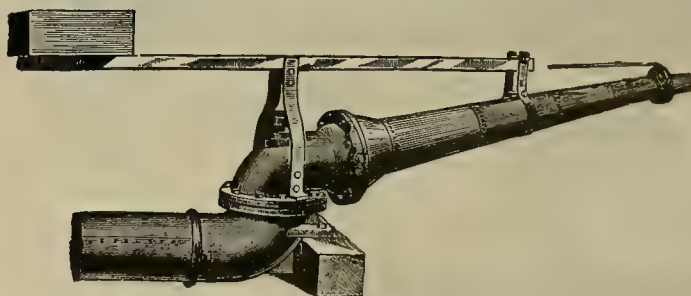
One of these machines will take the place of two or three belt concentrators of any style and do very much better work.

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The above presents an improved Double-Jointed Ball-Bearing Hydraulic Giant which we build. The improvement consists of the introduction of a Ball Bearing by which the pressure of the water is reduced to a minimum and the direction of the nozzle changed at will with ease. Catalogues and prices of our specialties of HYDRAULIC MINING MACHINERY furnished upon application. JOSHUA HENDY MACHINE WORKS, 38 to 44 Fremont St., San Francisco, Cal.

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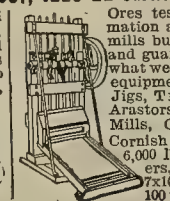
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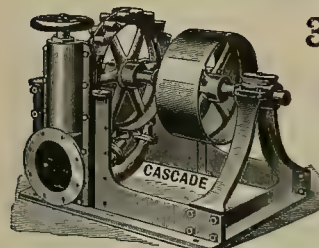
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Send for a Pamphlet of either Wheel and write full particulars.

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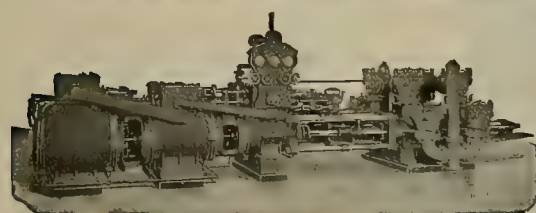
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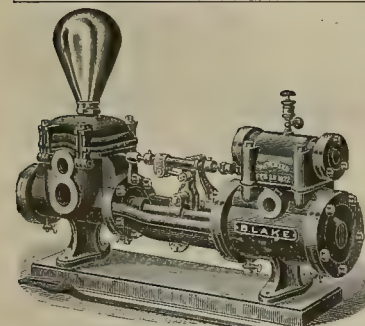


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— WITH —
AUTOMATIC ORE LOADER AND
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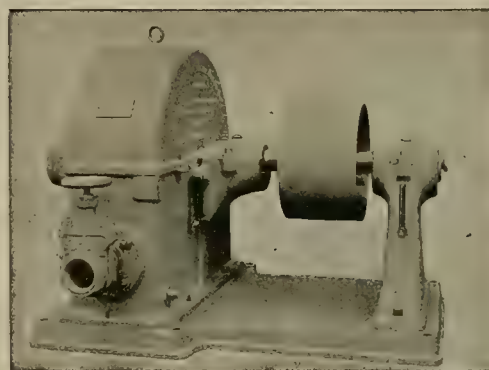


For Conveying
Ore, Cordwood,
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EMPIRE, NEVADA, April 17, 1898.
Vulcan Iron Works.—GENTLEMEN: The Ropeway furnished by your company to convey tailings from Morgan Mill to Mexican Mill, a distance of seven-eighths of a mile, is giving entire satisfaction. We transport 200 tons of tailings in ten hours; one man does the whole business, including elevating tailings from hopper in the ground, operating Vulcan self-loader, and attending to the Ropeway generally. The self-dumper requires no attention whatever. The Vulcan loader I consider the best feature in the whole Ropeway, making it possible for one man to load 200 tons in ten hours.
Yours very truly,
J. P. WOODBURY, Supt.

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The Pelton Water Wheel Company



Gives exclusive attention to the development and utilization of water powers by the most modern, economic and improved methods.

An experience of more than fifteen years, involving both the theory and practice of hydraulic engineering as relates to power development in its widest range of application, is at the service of its customers.

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ELECTRIC POWER TRANSMISSION.

Pelton wheels afford the most reliable and efficient power for such service and are running the majority of stations of this character in the United States, as well as most foreign countries. Highest efficiency and absolute regulation guaranteed under the most extreme variations of load.

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Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for illustrated Circular.

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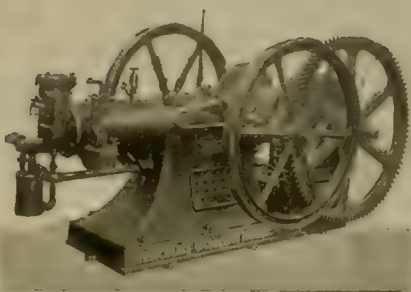
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HERCULES GASOLINE HOIST.

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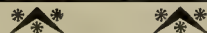
Suction or Deep Well, that throw a STRAIGHT STREAM. No cranks. No air chamber. Water travels a uniform speed. Shows no pulsation. Can be direct connected to engine shaft, geared to motor, or driven by belt. Suction pumps are packed without removing any part. A piston pump with valves. It has no equal for gasoline engines and hoists.

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Mining Timber

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Main Office, 348 E. Second St. = LOS ANGELES, CAL.

and let us make an estimate on your next order for LUMBER, SHINGLES, SHAKES and R. R. TIES. We make a specialty of MINING TIMBER and PLANK for Arizona and Mexico shipment.

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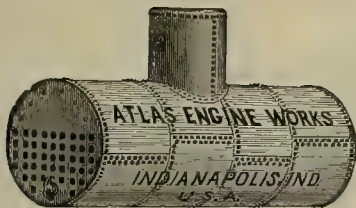
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IRRIGATION SUPPLIES OF ALL KINDS.

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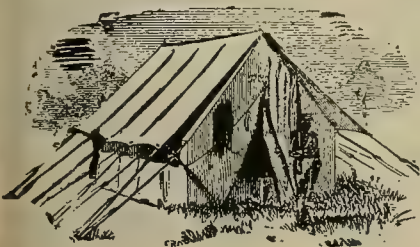
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Tents and Canvas Floor Covers for Rent. Fancy Awnings for Residences. Camp Furniture. JOBBERS IN COTTON DUCK. Write for Price List.

136 South Main Street, = LOS ANGELES, CAL.



Market Reports.

The Markets.

SAN FRANCISCO, Oct. 27, 1898.

SILVER.—London, 25d; New York, 61; San Francisco, 60½; Mexican Dollars, 47½@47¾. New York exchange, sight, 17½; telegraphic, 20 cents premium.

The yellow man with the white metal is still in evidence as regards the white man with the yellow metal.

Specie shipments from San Francisco during September were: To Hongkong, \$927,512; to Honolulu, \$77,000; to New York, \$6,513,109, a total of \$7,562,671, against \$3,410,152 in September, 1897. Of this amount \$6,196,335 was gold, against \$1,259,040 in the same period of 1897. For the first nine months of 1898 the shipments aggregated \$39,396,245, against \$30,347,537 in 1897.

LEAD.—New York reports "steady;" \$3.65 bid, \$3.70 asked. The firm naming the settling price for mines and smelters quotes lead at \$3.50. Local, pipe, 6@6¼; sheet, 6¼@7c; pig, 5¼c; bar, 6c.

COPPER.—New York reports Lake unchanged, \$12.37½@12.50. Boston reports that on the 21st the Quincy M. Co. sold a carload of copper at 12½c per pound, and expects to get higher prices at its next copper sale.

IRON.—American, soft, \$21 and \$23 per ton; Scotch, \$23.50.

SPALTER.—5¼@5½.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c; Bar, 19c.

ANTIMONY.—10, 10½.

BABBITT METAL.—10-12-14—best 16c.

QUICKSILVER.—Domestic, fair demand, \$41.50; export, \$37.00@37.50; carload lots, special rates; New York, \$40.

POWDER.—F. O. B. San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1** 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices:

Wellington.....\$8.00 Coos Bay.....\$5.00

Seattle.....6.00 Southfield.....7.50

Cargo lots, Eastern and foreign:

Wellsend.....\$7.50 Cumberland.....\$9.00

Brynmor.....7.50 Canal.....9.50

Pennsylvania, hd., 14.50 Welsh Anthracite, 12.50

Scotch.....8.00 Rook Springs.....7.60

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.08 per gal.; bbl., \$1.03; pure No. 2, cs., 85c; bbl., 80c; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.06; less than case; Baker's Crystal, \$1.26; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 44c; cs., 40c; raw, bbl., 42c; cs., 47c; lots of 5 bbls., 1c less; Lucol, boiled, bbl., 39c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17½c; Astral, 17½c; Star, 17½c; Eocene, 19½c; Extra Star, 21½c; Elaine, 22½c; Water White, bulk, in tanks, 11½c; Mineral Seal, iron bbls., 21c; wooden bbls., 23½c; cs., 26c; Mineral Sperm, 27c; Deodorized Stove Gasoline, bulk, 13c; do., cs., 18c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk per gal., 11½c; do., in cs., 16½c; Lard Oil, Extra Winter Strained, bbl., 56c; cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatsfoot Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs., 60c; Sperm, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31c per lb.; carloads, 29c; in 10-lb. tins 37c; sulphuric acid, 2½c per lb. 66° B.; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½c per lb.; blue vitriol, 4½c per lb.; borax, refined, 5@6c per lb.; chlorate of potash, 9½@10c; roll sulphur, 2½c; alum, \$1.90@2.00; flour sulphur, French, 2½@2¾c; California refined, 1½@1¾c; nitric acid, in carboys 8c per lb.; caustic soda, in 10-lb. tins 15c per lb.; Cal. s. soda, bbls., 65c; eks., 60c @ 100 lbs; chloride of lime, spot, 2.10 @ 2.25c; saltpeter, 15c; chlorate of potash, 25c; caustic potash, 12c.

CANDLES.—Electric Light Candles—6s, 16 oz., 7½c; 6s, 14 oz., 6½c; 6s, 12 oz., 5½c; 6s, 10 oz., 4½c; Granite (Mining) Candles—6s, 16 oz., 8½c; 6s, 14 oz., 7½c; 6s, 12 oz., 7½c; 6s, 10 oz., 6½c. Paraffine Wax Candles—1s, 2s, 4s, 6, 13s, white, 8c; colored, 9c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.35; cut, \$2.25; 10 to 20d, wire, \$2.40; cut, \$2.30; 8d, wire, \$2.45; cut, \$2.35; 6 and 7d, wire, \$2.55; cut, \$2.45; 4 and 5d, wire, \$2.65; cut, \$2.55; 3d, wire, \$2.80; cut, \$2.70; 2d, wire, \$3.05; cut, \$2.95. In carload lots, 10c per keg less.

CORDAGE.—

1¼-in. cir. (7-16 dia. and upward).....Sisal. Manila. 10½
12-thread (¾ dia.).....9½
6 and 9 thread (¾ and 5-16 dia.).....10½
Bale Rope (3 and 4 strand).....9½
Bale Rope (2, 6 and 8 strand).....9½
Duplex Rope is quoted 10 per lb. lower than Sisal.

Acetylene Gas.

A handsome new illustrated catalogue will tell you where and by whom the new light is being used, and what the verdict is. Mailed upon application. PACIFIC ACETYLENE GAS CO., 115 New Montgomery St., San Francisco.

San Francisco Stock Board Sales.

SAN FRANCISCO, Oct. 27, 1898.
9:30 A. M. SESSION.

200 Belcher.....09c 300 Mexican.....13c
100 Best & Belcher.....17c 300 Ophir.....52c
250 Chollar.....08c 100 Union Con.....22c
1250 Con. Cal. & Va.....79c 250 Yellow Jacket.....15c

2:30 P. M. SESSION.
100 Ophir.....53c 100 Best & Belcher.....13c
100 Mexican.....15c 350 C. Cal. & Va.....78c
100 Gould & Curry.....16c 200 H. & N.....\$1.00

Obituary.

CHARLES P. WICKS, president of the Colorado Miners' Bureau of Information, died of acute pneumonia in Denver, Colo., last week. The Bureau of Information is closed. For some time it had been kept open at the individual expense of Mr. Wicks.

COL. J. L. COLES, who for many years has been identified with mining interests in Idaho and California, particularly in and about Soulsbyville, Cal., and who a few months ago was one of the purchasers of the Zantgraf mine at Newcastle, Cal., died last week at Coronado Beach, Cal.

HENRY PICHOR, a well known mining man, died in San Francisco on the 24th inst., aged 62. He was a native of Switzerland, and had lived forty-four years in California, prominent in hydraulic mining enterprises, and for twenty-five years secretary of the North Bloomfield Mining Co.

Recently Declared Mining Dividends.

Modoc, Colorado, 2 cents per share, \$10,000; Dec. 25.
Mammoth, Utah, \$20,000; payable Oct. 31.
Golden Cycle, Colorado, \$15,000; Oct. 25.
El Dorado Leasing Co., Colorado, \$1000; payable Nov. 1.
Moon-Anchor, Colorado, 7½ cents per share, \$45,000; Oct. 20.
Sacramento, Utah, \$500; October 25.
Modoc, Colorado, 2 cents per share, \$10,000; Oct. 25.
Strong, Colorado, \$25,000; payable Nov. 1.
Anaconda M. Co., Montana, \$1.25 per share, \$1,500,000; payable Nov. 1.

Recent Mining Incorporations.

Manook Con. G. Placer M. Co., San Francisco; capital stock \$100,000, subscribed \$50,000; W. J. Barry, E. E. Kelly, A. Geautit, J. O'Keefe, T. C. Ganey.

Star Gulch M. Co., San Francisco; capital stock \$20,000, subscribed \$50; R. H. Blake, L. R. Hare, F. Reichert, J. H. Barnard, A. J. Robinson.

The Fortuna Placer M. Co., San Francisco; capital stock \$100,000, subscribed \$700; W. P. Burke, A. P. Haws, L. T. Haws, C. Wetherbee, G. F. Thompson.

Commercial Paragraphs.

THE Pelton Water Wheel Company has under contract three pipe lines for electric power transmission plants in Mexico, aggregating some 6000 feet in length and weighing upwards of 400 tons. These lines are from 40 to 48 inches in diameter and are made of mild steel varying from ½ to ¾ inch in thickness, in proportion to the pressure it has to sustain at various points on the line.

Books Received.

"Lecture Notes on the Theory of Electrical Measurements." W. Anthony, 12 mo., pp. 90; designed as an effective aid to students. Jno. Wiley & Sons, New York City; \$1.

Mines or prospects operated on contract to purchase, or under lease on fixed royalty or percentage. MONEY loaned, mines, MINING companies organized, their property exported, financed and managed. MINES, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated. EXAMINE mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

EDW. N. BREITUNG, Marquette, Mich.
Cable address Edbee. Codes, Lieber's Belford, U. S. A.
McNeil's A. B. C. Universal Commercial.

A BARGAIN.

Death of proprietor. PETALUMA MACHINE SHOP, FOUNDRY AND PATENTS. Will take city property in exchange. SANFORD BENNETT, 17 & 19 Beale St., San Francisco.

Mine and Mill Superintendent

Will be open for an engagement Nov. 15, '98.

Highest References Furnished.

Can also do Mine Surveying, Mapping and Assaying. Competent to take full charge of a gold, silver or copper mine anywhere.

As to terms, qualifications, etc., address H. I., Mining and Scientific Press Office, San Francisco.

Quicksilver

FOR SALE IN LOTS TO SUIT.

Agents for Redington Quicksilver Mine. REDINGTON & COMPANY, Wholesale Drugists, 23-25-27 Second Street, San Francisco.

AMERICAN AND FOREIGN
PATENTS
CAVEATS, TRADE MARKS.
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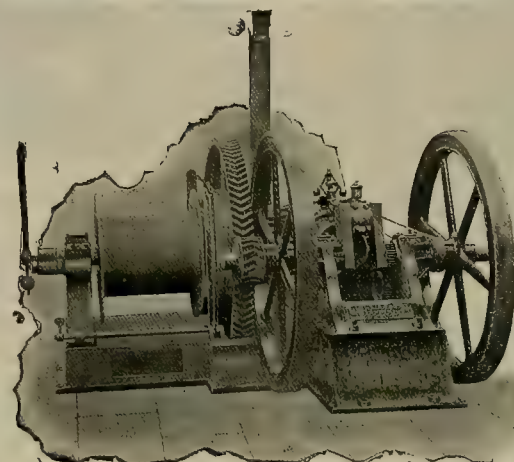
Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco



FRESNO, June 25, 1898

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gas line engine and hoist purchased from you is doing fine work and is perfectly satisfactory every respect.

Yours truly

TUOLUMNE MOTHER LO
M. & D. CO.,

Per N. W. Moody, Pl

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET, SAN FRANCISCO, CAL.

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WÖHLER, BARTNING Suc's, Mazatlan (Sinaloa), Mex.

Bankers, Importers, Exporters and Commission Merchants

Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco.

ORE BUYERS AND EXPORTERS. - MINING SUPPLIES.

The National Feed Water Heater

800,000 HORSE POWER SOLD.

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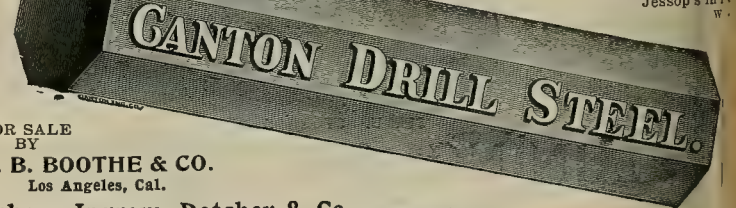
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Assessment Notices.

EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Forest Hill, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 26th day of October, 1898, an assessment (No. 14) of one-half of one cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, No. 1204 Claus Spreckels building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 31st day of November, 1898, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 11th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. J. CRAWFORD, Secretary.
Office—No. 1204 Claus Spreckels Bldg., San Francisco, California.

EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Forest Hill, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 12th day of September, 1898, an assessment (No. 13) of one-half cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, No. 1204 Claus Spreckels building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of October, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 1st day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. J. CRAWFORD, Secretary.
Office—Nos. 1204-11 Claus Spreckels building, San Francisco, California.

MARINA MARSICANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of September, 1898, an assessment (No. 15) of 2 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 31st day of October, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 21st day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
CHARLES BOVONE, Secretary.
Office—217 Sacramento street, San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of October, 1898, an assessment (No. 21) of three (3c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of November, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 28th day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
CALVERT MEADE, Secretary.
Office—106 Leidesdorff street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of September, 1898, an assessment (No. 11) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 227 12th street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of November, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 6th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
F. MEYTMANN, Secretary.
The Secretary will also receive payments from 12 to 5 P. M. at his business office, 225 Sansome street.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 22nd day of August, 1898, an assessment (No. 4) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 916 Market street, Room 57, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 3rd day of October, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 31st day of October, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
GEO. W. FLEISSNER, Secretary.
Office—No. 916 Market street, Room 57, San Francisco, California.

POSTPONEMENT.

By order of the Board of Directors of the National Cons. Mining Co., the day of delinquency of the above assessment is postponed to November 1st, 1898, and the day of sale to FRIDAY, November 25th, 1898.

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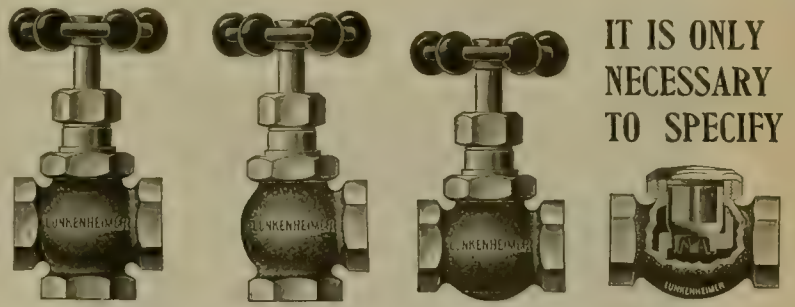
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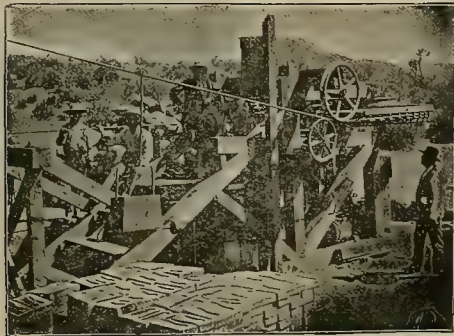
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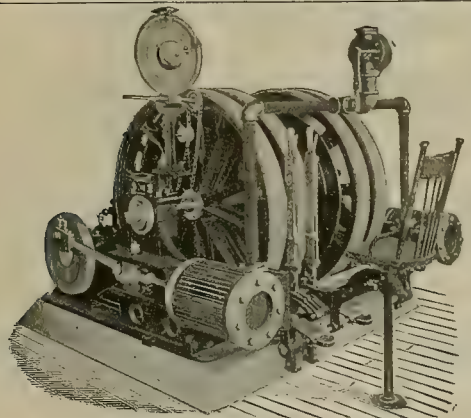
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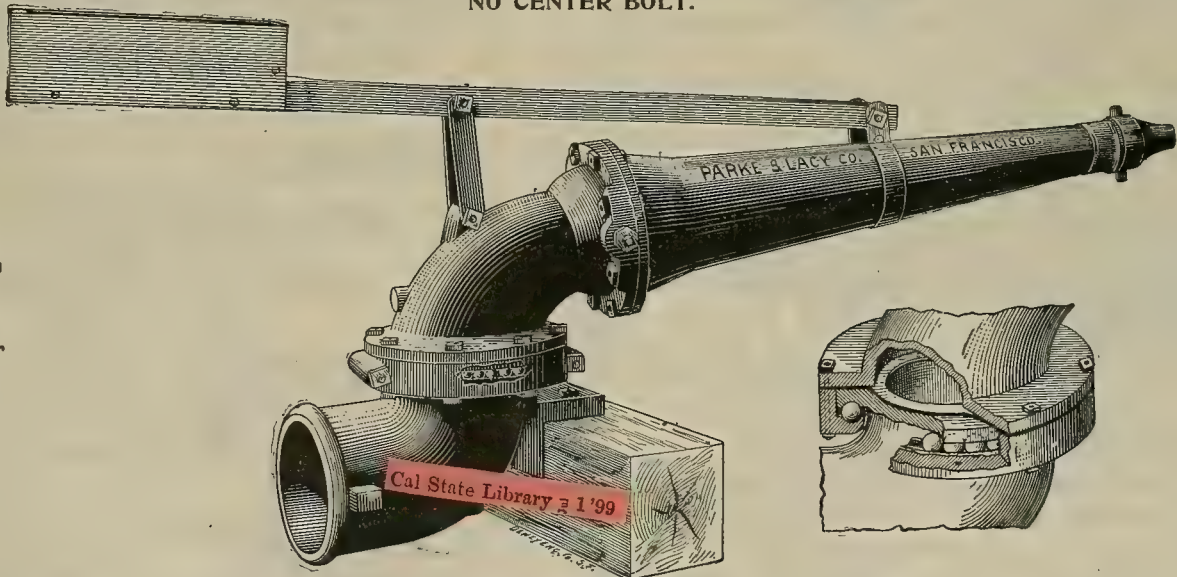
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Number 19.

SAN FRANCISCO, SATURDAY, NOVEMBER 5, 1898.

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Tunneling on the Mother Lode.

Cost of Tunneling by the Melones Mining Company on the Mother Lode in Calaveras County, Cal., With Comparison of Cost of Tunneling at the Hogsback Mine in Placer County, Cal.

Written for the MINING AND SCIENTIFIC PRESS by W. C. RALSTON.

The property upon which this work has been done belongs to the Melones Consolidated Mining Company, and is situated on the mother lode of California,

crosscuts were run and a large body of ore developed which showed a milling profit.

It was deemed advisable by the Melones Mining Company, who hold this property under bond from the Melones Consolidated Mining Company, to run a tunnel and develop this body of ore at a greater depth. An option was obtained upon the South Carolina mine, which adjoins the Melones Consolidated Mining Company's property on the south, and

feet in the clear, the grade of the tunnel being 3 inches to the 100 feet; water drain carried on right hand side of track.

Twelve-pound steel rails were used, gauge of track 22 inches, ties 4x6-inch timber placed every 3 feet; walking plank in most all of the tunnel 2x20 inches. The air compressor, which was used in the work, was an Ingersoll-Sargent, class "B," 12½x14 piston inlet, with a pulley which was belted to a



BLACKSMITH SHOP AND COMPRESSOR BUILDING—MELONES MINING COMPANY, CALAVERAS CO., CAL.



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USING BOTH MACHINES ON ONE COLUMN; SAVES TIME IN MEDIUM GROUND—MELONES MINING COMPANY, CALAVERAS CO., CAL.

on Carson Hill, near Robinson's Ferry, and adjoins on the south the Morgan mine.

The mother lode of California extends for a distance of over 150 miles in length through several counties, with a strike of northeast and southwest generally. Three veins comprise the main mother lode, commonly called the east vein, middle vein and west vein. The Melones property is situated upon the east and middle vein, and has respectively 1407 feet on the east vein and 5166 feet upon the middle vein. A shaft had been sunk on the Reserve mine, which is on the east vein, and within 230 feet of the Morgan mine. At the bottom of this shaft drifts and

on the same east vein, upon which a tunnel had been run a distance of 1080 feet. This tunnel, which is a crosscut to the country, was cleaned out and continued to a point within 40 feet of the Morgan mine and passed directly under the Reserve shaft. The tunnel is located 425 feet lower than the 200 level of the Reserve shaft. The whole distance to be run of the main crosscut was 3003 feet, when other crosscuts and drifts were to be run to open up the reserves of ore at that level. The South Carolina tunnel had been run by hand a distance of 1080 feet. This tunnel was continued, but with machine drills, and the size increased to 7x8

main shaft, on one end of which is a 5-foot solid disk Pelton water wheel. On this same shaft and on the other end is a pulley which was belted (when we had no water) to a Nagle engine 12x16, class "A" horizontal. From this shaft was also operated a number 4½ Baker blower. The blower was run as an exhaust, using 11-inch pipe, a pipe line, 1100 feet in length, taking water from the Union Water Company's ditch, through 10-inch No. 16 iron pipe for one-half the distance, and 8-inch No. 12 iron pipe at the bottom; all pipe double-riveted and tarred. This pipe line gave us 200 pounds pressure, effective under a head of 470 feet. The

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J. F. HALLORAN.....Publisher

San Francisco, November 5, 1898.

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compressor was started on Jan. 10, 1898, and machine drilling commenced.

On Sept. 24th the crosscut tunnel, with drifts and other crosscuts, (the same size as the tunnel), had reached a length of 2608.5 feet. During these 36.4 weeks no time was lost, save two days in the early part of July. During the work we made an average of 10.22 feet per day, 71.62 feet per week, and 306.88 feet per month of thirty days, nine sets of timbers only being used in the work.

The largest runs made for two consecutive weeks were 92 feet for the week ending May 28th and 90 feet for the week ending June 4th, or 13.14 and 12.85 feet per day respectively. "The largest runs made at the Hogsback mine for two consecutive weeks were 73.06 for the week ending Aug. 4, 1888, and 66.9 feet for the week ending Aug. 11th, or 10.51 and 9.55 feet per day respectively." The tunnel runs diagonally across the strike of the rock on an average at an angle of about 32°, but the strike changes at different points, from being nearly at right angles to running with the tunnel.

The rock passed through is greenstone and brown slate and heavily mineralized talc slate, filled with quartz stringers. The ground is very firm, as evidenced by the small amount of timbers used. Owing to the shortness of the bond speed was the great factor, so it was impossible to economize in men or powder. The working force when full-handed consisted of twenty-nine men, divided into three 8-hour shifts of seven men each (four machine men and three shovellers on each shift); two drivers with horses working twelve hours each; two engineers working twelve hours; one blacksmith, one helper, one mechanic and one outside man, working ten hours. The drill men were kept constantly at work in the face, and to save time an experiment was tried of using the two machine drills on one column placed horizontally across the tunnel, as near the top as possible. This permitted the machine men to get at work immediately after blasting without waiting for the dirt to be shoveled back from the face, so by the time the shovellers had the rock cleared away the machines were able to be swung around under the bar to put in the center cut and middle side holes. After these holes were drilled, long drills were inserted in the machines; they were then swung to a vertical position with the drills resting on the bottom of the tunnel, holding their own weight and also that of the column when the wedges were removed from the same. The whole weight now being on the drills, the machines were cranked down until the bar was in a position low enough to drill the balance of the holes. The column was then weighed up again,

the machine swung in position, and drilling completed. In medium hard ground this was found very satisfactory, but in hard ground no time was saved. No attempt was made to save powder, figuring that powder was cheaper than labor, and the finer the ground was broken the easier and quicker it was handled. No. 2, 40 per cent Hercules powder, was used during the entire work, with one stick of No. 1, 60 per cent, being used in the bottom of each hole, and which gave remarkably good results. The whole face was blasted at one time, the center cut having shorter fuse so that it would break first.

Water was freely used while drilling, conveyed to each machine through a 1-inch hose, under 200 pounds pressure. After blasting, the full force of water from the 2-inch water pipe was turned into the face in the form of a spray, and in this way the fumes were carried away and the atmosphere cooled, enabling the men to return more rapidly to work. An improvement was made, to save time in changing drills, by having the two nuts riveted on the U-bolt, and a key seat cut in the upper end of it with a wedge inserted, having a small lug on it to prevent its being knocked out. This wedge was put in the U-bolt with the taper side towards the end of the chuck, so that, after it was driven home, the constant hitting of the drill would keep tightening it. A couple of blows with a hammer loosened it, releasing the drill, thereby saving much time which is lost in loosening and tightening the two nuts, besides obviating the delays caused by the stripping of the threads, which necessitates a new bolt.

The king bolts commonly sent out with machine drills are made of too light material, and the thread of them, being fine, is easily stripped. At the Melones we used king bolts made of the best 1½-inch iron, with a No. 4 thread deeply cut, and using on this a 2-inch square nut. As a result, no accidents happened by machines falling, which is occasioned by the stripping of the threads.

Two Ingersoll Eclipse drills (old style) 3½-inch were used, one extra drill being kept in the shop. For 2608.5 feet of tunnel, the total cost of extras for these three machines amounted to only \$91.65.

The total cost of repairs and extras during the 8.5 months of almost continuous work for the compressor amounts to \$21.32. In the record herewith appended the facts are presented without any attempt at changing the conditions and with the hope that it will be the means of encouraging mining men generally to keep accurate records of their work, so that it will prove of assistance to those who contemplate doing similar work.

The record of 306.88 feet per month (of thirty days consecutively) may have been excelled, but when it is taken into consideration that this work was started at the end of the tunnel already run a distance of 1080 feet it makes the record some better.

Having run a tunnel (but not quite so long) at the Hogsback mine in Placer county nine years ago, and having kept a record of that work, I thought it would be of interest to readers of the MINING AND SCIENTIFIC PRESS to compare the work.

The tunnel in Placer county ran diagonally across the strike of the rock, at an angle of about 20°, which was composed of alternate stratas of slate, diorite, and white, barren quartz.

The regular force of men, consisting of twenty-one all told, divided into three shifts of five men each, working eight hours; two engineers working twelve hours; two drivers and horses working twelve hours, and two blacksmiths working ten hours.

MELONES MINING COMPANY.

ACTUAL COST OF 2608.5 FEET OF TUNNEL AND DRIFTS, 7X8 FEET, EXCLUSIVE OF MANAGEMENT, UP TO SEPTEMBER 24, 1898.

| | Cost per Running Foot. |
|--|------------------------|
| Labor payroll..... | \$19,501.46 |
| Powder—2000 lbs. No. 1 @ 16.6¢; 25,550 lbs. No. 2 @ 11.9¢..... | 3,405.65 |
| Fuse—74,000 ft. @ 51.7¢; Caps—200 bxs. @ 60¢..... | 500.20 |
| Wood—33¾ cds. @ \$5..... | 1,667.50 |
| Water—40 in. @ 15¢ per in. and tender..... | 828.50 |
| Coal—Cumberland, 11,591 lbs. @ \$15 ton..... | 79.75 |
| Freight..... | 99.58 |
| Foot Planks and Ties, and 9 sets of Timbers—3466 ft. @ \$20 per M..... | 169.32 |
| Candles—3040 lbs. @ 7½¢..... | 262.04 |
| Steel Rails—21,555 lbs., 1½¢ and 2½¢..... | 567.62 |
| Air and Water Pipe—11 in. Air Pipe, 15¢ and 30¢; 3 in. do, 22½¢; 2 in. do, 12½¢..... | 1,042.25 |
| Horse Feed—Hay, 1½¢; Barley, 1.9¢..... | 267.16 |
| Steel, Drill Parts, Oil, Waste, etc. | 316.92 |
| Total..... | \$28,708.25 |
| Actual cost per running foot..... | \$11.02 |

HOGSBACK MINE.

ACTUAL COST OF 1559.6 FEET OF TUNNEL, 7X8 FEET, EXCLUSIVE OF MANAGEMENT, UP TO DECEMBER 27, 1888.

| | Cost per Running Foot. |
|---|------------------------|
| Total labor (including timbering)..... | \$12,131.49 |
| Powder—10,021 lbs. @ 14½¢ delivered..... | 1,473.10 |
| Fuse—23,045 ft. @ 54½¢; Caps—340 case..... | 165.50 |
| Wood—322 cds. @ \$2.75 delivered..... | 1,435.50 |
| Charcoal—1580 bush. @ 20¢..... | 316.00 |
| Candles—1755 lbs. @ 13¼¢..... | 232.23 |
| Gang Planks and Ties—7624 ft. @ \$22.50 per M..... | 171.54 |
| Timbers—21 sets @ \$1.80 per set..... | 37.80 |
| Steel Rails, etc.—16 lb., 20,048 lbs. @ 4½¢..... | 901.92 |
| Air and Water Pipes—1800 ft. 3 in. @ 29½¢; 1700 ft. 1 in. @ 6¼¢; freight on same..... | 761.43 |
| Horse Feed—Hay, 2¢; Barley, 3¢ per lb..... | 319.60 |
| Steel, Drill Parts, Oil, Tools, etc..... | 916.33 |
| Total..... | \$18,797.83 |
| Actual cost per running foot..... | \$11.94 |

COMPARISON SHOWING BEST WEEK'S RECORD AND COST OF SAME AT EACH MINE.

| | Melones Mine. Report for the Week May 29, 1898, 10 a. m. | Hogsback Mine. Report for the Week Aug. 4, 1888, 9 a. m. |
|------------------------------------|--|--|
| Holes drilled..... | 291 | 150 |
| Holes reblasted..... | 6 | 11 |
| Total depth of holes..... | 1478 ft. | 758 ft. |
| Average depth of holes..... | 5 ft. | 5 ft. |
| Time used in drilling..... | 45 h. 0 m. | 26 h. 0 m. |
| Average time per shift..... | 2 h. 8 m. | 1 h. 15 m. |
| Timbers used..... | None | None |
| Powder used..... | 925 lbs. | 344 lbs. |
| Candles used..... | 77 lbs. | 72 lbs. |
| Water used..... | 40 in. | None |
| Wood consumed..... | None | 81 cds. |
| Rock extracted per shift..... | 23.19 cars. | 21.8 cars. |
| Rock extracted per day..... | 69.57 cars. | 65.42 cars. |
| Total extracted the week..... | 7 | 458 |
| No. of working days..... | 7 | 7 |
| No. of shifts..... | 7 | 21 |
| No. of men..... | 31 | 20 |
| Average progress per shift..... | 4.38 ft. | 3.5 ft. |
| Average progress per day..... | 13.14 ft. | 10.51 ft. |
| Tunnel advanced for the week..... | 92 ft. | 73.6 ft. |
| Previously reported..... | 2302 ft. | 404.1 ft. |
| Total length to date..... | 2492 ft. | 477.7 ft. |
| Expenses for the week (labor)..... | \$551.75 | \$453.75 |

In comparing the foregoing several differences are apparent. The small amount of carloads per week at the Melones as compared to the Hogsback is explained by stating that the ground at the Hogsback mine was blocky and broke big, necessitating handling much more rock than was necessary.

The difference in cost of labor per week is explained by stating that at the Melones mine of the twenty-one miners only six receive \$3 a day, the balance \$2.50 a day, carmen \$2, whereas at the Hogsback mine everybody was paid \$3 a day. It will also be noticed that it required twice as many holes to be drilled in the face of the Melones mine than it did at the Hogsback mine, as the ground was much harder and more difficult to break. During the progress of the work at the Melones mine not a single man was maimed nor did any accident occur.

To Mr. B. Deleray, the superintendent of the mine, is due the credit of the splendid results attained.

W. C. RALSTON, Manager.

San Francisco, Oct. 3rd, '98.

"No. 2000."

This is the two-thousandth issue of the MINING AND SCIENTIFIC PRESS, being No. 19, of the 77th volume. It is vouchsafed to very few such publications as this to announce the appearance of its two-thousandth issue, and in making this brief chronicle of so interesting a fact in the mining world, it is only to say that great as have been the advances in the mining and metallurgical world since this paper began publication in 1860, and in which it has had so prominent and honorable a part, it is believed that the coming years will bring at least equal progress and advancement in mining—the world's basic industry—and, as in the past it has been our pleasure and our privilege, so, in the future, it will be our province and our purpose to aid in the advancement of the great industry of which the MINING AND SCIENTIFIC PRESS has been so long the chief exponent.

At the coming session of Congress a Colorado effort will be made to secure the passage of a law granting contestants in the matter of conflicting mining claims the right to compromise the case without impairing their rights. It has been customary in courts to permit such action, on the principle that each could thus avoid expensive litigation, and yet preserve his rights of discovery, and such a course has often been recommended by the attorneys. The Commissioner of the General Land Office has ruled that whenever suit was brought it must be a fight to a finish; he holds that if a contestant has a right to a portion of the ground, he has a right to all of it, and cannot compromise the case pending a decision from the land office at Washington, D. C.

Concentrates.

THIS is the 2000th issue of this progressive publication.

The specific gravity of quartz is 2.65; its weight 165 lbs. per cu. ft.

THE Idaho Antimony Mining Co., Kingston, Idaho, employs twenty-five men.

TWENTY days' receipts during October at the Denver, Colo., mint foot up \$1,342,022.63.

SAN MIGUEL COUNTY, Colo., gives employment to about 1500 men in mines and mills.

In May, '84, the flow of water from the mouth of the Sutro, Nev., tunnel was 49,694,800 gallons daily.

EIGHT mining companies in the Cripple Creek, Colo., district will pay dividends of \$181,750 during the present month.

By an explosion of dynamite in the Trio mine at Jamestown, Cal., last Monday, D. Stewart and F. Calkings were killed.

MINERAL COUNTY, Colo., in 1897, produced \$218,000 gold, 1500 tons of lead, 2500 tons of zinc and nearly \$2,000,000 in silver.

TO FURNISH light and power to the mines of the district, an electric plant is being built at Central City, Colo., at a cost of \$300,000.

WEIGHT for weight in making steam, wood has four-tenths of the evaporative power of coal: will do less than one-half coal's work.

In the pyrites mines near Bakovici, Bosnia, a California stamp mill and Frue vanners were erected last February with satisfactory results.

The notice of an application for a patent to a claim, should, in stating the names of adjoining claims, include unsurveyed as well as surveyed claims.

In '97 Los Angeles Co., Cal., led the other fifty-six California counties in the production of brick clay, gypsum, infusorial earth, serpentine and petroleum.

ORES containing coarse gold not easily soluble in cyanide should always have that portion extracted by concentration or amalgamation before leaching.

THE Idaho Springs, Colo., Gazette says that though that district is operated mainly by local capital, the output is heavy and three sampling works are kept busy.

GIBBONSVILLE, IDAHO, wants a custom mill, or reduction plant, to handle base ores, which are said to exist in several well developed properties in that neighborhood.

ORE crushed by steam stamps usually makes less slimes than when gravity stamps are dropped thereon, the pulverized ore being forced more rapidly through the screens.

FROM the Haggerty mine in the Grand Encampment district, Wyoming, was taken a 1200-pound piece of copper ore, which was last week placed on exhibition in Denver, Colo.

SEATTLE, Wash., papers report a shortage of money and consequent disappointment in inability to secure reduced rates from transcontinental roads on the part of east-bound men returning from the Klondike.

SIZE of required wire and consequent cost varies with required voltage and distance of transmission. To transmit 200 H. P. five miles the cost of erection, complete, of that length line should not be over \$2000.

M. J. RIXOFF of London, England, representing an English company, is at Leadville, Colo., with a view to erecting an electric plant to furnish light and power to the mines and smelters of the Leadville district.

HORSEBACK prospectors are not as common as heretofore. The men who "rode all over that country and found nothing" are giving place to the patient, practical prospector who is not in too big a hurry to miss a good thing.

THE blanket sluice has not gone out of use, and may still be found doing duty in a limited but faithful way, saving fine amalgam when properly set and frequently washed, but not of much modern value for concentrating sulphurets.

ABOUT as large a drum as "Concentrates" knows of is the double-cone drum in the hoist of the Tamarack, Houghton, Mich. It is 36½ ft. diam., weighs 340,000 lbs., shaft diam. 28½ ft., length 33½ ft., carries 7000 ft. 1½ in. cable on each side.

DURING October 500,000 ounces of silver were deposited at the San Francisco Mint by the mine owners, who withdrew the same amount from the mint in Philadelphia, thus saving express charges on the transportation of the bullion across the continent.

THE Potosi & Rio Verde Ry. Co. is a New York concern, with a \$200,000 capital, incorporated to build an electric railroad from San Luis Potosi, Mexico, 66 miles to the Rio Verde mining district, to carry ore from Rio Verde to the Potosi smelter.

FOR the first time in its history, California was surpassed in '97 in its annual production of gold by another State, and the United States by another nation. In '97 Colorado produced more gold than California, and South Africa more gold than this nation.

A GOOD model of a 10-stamp mill complete, on a scale of one inch to the foot, at the California State Mining Bureau, Pioneer Bldg., S. F., shows the whole mode of operation—a miniature presentation of the detail of a mill at the Rising Sun mine, Placer Co., Cal.

THE '97 silver production, coining value, of California, Colorado, Idaho, Montana, Nevada, South Dakota, Texas, Utah and Washington was \$65,724,251. The remainder of the U. S. produced \$3,912,921; of this \$3,744,067 was from Alaska, Arizona and New Mexico.

A MAN is chiefly charcoal and water, and cannot exist in heat that consumes the charcoal in spite of the water. Animals, two-legged and otherwise, with silicon instead of charcoal, may inhabit other earths in stellar space, of a higher temperature than this terrestrial ball.

THE constitutionality of the new mining law of California has not been passed upon by the State Supreme Court. In July, '97, the law was held to be unconstitutional by the Superior Court of Mono Co., and in April, '98, a contrary opinion was given by the Superior Court of Shasta Co.

THE greatest dividend-paying mine in British Columbia is the Payne, near Sandon, owned by A. W. McCune of Salt Lake, Hoge & Brownlee of Butte and Anaconda, and S. McDonald of Spokane. The mine, as locally reported, yields a

profit of \$1,250,000 annually and has paid \$1,800,000 in dividends to date.

THE idea prevalent in some quarters that the reserving of forest sections by the Government is prejudicial to miners is not in accordance with the facts. Such reservations insure to the lasting benefit of the mining industry, and no real prospector or miner is hampered or injured thereby.

ANSWERING four questions of similar import: Since July 1st, '98, the Land Department considers each placer location a separate mining claim in patent proceedings, upon each of which is required \$500 in work or improvements. One application will do for contiguous or adjoining claims.

THE aggregate value of mineral products that passed through the custom houses of the Republic of Mexico the last fiscal year of 1897-98 was \$91,250,000, an increase of \$10,500,000 over the previous year. Of this, the amount of silver is stated to be \$67,000,000; gold, \$16,000,000; copper, \$4,700,000, and lead, \$3,000,000, reckoned in Mexican silver.

A FAN at the Wilkeson, Wash., Coal and Coke Company's mine is 10 feet in diameter, and, when making 170 revolutions a minute with a water gauge of 1.7 inches, puts 116,810 cubic feet of air per minute in circulation. When traveling 235 revolutions per minute with a water gauge of 2.5 inches, it circulates 142,290 cubic feet of air per minute.

GOLD may be induced to deposit from its mineral salt to the metallic state on such suitable base as iron sulphide, and mineralogists have thus manufactured natural looking specimens of "gold quartz" from rock which by previous assay contained no trace of gold. Such dexterity is, however, not wholly commendable, suggesting proficiency in the ignoble art of "salting."

ONE thousand dollars in standard silver dollars weigh 859.375 ozs.; the same amount in halves, quarters and dimes weighs 893.75 ozs. This is due to the Act of 1853, under which these smaller coins are minted. Silver was then comparatively high, and foreign governments drained the U. S. To stop exports the standard was lowered and has remained so for forty-five years.

M. JAHR of the Breslau Mining Department has devised a theodolite for underground surveying, in which the verniers are lighted by incandescent electric lamps supplied with current from an accumulator slung from the top of the tripod, and connected with the instrument in such a way that when the telescope is turned in a vertical or horizontal plane the current is not interrupted.

IN the Koenig mine, Neuenkirchen, it has been found that the comparative cost in underground work of compressed air, electricity and water pressure was as follows: Installation of compressed air, \$3750; electricity, \$3900; water power, \$3000; working cost for 66 H. P. and 300 days, compressed air, \$875; electricity, \$750; water power, \$650. The water pressure available was 150 yards.

REGARDING the clippings this week from Butte, Montana, Spokane, Wash., and Los Angeles, Cal., it is desired to courteously say that this paper is too much taken up in the constant endeavor to keep mistakes out of its own columns to attempt the correction of alleged or manifest errors in those of any of its contemporaries. No one is infallible, and, possibly, the writers or publishers of the excerpts referred to believed them.

A COLORADO assayer asks a practical question, which, after considerable inquiry, "Concentrates" is unable to satisfactorily answer. He questions: "Is an electric furnace for making crucible assays practicable?" It would seem that where fuel is dear, electric energy cheaply procurable and a large number of daily fusions made, it should be, but know of no one manufacturing such a device. Probably some of our readers can supply the information.

POTASSIUM PERMANGANATE is successfully used in New Zealand, says Dingle's *Polytechnischer Journal*, for gold extraction. The finely crushed ore is ground with common salt and sulphuric acid and the permanganate added to the mixture. Hydrochloric acid is first formed; with this the permanganate yields chlorine, which at the moment of its liberation dissolves the gold. It is claimed that the process extracts the gold completely. It can be used with copper-containing ores.

TWO specimens from Georgetown, Cal., are not diamonds, though diamonds have been found in that vicinity. Full directions for diamond hunters and the finders of diamonds were published in the issue of Feb. 16, 1895. California diamonds are not uncommon. They are found in the hard, compacted gold-bearing gravel occupying ancient river channels capped with lava. Louis Glass of San Francisco wears California diamonds found by him while superintendent of the Spring Valley hydraulic mine, Cherokee, Butte Co., Cal.

IF October's record is kept up during November and December the subscriptions during the last three months of '98 to this paper will exceed in number that of any similar period in this journal's history. During October there were received in the business office 311 new subscriptions. When it is considered that during October a fierce political battle was going on in a great part of the region whence these subscriptions came, it will be seen that however much the minds of mining men may be distracted by political excitement they want this paper.

TO FIND the necessary size of valve for steam boiler, $\frac{1}{2}$ the number sq. ft. of grate surface of boiler is the number sq. in. of required valve area. To find number sq. ft. heating surface in a horizontal tubular boiler, first reducing all dimensions to inches, multiply two-thirds of the circumference of the shell by its length; multiply the length of the tubes by their combined circumference, subtract from two-thirds of the area of both heads the combined area of the tubes, add the remainder to the sum of the tubes and shell, divide total by 144; the quotient will be the number required.

FIFTY-SEVEN DAYS remain to do required annual assessment work for '98. In some regions assessment work is done by contract. Some man who keeps posted on claims, especially those belonging to absentees, by lively rustling gets the job to keep alive forty or fifty unpatented locations. He hires men and figures on an average profit of \$35 per claim. The temptation to sharp practice sometimes causes less than \$100 worth of work to be put on each claim, which tends to make trouble later on. The better way is to do it oneself or see personally that it is done legally, unless one is "sure of his man."

SINCE the 1st of last July, all applications for U. S. patents for mining claims must be accompanied by an affidavit that \$500

worth of work has been expended for each claim. In case of a group of contiguous claims, if it can be shown that the work done on any one of them went to improve or develop the entire group, such will be admissible, provided the affidavit shows that on such one claim the work or improvement aggregates as many times \$500 as there are claims in the group for which patent is desired. For instance, if the application be for say five claims, an aggregate of \$2500 in work or improvements must be shown to have been expended: such \$2500 can have been put entirely upon any one of the five, provided it be shown that such amount tended to improve or develop the whole five.

MANGANESE ORE is produced in Alameda county, Cal., which last year produced 504 tons, worth \$4080; in '96, California produced 284 tons, worth \$3415; in '95, 535 tons, worth \$5400. It has also been mined in San Joaquin county. The world's production is about 500,000 tons annually, about one-half of which comes from Russia. It is also imported from Germany, Chili, France and Cuba. It is plentiful in Colorado, Utah and Arkansas, but the ore can be delivered cheaper in New York from Cuba than from any one of the three last-named sections. Its principal use is in iron and steel manufacture, and as a re-agent in the manufacture of bromine and chlorine (manganese binoxide). In '97 Pott & Batum in the Caucasus exported 210,106 long tons manganese ore, of which 42,300 tons came to the United States.

THERE are two kinds of hydrides—those in which the hydride is in solution with metal, and others formed at higher or lower temperatures, and which appear to be of chemical and determined combination. To this latter class belongs the hydride of calcium, similar in results to crystallized carbide of calcium as prepared in electric furnaces. Moissan describes, in the *Comptes Rendus*, a hydride of calcium of the formula CaH_2 , formed by heating crystallized calcium in a stream of dry hydrogen. It is a hard, white crystalline body, stable in dry air, even at a red heat, but burning before the oxy-hydrogen flame. At ordinary temperatures it is not very reactive, but when heated reacts readily with most of the negative elements. It is a powerful reducing agent, decomposing cold water with great violence, with the formation of calcium hydroxide and liberation of hydrogen. In this hydride the hydrogen thus seems to resemble the carbon in calcium carbide and the phosphorus in calcium phosphide.

THE Anaconda Copper M. Co., in Montana, have about 5000 cars fitted with a self-oiling car axle. The axle is made in halves, being divided at the center, and both wheels being pressed on. A cast iron sleeve is used as a support for the axle as an oil reservoir. This sleeve is bored to fit the axle, the center part being counter-bored to provide oil space. The sleeve enters about 1½ inches into the hub of each wheel, with a sufficiently close fit to prevent the loss of oil. The object of having the axle divided in the center is mainly to allow for variations of travel in passing around curves, so as to be able to press the wheels separately on each half-axle. The half-axle is slightly tapered at one end; the other end is provided with a groove, in which is a small fork-shaped brass casting, serving to hold the axle in position. At the center the sleeve is enlarged, and has an opening to let the two forks drop in. A steel cover is hinged over this opening, serving to retain the forks in position and to keep out dust and dirt. The cover can be slipped to one side to permit oiling, or, when it may be necessary, to take out the forks and remove the wheels and axles.

THE claim for "the Stephens process," at Salida, Colo., is that it will treat sulphide as well as oxidized ores, and make roasting unnecessary, and that "by electrical precipitation" it will treat copper ore "as easily and as cheaply as it will gold or silver ore." According to the "professor" who has charge of the laboratory experiments, "the practical working of the process is on similar lines to the chlorination process, but the gases evolved by the chemical combination of the solid and liquid chemicals used are more potent in solvent properties. The ore is reduced to a certain degree of fineness (determined experimentally) and then charged into lead-lined iron cylinders, the chemicals and water are then added, the cylinders sealed and left to evolve. After a certain time has elapsed (determined by laboratory experiments) the barrel is opened, the charge washed several times by decantation, then the ore is rinsed out and charged on a filter bed, the precious metal now being in a liquid state. Experiments performed in our laboratory have proven that several precipitants may be used for the recovery of the gold, viz.: Sulphureted hydrogen, sulphide of copper and ferrous sulphate. This green vitriol is easily made from scrap iron and sulphuric acid; both are inexpensive materials." The professor thinks it possible he "may modify the precipitation according to the results of investigation of electrical methods."

A "TRANSFER ORNAMENT" is any design made the way it is desired as a design for the purpose to be secured. For instance, assuming that one wants a design for the decoration of a wooden covering to machinery: The painter or designer gets up some appropriate combination that will look well. He paints the design by hand first, then such design is passed to the engraver. From the engraver the design goes to the printer, when each color is printed on an exactly-registering press, so arranged that the colors fit as to shading, etc. Such a print is usually a varnish or sizing print. This print receives a layer of metal leaf, and, after clearing away the surplus, appears upside down on the paper. What gives such a print the name of "transfer ornament" is the fact that it is so printed upside down on a chemically-prepared paper. This paper is porous and has on its face a coat of a chemical preparation, so that water placed on the back will soak through quickly. When the ornament has been printed on this paper, has been given a coating of varnish over the ornament, and the varnish has been allowed to set for a few minutes to get tacky, the paper ornament and all is then placed in proper position and pressed firmly against the woodwork. All that is necessary to transfer the ornament is to wet the paper on the back. The water soaks through the paper and softens the chemical coating on the paper, which in turn releases the ornament printed on it, and, the varnish being on the other side of the ornament, it sticks to the woodwork. When the paper is lifted off appears, in brilliant coloring or in gold or silver, as desired, the design. It is necessary to take a little benzine in a sponge and wash over the ornament quickly, washing away all the surplus chemicals and surplus varnish that transferred with the design. To prevent being scratched after twenty-four hours it should have a coating of varnish. The paper acts as a conveyor: the ornament is printed on the coating and not on the paper.

Occurrence and Treatment of the Carbonate of Soda Deposits of the Great Basin.

Written for the MINING AND SCIENTIFIC PRESS by S. A. KNAPP.

Comparatively little attention has been paid to the natural sources of wealth of the great basin in the form of chemical deposits, unless same were extremely rich in some of the more valuable salts. The borax prospector has examined most of them, but unless they boiled out rich on the first test they were passed by. Soda was never considered of any value except for the purpose of working cotton ball or borate of lime, and the dry deposits of it were condemned as alkali flats and considered as of no possible use, and the lakes unfit for use. Until within the past ten or twelve years practically nothing was done towards developing same, and then only in a small way, the first work of any importance having been done at Ragtown, Churchill county, Nevada.

The soda deposits, some in solution and others as dry deposits, doubtless desiccated lakes, are numerous all through the great basin, but the carbonate deposits of economic value seem to be confined to the eastern skirts of the great Sierra Nevada range of mountains, and extending northerly and southerly along the base of the mountains, both in California and Nevada. As we go easterly from this line the carbonates decrease and the sulphates increase, until, in Wyoming, on the eastern limit, we find the deposits almost entirely sulphates. The various deposits differ in their chemical composition very widely, and even within any given deposit the proportions in which the salts exist in different portions of the deposit vary, the general character of the salts, however, being a mixture of chloride of sodium, carbonate of soda, bicarbonate of soda, sulphate of soda, with occasionally some chloride of potassium, borate of soda and borate of lime. In the dry deposits these salts are mixed with more or less sand and dirt. As but little call, except for local needs, is had for chloride of sodium, but little attention is paid to saving it. Sulphate of soda is likewise of but little practical use and is disregarded, the only salts considered as worth saving under present conditions being the carbonates and bicarbonates of soda and the borates of lime and soda. As the borates are local and not present in all the deposits in sufficient quantity to warrant treatment for their recovery, we will consider at present only the treatment of the material for the saving of the carbonates.

The treatment varies with the material and the chemical composition, and in the case of lakes or deposits in solution is divided into two classes: 1. The hot weather, or summer, soda process. 2. The cold weather, or winter, process. The hot weather process has for its foundation the presence of bicarbonate in the solution, as well as carbonate, and the chemical fact that in dense solutions one molecule of bicarbonate will unite with one molecule of carbonate and form sesqui-carbonate, also known as trona or urao, which precipitates.

To obtain these salts in a pure state, other chemical facts are taken advantage of, to wit, that salt or chloride of sodium will not precipitate unless the density of solution rises above 32° Baume, and that sulphate will remain in solution up to 34° Baume, providing the temperature of the solution remains above 75° Fahr. The method employed is to pump solution into vats with clay bottoms and sides and evaporate same by solar heat, and accumulate solutions at low density until warm weather approaches, when, solution being conducted to crystallizing vats, the density is allowed to run up by evaporation to the neighborhood of 29° or 30° Baume. When the sun's heat is sufficient to keep temperature up to 75° or above the density is run up still higher, and crystallization commences and strong solution is added from time to time and waste or exhausted solution is run off. During the warm weather this method is continued, and gradually there accumulates a hard cake or deposit of the sesqui-carbonate of soda, which at the end of the season varies from a few inches to as high as 12 inches in thickness over the bottom of the vat. When the season is over and cold weather approaches, the cake of sesqui-carbonate is broken up, taken out of vats, washed and piled up to dry in the air, the composition of the material being, if work is carefully done, as follows:

| | |
|--------------------------|---------|
| Bicarbonate of soda..... | 36.46% |
| Carbonate of soda..... | 45.86% |
| Chloride of soda..... | .32% |
| Sulphate of soda..... | 1.25% |
| H ₂ O..... | 16.16% |
| Insoluble..... | .02% |
| Chatard..... | 100.07% |

Often the sulphate and chloride are still lower than above figures.

When, after drying, this material is subjected to heat in a properly constructed furnace—revolving automatic or reverberatory—the soda parts with its water of crystallization and the excess of carbonic acid, and leaves an anhydrous mono-carbonate of soda almost absolutely pure, or soda ash, which is then ground and packed for shipment.

The cold weather process is applicable to solutions

containing carbonate of soda and chloride of soda only, and consists of evaporating solution to density of 30° or 31° and holding same until cold, freezing weather, when the entire soda contents unite with water of crystallization, forming decahydrate or sal soda (Na₂O—21.68—CO₂ 15.39—H₂O—62.93—), which falls, leaving the salt in solution, which is then drawn off and run to waste. The soda is raised from the vat and piled on protected platforms, where a free circulation of air takes place, and it gradually loses its water of crystallization. As the warmer weather approaches in the spring the piles are broken down and soda spread to dry, and the air dries it down to a mono-hydrate of soda (Na₂O—50 CO₂ 35.48 H₂O—14.52), in which form it is especially useful to soap makers and for manufacture of washing powders. By the cold weather process practically all the contents of the solution as mono-carbonate are recovered, while by the hot weather process, generally speaking, only about 25% of the available soda is recovered, it depending entirely upon the amount of bicarbonate present in the solution; but as the handling of solution is merely a question of pumping, the soda maker does not worry very much over the low extraction, merely providing more vat room and running his pumps longer.

In the working of lakes or deposits of solution the necessary conditions must be present to do so successfully, and these are: 1. Convenient beds of clay impervious to the soda solution, in which the vats are dug. 2. An altitude low enough to insure a long term of warm weather for evaporation and precipitation. 3. Convenience to transportation for providing fuel and shipment of product to market.

The following are the principal lakes or solution deposits where carbonates are present in sufficient quantity to allow working: Albert lake in Oregon; Ragtown lakes, Churchill Co., Nev.; Mono lake, Mono Co., Cal.; Black lake, Mono Co., Cal.; Owen's lake, Inyo Co., Cal. The only ones worked are the Ragtown lakes, where about 1000 tons per annum are being made, and Owen's lake, where about 5000 tons per annum are being produced. Mono lake is at too great an altitude to allow good evaporation. Albert lake is open to the same objection. Black lake is a little too far from transportation and is small.

The dry deposits are scattered along the eastern base of the Sierras, commencing near the Oregon line, where there are two; next the Double springs marsh in Esmeralda Co., Nev., property of Occidental Alkali Co.; the Hot springs marsh in Esmeralda Co., Nev.; Teel's marsh in Esmeralda Co., Nev.; Columbus & Fish lake marsh. Some of these deposits are so high in chloride and sulphate as to be economically of little value; others run high in the carbonates. As an instance, the Double springs deposit in Esmeralda Co., Nev., has an area of about 800 acres, of which 500 acres are covered with a deposit of soda of an average depth of about 6 inches. An analysis of an average sample of the crude top incrustation gives:

| | |
|--------------------------|------|
| Carbonate of soda..... | 20% |
| Bicarbonate of soda..... | 25% |
| Sulphate of soda..... | 15% |
| Chloride of soda..... | 10% |
| Sand and soluble..... | 15% |
| H ₂ O..... | 15% |
| | 100% |

This deposit is but four miles from rail transportation, being near the line of the Carson & Colorado R. R., which line also reaches Owen's lake. Beneath this top incrustation is a bed of damp clay, strongly impregnated with soda; and when the top incrustation is removed, the soda rises on the surface of the clay and gradually accumulates, in this way renewing the deposit, which up to the limit of this renewal is practically inexhaustible.

The Hot Springs marsh is about twenty miles from rail transportation; the deposit is of the same general character as that at Double springs, and of about the same area. Teel's marsh, about fifteen miles from rail, is much smaller, and the salt is not as high in carbonates as Double springs. Columbus marsh, nine miles from rail, is a very large deposit. A portion of the marsh has good incrustation of carbonate, in another portion borates of soda and lime predominate, while in others salt and sulphate of soda are in excess. Other deposits exist in Saline valley and south and east from there, but are too far from rail to be available. The only dry deposit upon which any work has been done is the Double springs deposit in Esmeralda county, Nevada. Here the method adopted was to gather the incrustation and tram same to dump of works, dissolve in hot water, settle the solution in settlers and draw the clear solution to vats for precipitation, as described in the hot weather process. The small percentage of extraction, owing to low per cent of bicarbonate present after boiling, militated against the success of the process, although considerable soda of a high grade was made. Recently a series of careful experiments have been made, and, as a result, the process will be changed, so that 85% of the available soda will be recovered, and the process be continuous winter and summer.

Briefly, the process is: 1. Gathering crude and tramping to dump. 2. Dissolving and settling to obtain clear solution. 3. Carbonating solution so as

to change all carbonates to bicarbonate, which precipitates immediately by adding CO₂ under pressure. 4. Precipitating and washing bicarbonate. 5. Drying bicarbonate and furnacing same in a retort furnace to save the CO₂ for use in carbonating fresh solution, the CO₂ being compressed and stored in receiver.

As an illustration of the purity of the product obtained by this process I give the analysis of a sample of bicarbonate produced on a large scale at Double springs marsh:

| | Double Springs Bicarbonate. | Chemically Pure Bicarbonate. |
|------------------------|--------------------------------|---------------------------------|
| Na ₂ O..... | 37.00 | 36.94 |
| CO ₂ | 52.30 | 52.36 |
| H ₂ O..... | 10.70 | 10.70 |
| | 100.00 | 100.00 |

After furnacing we have left an almost pure mono-carbonate, 97-98% carbonate of soda, which is then ground and packed for shipment. The latter portion of the process is an adaptation of the methods used in the Solvay process for production of ammonia soda, and has stood the test of long and successful use. This process is applicable to all the deposits that are sufficiently high in carbonates, and has the advantage of being under perfect control at all times, and will doubtless be generally adopted in working dry deposits.

The economic importance of these deposits can hardly be understood by those who have paid but little attention to the development of the alkali trade. The great variety of products into which soda ash enters—glass making, soap manufacture, paper making, borax manufacture from borates of lime, wool scouring, the manufacture of sal soda and washing powders, the manufacture of bicarbonate for baking powder purposes, etc., etc.—makes a heavy demand for it, which until within a few years was entirely supplied by England, our imports of ash running as high as 300,000 tons per annum, and for the Pacific coast alone as high as 25,000 tons per annum. In addition, the paper maker is gradually waking up to the fact that his caustic lye can be much more cheaply and easily made by using ash, and causticizing by lime, than to import and handle the prepared caustic, which still further increases the demand for ash, so that we may look forward to a heavy and constant increase of the demand for this product, and the despised alkali will in time take its place as one of the leading products of the arid region and the deposits be thoroughly developed.

Hawthorne, Nev., Oct. 20th, '98.

Find of Ancient Bones.

TO THE EDITOR:—In a shaft sunk at the Hancock bituminous deposit, lying northwest of Los Angeles, Cal., in the center of what appeared to be an old tar spring, near the surface, were found the bones of domestic animals—horses, cattle, sheep, etc.; at a greater depth the bones of the bear, elk and other wild animals, and resting on the shale beneath the bituminized sand at a depth of 30 feet were the bones of the *Elephas Americanus*.

During the latter part of the summer seasons in California, which are rainless, the natural grasses dry up, but owing to the slight amount of water which ascends with the bitumen, there grew surrounding these asphalt springs during the dry season green and succulent herbage.

This green herbage was the bait of the trap which tempted these herbivorous animals to their doom. With everything else dry these green herbs were an irresistible temptation. In struggling to get them the animals became mired in the tar spring and suffocated, their bones gradually sinking to the bottom.

The *Elephas Americanus* seems to be the first one that met this fate, as his bones rest upon the underlying shale below the remainder of the fossils. These springs must be very old, as it is many years since the American elephant fed upon the adjacent plains.

Los Angeles, Cal., Oct. 20th, '98. A READER.

True Heroism.

TO THE EDITOR:—If the following incident is deemed worthy of publication, you can make use of it. It is authentic. N. S. TROWBRIDGE.

Sumdum, Alaska, Oct. 8th, '98.

Heroes are found among the miners of our country as well as among our soldiers, as the following incident proves: Three men of Sumdum, Alaska, had just spitted eleven holes in the bottom of a shaft and started for the surface on the edge of a bucket. The swing of the bucket threw one of them against a timber and he was knocked off, falling to the bottom. He was not seriously hurt and retained perfect consciousness. Death in a horrible form stared him in the face. "Billy! Billy!" shouted he to the foreman; "don't leave me here to die!" "Pull that bell cord," said Billy to his companion. "I can't find it," was the reply. "Pull that cord, damn you, or I will knock you off the bucket!" The cord was pulled and the descent, then 60 feet from bottom of shaft, was made. As the bottom was approached, the engineer slowed up, as usual. Quick signals to lower, and, the bottom being

reached, the two men jumped off, and, grabbing the hurt man, put him into the bucket. Signals to hoist at full speed started them upward. The explosion occurred just as the men reached the surface and safety. Who shall say that heroism of the highest kind was not here displayed!

The Country of the Klondike.

NUMBER III. — CONCLUDED.

Written for the MINING AND SCIENTIFIC PRESS by RUSSELL L. DUNN.

Pine Creek or Lake Atlin district is from location alone a more promising field for prospectors than the Shorty Creek district. It is the Lewis river basin above Lake Tagish. It is close to and easily accessible from Skaguay all the year. Like the Shorty Creek district it is above glaciation, or more exactly it is in a locality over which there has been no glacial movement, although there are glaciers above it and glacial terraces and moraines down the Lewis river from it. The placers are shallow and are the beds, low bars, and "old channels" (forming "benches") of several creeks and small gulches adjacent to Lake Atlin. The auriferous gravels contain considerable quartz float. This latter has led to the discovery of several lodes so situated that they undoubtedly contributed to the formation of the placers. Transportation is good, and machinery, supplies and men can be put into this district so cheaply that both low-grade placers and comparatively low-grade lodes can be profitably exploited.

Aside from these three districts there is nothing else yet discovered and proven of commercial value in the Northwest Territory. Most of the alleged discoveries are of the glacial moraine and terrace colors discovered in surface panning. The country, however, is in no sense prospected conclusively, even though many possible areas close to routes of travel have been pretty well gone over. The area within which the chances of profit by discovery justify the risk of loss from failure to discover commercially available mineral deposits is, however, restricted. Portions of the higher interior are so far back from water transportation that only enormously rich deposits will pay to work. Such deposits are not common, though not impossible. The Klondike district is both rich and favorably situated with reference to transportation. What is known as the White River country, and the northerly and westerly portion of the Alsek basin towards the St. Elias mountain range, is very unfavorably situated. Another condition that eliminates very considerable areas of the valleys is the glacial terrace accumulations.

Another deterrent condition is entirely artificial, but it is none the less certain to limit exploration unless removed. It is the Canadian mining regulations and royalty. No gold-mining industry in the world has been known to be profit earning enough to stand up under a royalty of 10 per cent of the gross gold output. Some individual mines may for a time, but the great number of mines cannot pay this and make a profit. The demonstration of this is conclusive when the gross gold output of the mines of any district is compared with the gross working cost charges against this output. Ten per cent of the gross output will certainly appear to be so large a proportion of the profit margin that if it were added as a cost charge it would make the business of mining undesirable. The practical effect of that royalty tax is to annihilate the unearned increment, or rather to appropriate it to the Government. The sale value of a mining claim is wiped out by destroying its profit basis. The placer claims are too small. The length, 250 feet in the Northwest Territory and 100 feet in British Columbia, is not sufficient except in the richest kind of ground. While it has not affected the development of the Klondike, where much of the ground is extraordinarily rich, it does affect injuriously the other districts. That one double discovery claim is allowed is very little incentive to explore remote localities. Lode location is regulated by the British Columbia laws and the claims permitted are of sufficient size. There is no royalty charge on the gold production. While capital will doubtless continue to invest in the Klondike placers, despite the royalty and smallness of claims, there will be little or no inquiry for and investment in the placer claims of Shorty creek and other localities where there may be placers of moderate richness.

In a general way, comparing the American portion of the Yukon basin with the country described, I consider the former as possessing very much larger areas within which there may reasonably be anticipated the discovery of profitable placer deposits. Even if none are found absolutely as rich as the Klondike, the proportion of the total output that is profit will be much larger from placers not nearly as rich. There is no royalty, arbitrary limitation of claim ownership, or vexatious mining regulations, and it is possible to acquire mining rights in fee by patent. In the Northwest Territory a mining claim is only a lease from year to year, and there is no vested right. The regulations are changed without notice and without appeal being possible. Instead of considering mining in this country as a legitimate

industry and business, the government of the country, through its officials, conducts it as a great "bunko plant." Independent of all its personal acts, of which individuals have complained, the Government has taken directly and indirectly \$3,000,000 out of a total gold production that has not yet reached \$12,000,000. This is a far larger sum than the aggregate mining profits realized out of this production by the claim owners. There is no game of chance where the deal has such a percentage in its favor. No other mining region in the world is similarly burdened. The Transvaal Boers, taking a far less percentage of the gold output of the Rand mines, seriously crippled the industry there, but their exactions are trivial compared with what is going on in the Northwest Territory. So long as the selling of stock and mines is a greater and more active industry than the mining of the gold, the "kick" at the percentage of the latter taken by the dealer (which is the Canadian government) is not forcible, as the principal game is not directly interfered with, and each player hopes to cash in winnings before he personally is downed by the percentage against the player.

There is a class of mining from which much has been expected in the Northwest Territory that is inevitably a complete failure. The Canadian government has sold several thousand "dredging leases," each the right to dredge a five-mile section of river bed in the Northwest Territory for gold. The sale of these leases has been a swindle from the start. There is not now and has not been a possible chance for "dredging" for gold in the river beds of the Yukon basin. River-bed dredging for gold can only be a commercial business when there is a gold-bearing river bed and physical conditions with it that admit of the employment of a dredger. In the Northwest Territory there is no gold-bearing river bed under the proper physical conditions. The conditions of placer gold genesis and distribution are such that the gold is in the minor gulches, ravines and valleys, and not in the larger valleys containing large water flows. If exceptionally in such a large valley (and I do not know of any such exception), the gold would not be under the flowing water of the river, but in the rock cut out of an older channel, obliterated by the stream wash forming the bed of the flowing stream. The gold-bearing channel would be crossed by the present flowing stream at one or more places, and might even be superimposed by it, and in such condition the dredging of these places under the flowing stream would produce gold, but elsewhere would be barren of commercial results. One "joker" in the Canadian dredging leases is that the right to dredge is strictly limited to the flowing stream bed between the banks of its "low-water flow." With that "joker" in the leases, even if the valleys were gold-bearing, the dredging for it could not be done where the gold is, but would have to be done where it is not. Even this last bare right meets another "joker" in the physical condition of the stream beds. These, except close to the contact with the flowing water, are perpetually frozen sands and gravels. It is an impossibility to excavate these frozen sands and gravels with a dredge, and even if excavated, they could not in their frozen condition be washed and the gold obtained. Briefly, it may be stated that there is no gold-bearing river bed to dredge; and if there was, it couldn't be dredged. It has not required the demonstration of trial to find out these facts. Not a single dredger trial in the Northwest Territory has yet been made; not a single lease has been prospected. But it was known to the Canadian official that the river beds in the Northwest Territory were perpetually frozen, and their expert advisers should have known (there is no excuse for not knowing) that in the Yukon basin valleys the beds of the flowing streams could not reasonably be sufficiently gold-bearing to make dredging a commercial possibility. The Canadian government has practically connived at one of the most widespread and gigantic mining swindles of recent years by officially recognizing the dredging of the Northwest Territory river beds in its official mining regulations, and has shared in the proceeds by selling the absolutely worthless leases for large sums of money. Purchasers of these leases have not received and cannot receive the slightest valuable equivalent for the money they have paid.

In this connection, to avoid the slightest misunderstanding of my meaning, I desire it distinctly understood that it is not dredging that is condemned as a method of mining, but the Canadian official appropriation of it to the Northwest Territory mining conditions. Given the gold-bearing gravels with the proper physical conditions, and dredging to exploit them for their gold is economically an ordinary business proposition, with only such mechanical risks as are incident to steam shovel and dredging work where gold mining is not the object of the operation. The problem of gold mining by dredging is no longer in a possible uncertainty of successful operation of the machine, but in finding the gold-bearing deposit under the proper physical conditions. Under the most favorable conditions dredging for gold costs no more per unit of material handled than hydraulicking does under its most favorable conditions of operation.

Methods of placer mining are still primitive in the

Klondike country. The rocker and the pan have first place; the sluice, operated by shovellers, is secondary. Fire is used to burn out the frost, not only to sink the prospect shafts, but to remove by drifting the pay gravel. High wages are paid and are necessary, working under the severe conditions. Many of the claims are owned by parties who have neither the capital nor the patience to wait on economical development of the ground. Aside from this last, there is no good reason why the Russian method of prospecting and determining areas of ground that can be mined at a profit, and Russian methods of mining improved by our tools and mechanical applications, should not be used. Hydraulicking is possible with some placers, but not many. Ground sluicing can be used to a limited extent. Drifting in the deeper old channels, where water is not at hand for hydraulicking, is sometimes available as a method, provided the gravel is thawed out. In frozen ground, unless quite deep, the open pit (Russian) method is preferable.

Quartz mining involves no new conditions or untried problems. Probably, though, mills cannot be operated in the cold season. Aside from this, costs should not be largely increased over the most favored localities. The transportation of machinery would be over the rivers in summer and by sled over the snow in winter. Installation will naturally involve more expense and time than in more favored localities, but, once installed, climatic conditions will not interfere, except as noted above, with continuous operation. In a word, there is no longer excuse for mystery in gold mining in the far north. It is simply such a commercial proposition as gold mining presents elsewhere.

Riveting of Boilers.

The following extract on riveting of boilers is taken from the American Boiler Manufacturers' Association's report: In riveting boilers the holes should be perfectly true and fair, made so by the use of clean cutting punches or drills; sharp edges and burrs should be removed by slight counter sinking and burr reaming before and after the sheets are jointed together. The under side of the original head of the rivet must be flat, square and smooth to insure perfect contact with the plate. For rivets from $\frac{3}{8}$ -inch to $\frac{1}{2}$ -inch diameter allow $1\frac{1}{2}$ diameters for length of stock to form the head; for large rivets less length. For a button set on snap rivets 5 per cent more stock may be allowed to form the driven head. Light regulation riveting hammers are to be used until the rivet is well upset in the hole; after that the snap and heavy mauls. For machine riveting more stock may be left for the driven head to make it equal to the original head, the exact amount to be fixed by experiment. The amount of pressure on the die should be about eighty tons for $1\frac{1}{2}$ inch or $1\frac{1}{4}$ -inch rivets; sixty-five tons for 1 inch, fifty-seven tons for $\frac{3}{4}$ inch; thirty-five tons for $\frac{3}{8}$ -inch rivets.

Rivets should be tested both hot and cold by driving down on an anvil with the head in a die, by nicking and bending, and by bending back on themselves, all without developing cracks or flaws. The heads of rivets ought to be of equal strength with the shanks; this is fulfilled by giving the head at the periphery of the shank a height equal to one-third the diameter of the shank. A slight fillet at this point is advisable. The rivets should have a diameter about double the thickness of the thinner plate; the pitch should be about three times the rivet hole; the distance between staggered rows of rivets half the pitch; the lap for single riveting about equal to the pitch; the lap for double riveting about one and one-third times the pitch and one-half pitch more for additional row of rivets.

A factor of safety of four and one-half shall be used where the tensile strength of the plate and the shearing strength of the rivets have been determined by actual tests; where this has not been done a factor of safety of five shall be taken, and at most 55,000 pounds tensile strength per square inch for steel plate and 40,000 pounds sheer strength per square inch for rivets be allowed. Rivet holes may be either punched with good sharp punches and well-fitting dies in American Boiler Manufacturers' Association steel up to five-eighths of an inch in thickness; above that thickness either punching and reaming with a fluted reamer or drilling is advisable. The judicious use of the drift tin with light hammers in pulling the plates into place and rounding up the hole is not objectionable; but enlarging or gouging holes to fit by driving in a pin with heavy hammers or mauls is condemned as a bad practice. When drawn into an approximate fit, the holes must be trued up by means of reamers.

A Montana Opinion.

The MINING AND SCIENTIFIC PRESS of San Francisco is the great mining publication of the West—newsy, sufficiently scientific to interest experts and not too technical to be of interest to prospectors.—Boulder, Montana, Age, Oct. 19th.

The Present Conditions of Gold Mining in the Kochkara Region in the Oural.

Written for the MINING AND SCIENTIFIC PRESS by R. HELMHACKER, Prague, Bohemia.

This gold field, extending on the eastern side of the Oural range, lies in the Government Orenbourg in the land of the Kozaks of the Kosoibrodstanica, and is termed by the Oural Mining Department as the seventh Orenbourg mining region in the Oural. This field, about 55 km. northwest from Troick, or 85 km. southwest from Mias, can be reached from the railway station Bishkeel, between Zlatoust and Cheliabinsk, in passing the Bashkir villages Medviejeva, Kazbaieva, Karatanova, Koelgha and Kochkar, lying on the Kabauka rivulet, distant on the country road 92 km. from the railway. From Kochkar 27 km., nearly in a southern direction, is the Kosoibrodstanica, on the Sanarka rivulet. From Kochkar in strictly southern direction to the Sanarka rivulet, in the length of about 35 km., extends this gold field, from which the northwest corner southward from Kochkar, covering a space of 50 km. square, has most of the mining establishments.

In this were discovered gold detritus, or rather alluvial gold, in 1844, along the highest course of the small tributaries of the Kabauka and Sanarka, both flowing to the Ooi, farther to the Toora and then in the Irteesh, thus along the Kabauka with the Kochkara, the Chornaia, the Antipin gulch; then along the Sanarka with the Kamenka, the Tioplaia and the Oseika. In 1849 were seven claims working; in the years 1863 to 1867 the primitive gold deposits were discovered. The number of claims increased rapidly to 70 in the year 1870 and reached 330 now in 1898, with about 360 to 400 developed gold-bearing veins. The average yearly output for the last five years afforded from the placers in the Kochkar region amounted to 340 kg. and from the veins 1330 kg., while the annual gold extraction from all the mining establishments in the Kozak lands in this section of country averages annually 2750 kg. The total amount of gold washed from the placers from 1844 to 1897 equals 25,160 kg., while from the veins were extracted, from 1868 to 1897, 21,900 kg., or jointly 47,060 kg., to which must be added yet 450 kg. of silver.

Led by the mining importance of this region, the director of the Geographical Comité in St. Petersburg, A. P. Karpinsky, suggested that it be geologically surveyed, and mining engineer N. Vysocky is now engaged in this work.

The geological features are simple in the mining district. A broad zone of granite forms the prevailing rock, in which are subordinately found long streaks of crystalline schists, large masses of serpentine and also strata of carboniferous limestone of the lower division. In the district where the mines are situated the granite is decayed and more rotten than in the other portions of its extent, evidently by the influence of chemical and dynamical agencies. The 35 to more than 40 km. broad granitic or somewhat granito-gneiss zone, directed with its length in the direction from north to south, was subject to a great many east-west—also transversal—fractures or disturbances, forming now very numerous, nearly parallel, faults, which, having enclosed masses of detached and fragmentary granite, like in grousans, now form series of rock-lode courses. These lodes, with stony gangue or rock to several meters thick, were formed of dynamical and chemically decomposed and metamorphosed granitic country rock; therefore dynamo-metamorphic grousans exhibit dark grey-green hues, are sometimes somewhat slaty and bedded and composed of crushed orthoclase, plagioclase, quartz and biotite as primary elements, with secondary formed species as biotite, chlorite, talc, phyllosilite, calcite, pyrite, and others. In some lode matter amphibole is also present. The granitic country rock traversed by these rock lodes is entirely decayed to a friable mass, in which the orthoclase, or generally the feldspar, is decomposed entirely or partly to quartz, pyrophyllite and kaolin, particularly below the earth's surface to a depth varying from 20 to 60 m. Such entirely rotten granite exhibits either the characteristics of a white or pink argillaceous mass, unctuous to the touch, or they are brownish in the gangue lodes.

The dark gray-green rock courses of dynamo-metamorphic granite stuff form the country rock for true quartz veins, trending either amidst them as fissure veins, or lenticular veins, or a network of veins, or on the contact between the gangue lode and the decomposed granite country; or the quartz vein runs sometimes, but rarely, through the granite country itself. Therefore, the quartz veins in the dark gray-green rock dykes extend conformably with them, also generally from west to east and mostly parallel to the bedding, sometimes slightly directed to the southwest or southeast, inclining more or less perpendicularly, or nearly so, sometimes lesser to the angle of 60° either to north or south, appearing in about fifty parallel vein systems. As the lode matter were later dislocated in the direction of the bedding or slaty structure, rarely also disturbed in a transverse direction, the gold-bearing

quartz veins traversing them, in coinciding mostly with the bedding, exhibit the same displacements.

The quartz veins in the rock lode, or the quartz blotches and lenticular strings or minor veins, all forming an object of mining, exhibit thicknesses varying from thin plates, a few centimeters thick, to 2 m., sometimes even 3 to 4 m. and more, when forked into a network of veins. The quartz in the veins differs in its character; it is either not transparent and high-grade gold-yielding, or transparent in the veins beneath the Oseika brook; the white quartz veins are of higher grade than the gray ones. Generally the vein quartz is grayish or greenish with included strings or nests of chalcedony, on some spots also calcite or chlorite filling sometimes, though sparsely, also the whole vein fissure. The quartz vein, with the accompanying chalcedony, contains in the vein matter inclusions of arsenopyrite, pyrite or pyrite mixed with chalcopryite, antimonite and also galenite, very seldom tetrahedrite.

Near the outcrop the quartz veins are cellular, sometimes spongy, containing disintegrated bleaked chalcedony, with products of decomposition of other minerals, as spotted with iron ochre, manganese ores, green and blue copper minerals (malachite and azurite), on places, also with pharmacosiderite and arsenosiderite, and even with small nests of embolite. Such tinged minerals are found also in the country rock, or the argillaceous mass formed out of decomposed granite.

The granite, decayed to an argillaceous matter, is mined on some places beneath the soil, mostly in the vicinity of the lode rock, as the strings and branches of chalcedony and quartz penetrating it are gold-bearing.

Generally the quartz veins are all resembling, but in some cases the principal vein lays in the contact between the lode stuff and the disintegrated granite, with a strike to even 3-4 km., or some thick quartz vein, in thickness to 3 m., divides into a network of strings; but the course of veins is mostly indicated by long lenticular quartz slabs, extending from 1 to 10 and more metres, and swelling up periodically from $\frac{1}{2}$ to $\frac{1}{3}$ m.; or they are thinning and then dying out in depth as well as in the strike to a mere joint; but in some distance new veins of the same character are again appearing. In some instances gold-bearing veins or lenticular veins are dislocated by their parallel barren quartz counters. Though the lenticular quartz veins thin out entirely, new ones appear again—though not in the same bedding slide—in another contiguous plane in the dynamo-metamorphosed lode rock.

The vein stone to the depth beginning with 20 m. to 50 m., and yet deeper—that means to the depth of the constant water level—is cellular or spongy quartz, with ochre impregnations or ochery spots in it, with free gold, either in visible granules or wire-like aggregates or thin sprinkles, or with invisible free-milling gold. The lode gangue, also the entirely decayed granite near the vein walls, contains also free-milling gold. The gold yield in the disintegrated quartz in the veins varies from 4 to 30 gr. in one ton; in aggregate the vein stuff contains 5 to 13 grams per ton.

Deeper down to the level of constant water the veins in their decomposed condition decrease a little in their yield of gold, which is attributed to the increased appearance of undecomposed chalcedony more than in the quartz and its ochers. The quartz and chalcedony in the veins afforded from 4 to 10½ gr. Au. in the ton, also a decrease in the yield as compared with the more disintegrated vein mass beneath the outcrop. Thus some stuff which gave 4 to 10½ gr. Au. in one ton left, when worked, about three-fourths of its bulk of chalcedony with a yield of 44 grains Au. in one ton. Some other chalcedony inclusions tested with a tenor from 40 to 400 gr. Au. in one ton, gave crushed, washed and amalgamated returns from 5 to 10 gr. Au. in one ton. Though the decrease of the Au. tenor with the appearance of more undecomposed chalcedony is evidently proved, the gold content is more constant and less fluctuating than in the uppermost more disintegrated portions of the quartz veins without the frequent inclusions of fresh chalcedony.

Yet deeper, also below the constant water level, the veins with the chalcedony inclusions carry granular portions of sulphureted ores either pyrite or arsenopyrite, while the free gold afforded by the washing and amalgamating operation from the quartz and chalcedony decreases to 8-4 and less grams in one ton. Sometimes the chalcedony forms only 4%, with 20 to 25 gr. Au. in one ton, of the vein stuff. In such depth, where the sulphureted ore begins to appear, the free gold is yet sometimes, though rarely, visible in thin splashes covering joints or slides in the vein stuff.

(To be Continued.)

TELEGRAPH and telephone poles are now being manufactured out of paper. The pulp from which these poles are made has mixed with it borax, tallow and other ingredients. It is then run into a mold with a central core and comes out as a hollow tube of the proper diameter and length. Before being erected the poles are given a coat of paint or varnish which makes them waterproof. They may be made fireproof by saturating with a solution of alum water.

Carbons for Diamond Drills.

Written by AMERICAN CONSUL FURNISS.

The State of Bahia is said to be the sole seat of the carbon industry. The carbons have been found for years; but there has been no market until the commencement of the present decade, when, on account of their hardness, they were sought by makers of diamond drills. As the demand grew greater the supply decreased and prices rose. The region in which they are found is in the interior of the State and is reached only after a long and tiresome journey. One goes from Bahia by boat to St. Felix, and then by rail to Bandeira de Mello. This is the edge of the diamond region, and carbons are always found near diamonds. The most productive region is further up the Paragassu river, and to reach it one goes overland by mule, following a rough and hilly pack trail for a couple of days. It is thought that diamonds and carbons are found all through this section; but, on account of the rude methods of mining, only the bed of the Paragassu and its tributary, the San Antonio, and the side of a range of mountains called Serra das Lavras Diamantinas are worked. The carbons are found in a kind of gravel called cascalho, and this occurs in the river bed beneath the silt and on top of a stratum of clay; in the mountains, beneath a stratum of rock and above the same stratum of clay; and in the surrounding country, beneath several strata of earth.

To obtain those in the river bed a place of not more than 20 feet in depth and where the current is not too rapid is selected. A long pole is then planted there and naked divers go down this pole, taking along with them a sack kept open with a ring. They first scrape away the silt and then proceed to fill the sack with the underlying gravel, removing all the gravel down to the clay. As soon as a sack is full the man above, in one of the native canoes made from a chiseled-out tree, is signaled to. The bag is raised to the surface with the aid of the diver below, taken to the shore, and dumped at a sufficient distance to prevent being washed away by any sudden rise in the river. This operation is repeated day by day for the six months of the dry season. At the commencement of the rainy season, when diving has to be suspended on account of the strong current and great depth of the river, the gravel is washed and examined for carbons and diamonds. The divers are quite skillful, and many of them can remain below for a minute at a time; there are some who stay as long as a minute and a half. Of course, the gravel becomes partly recovered by silt while they are at the surface, thus causing extra work, which would be avoided by more modern methods. Places where there is greater depth of river can not be worked at all.

The other method of mining consists in drilling through the rock in the mountain side, and by a series of tunnels removing the diamond and carbon-bearing gravel. It is piled up in the dry season and washed during the rainy season by conveying the water down the mountain side in sluices. The greater part of the carbons is found in the mountains, because they are more accessible here than in the river bottom. No mining of any consequence is attempted elsewhere than above stated, except along the river bank; and little is done there, because the water runs in as soon as the carbon-bearing gravel is reached, and with their rude methods the natives can not bail it out fast enough. The reason why no mining is attempted in other places is on account of the lack of water to wash the gravel after it has been raised. The idea has never occurred to them to use modern mining machinery, or, if it did, they have not the capital to invest.

Carbons are found in all sizes, varying from that of a grain of sand to one of 975 carats. This large one was picked up in 1894, on a road where the gravel formation was exposed, and was sold in Paris for 100,000 francs (\$19,300). The most valuable ones are those weighing from one to three carats. The larger ones have to be broken and there is always great loss, as they have no line of fracture. Thus the largest carbon found, after being broken into salable pieces, brought considerably less than 100,000 francs, the cost price.

About two years ago there was a local combination to keep up prices, but the chief promoter failed and there has since been no attempt to combine. The price that now prevails is due entirely to the great demand, small supply, and the laborious method of mining. The small supply is due to the crude methods. Frequently a pair of workers will obtain only three or four carbons as a result of their six months' work, and for these they demand and receive a good price. The large export dealers have their business here and agents in the mining region; but as the miners keep posted as to the market price, the dealers are little more than commission houses. The largest exporter in Bahia is Theophilo Gomes de Mattos, Rua Cons. Dantes. He has at present about 125 carats of carbons of well-assorted sizes, and will ship to the United States on the same terms as to Europe. He has never sold to the United States because the purchasers there insist on par-

tical sizes, and he can not sell picked stones, but an assortment, as he buys them, and for which there is always a demand. The price to-day is about \$5 per grain, making a carat worth \$22.50; but the price fluctuates so much that no definite information can be given. Another dealer in Bahia is Francisco de Mello & Co., Rua Cons. Dantes. They should be addressed in Portuguese or French, though the first named reads German.

Bahia, Brazil, Aug. 24th, '98.

The Use of Aluminum Alloys.

Aluminum bronze is an alloy of copper and aluminum, in proportions varying from 89 per cent copper and 11 per cent of aluminum to larger proportions of copper and so small a percentage as 4 of aluminum. This series is known as aluminum bronze and forms one of the strongest metals known to the arts. Owing to the large percentage of copper which this contains, however, it is not feasible to use this as a substitute for, or in competition with, brass and this metal is used principally where great strength is required, or where great strength and a non-corrosive metal are desired. Aluminum bronze probably is affected less by acid than any of the so-called "acid metals." This is also true of the action of salt water upon it. Aluminum bronze is also used for bearings where a good anti-friction metal is required.

In aluminum brass the percentage of aluminum which is used varies from $\frac{1}{10}$ of 1 per cent to a 10 per cent mixture. The lower percentage of aluminum in brass is used more particularly to give the brass additional fluidity, and, consequently, enable castings to be manufactured which will appear sharp and clean. Results can be obtained thus by the use of a very small percentage of aluminum, which it is impossible to obtain with the ordinary brass mixtures without its use. It is possible to use a cheaper grade of zinc when some aluminum is added and considerable strength is required, provided the zinc does not contain too much lead as an impurity. The presence of much lead in zinc, when the most inferior grades of zinc are used with aluminum, causes the lead to sweat out on the surface of the castings and discolor them.

The way in which aluminum is added to brass is to first make a mixture of aluminized zinc of some standard percentage. This aluminized zinc generally contains 10 per cent of aluminum, and is made by taking a plumbago crucible and melting in it one pound of aluminum. After the aluminum is melted, zinc should be added as fast as the molten metal will take it up, until all of the nine pounds have been added.

Then the crucible is removed from the fire, and the contents cast into molds of convenient form and size, which can afterwards be broken up; and this aluminized zinc is introduced into the copper with the other zinc, and in such proportions as will give the required amount of aluminum in the finished casting.

When aluminum is used, as previously stated, in small percentages, from $\frac{1}{10}$ to $\frac{2}{10}$ per cent—that is, from two to four pounds of aluminum to a ton of brass—its action is towards clearing the metal of impurities and giving additional fluidity, rather than giving additional strength, and it is not until one-half of 1 per cent is added that an increase of strength is secured in the finished casting. It has been found by careful experiment that the introduction of aluminized zinc in brass causes a much smaller loss in the zinc than if aluminum is not used; that is, it seems to prevent to a certain extent the zinc burning or volatilizing, should the metal become overheated—which is always the case to a certain extent, for it is never possible to weigh out of the crucible as much metal as has been placed in it originally.

Brass is now made and used in connection with acids, known as "acid brass," and contains copper, iron, lead and antimony. This, properly speaking, is more nearly a bronze than a brass; and it is possible to manufacture with copper, tin and a small amount of aluminum a brass which seems to be superior in withstanding the corrosion of most acids. The percentage of copper which is used is a little more than is ordinarily used, and the percentage of tin less.

Some large brass mills manufacturing sheet now use a small amount of aluminum in their sheet brass, and it seems to enable them to cast their ingots more perfectly and to roll not only a stronger sheet, but one with a more perfect surface than can be obtained without the use of aluminum. This whole subject, however, of the use of aluminum in casting brass is to a certain extent new to the majority of brass founders, and is little talked of by those who use it, for the reason that where they have secured advantageous results they have kept it to themselves to reap the benefits which accrue when there is close competition.

Copper melts at about 2000° Fahr., and if a small amount of aluminum, which melts at about 1200° Fahr., is introduced into a large volume of copper, it comes to the surface and is oxidized, and the full advantage effected by the aluminum is not felt. If any of the aluminum does oxidize, some remains in the brass or bronze, as the case may be, in the form of an oxide of aluminum, a white powder, which

will show out on the surface of the metal if it is turned to a finished surface, or if the metal is rolled into a sheet and then polished.

If, however, the aluminum is properly introduced, there is no reason it should be oxidized, and a perfect surface can be obtained, the finish on such a metal being of a high quality. It is to be noted, however, that it is not desirable to use aluminum in brass which is to be dipped, for the reason that the introduction of aluminum gives the brass an acid-resisting quality, and no matter how small a percentage of aluminum is used in brass, if it is intended for dipping purposes the effect of it will be quite apparent, and it is impossible to obtain such a finish as if no aluminum were used. But this very quality makes the presence and use of aluminum in brass particularly advantageous and desirable for any place where the brass must be used to withstand corrosive action, either from acids, water or salt air.

In making brass castings, owing to the additional fluidity mentioned above, it is possible to increase the number of patterns on the gate, where a lot of small castings are being made from one-third to one-half over what can be cast if no aluminum is present. This is one of the principal advantages and uses for aluminum in brass castings, where the aluminum is only used in very small quantities. The presence of aluminum in either brass or bronze tends also to change its color slightly. The larger the percentage of aluminum that is used, the lighter the finished article will appear.

In the case of aluminum bronze, 95½ per cent copper and 4½ per cent of aluminum will give a color which is almost impossible to detect from 14-carat gold. It is to be noted, however, that the addition of very much aluminum will materially increase shrinkage, and this should be provided for in casting work by using larger gates and higher risers.

In very small articles, the addition of aluminum has been found to be particularly desirable; for, owing to competition, the manufacturers of this class of goods have been obliged to use a poor grade and cheap quality of brass, and by the addition of a small amount of aluminum they are not only able to get a casting which is stronger and superior in quality, as far as actual strength is concerned, but they are enabled to cast more pieces from a single gate or flask, and consequently considerable time is saved in making up the moulds for such articles, the saving thus accomplished forming an item in the competition which is to be met, owing to the reduced foundry cost of the article manufactured by the use of aluminum.

It is to be noted in both the alloys of copper, zinc and aluminum, and also copper and aluminum, that the use of too much aluminum will give a very brittle metal. On the copper end of the series the dividing line between the strong and the brittle alloys seems to be exactly at the point where a very decided change in color takes place; that is, where the metal changes from the yellow color of gold to the white color of silver, and this change takes place in a mixture containing between 80 and 85 per cent of copper. Alloys which contain more aluminum than this, as, for instance, 25 or 30 per cent, become so brittle that they will break if they are dropped on a stone or iron floor, and the machining also becomes very difficult, as the metal chips and does not turn smoothly. In some special cases these higher alloys can be used—if no strength under a blow is required. They have a very hard surface and take an excellent finish.

It is also to be noted that with the use of very much aluminum—that is, for percentages from 1 to 2 per cent in either brass or aluminum bronze, the strength increases to a very noticeable extent on the second and third melting. This is accounted for by the fact that a more perfect alloy is formed between the metals and the aluminum on each successive melting. Taking, for example, ordinary castings of 90 per cent copper, 5 per cent tin and 5 per cent aluminum, on the first melting these are of about 41,000 pounds per square inch, ultimate tensile strength. These castings on the second melting are of nearly 43,000 pounds tensile strength.

Mixtures of 10 per cent copper and 10 per cent tin usually give only from 33,000 to 34,000 pounds as their ultimate tensile strength; and when these proportions are increased to 20 per cent of each metal the tensile strength is only about 2000 pounds, and the metal is found to be extremely brittle. The maximum shearing strength of the copper-aluminum-tin alloys is also about the point of the maximum tensile strength, that is, where there is from 5½ to 6 per cent of each metal present. The maximum tensile strength of aluminum bronze is at about the point when it contains from 1 to 10 per cent of aluminum.

It is to be noticed that the addition of about 6½ per cent each of aluminum and tin to copper increases the tensile strength nearly three times and makes it a very much harder and a denser metal, and consequently of more value in the arts.

NIKOLA TESLA announces the discovery of a method by which electrical energy in large quantities can be transmitted through the atmosphere without the use of wires or other metallic conductors.

Where Silver is Produced at a Cost of 23 Cents Per Ounce.

In the "Concentrates" column of the issue of October 1st, referring to the degree of perfection attained in the economical production of gold, it was stated that "in Mercur, Utah, gold is produced from the mine cheaper than silver can be there so produced." Under date of October 11th Mr. Wm. Orr of Salt Lake City, Utah, wrote correcting the statement, and saying that "from the majority of the mines in the Mercur district gold is produced at a cost of, approximately, \$8 per ounce, while at the Chloride Point mine, under the management of Mr. Gill S. Peyton, and by the use of the MacArthur-Forrest cyanide process, silver is being produced at a cost of 23 cents per ounce." The statement, published in the issue of October 22nd, attracted considerable attention, and, in response to a request for further information regarding so important an assertion, Mr. Orr, under date of the 31st ult., sends the following:

"Chloride Point ore is composed of altered cherty and shattered limestone, with which are associated the minerals calcite, barite and gypsum in quantity, and traces of galena, cerussite, stibnite, malachite, azurite and red oxide of copper. The silver is carried in very fine layers of chloride of silver in the cracks of the altered and silicified limestone. The milling ore carries no lead, but a considerable percentage of lead is found in the shipping ore. The copper minerals, although only present to a very limited extent, are always associated with the silver, and prove an excellent indicator of the rich ore. The method of milling is as follows: The ore is crushed to ¼-inch mesh and placed in the tanks (20 feet diameter and 8 feet deep), and there leached from seven to ten days with varying strengths of cyanide solution, the solution meanwhile being run through zinc shavings to recover the values. The first solutions drawn off the ore carry from 18 to 32 ounces silver per ton of solution, according to the value of the ore and the strength of cyanide solution employed, the silver contents of the solution gradually decreasing as the values are extracted and drawn off. By assay of the solution the necessary time for leaching is determined. The product from the zinc boxes is exceedingly pure, running from 800 to 945 fine, without any refining whatever. The loss of cyanide is approximately 2½ to 3 pounds per ton of ore. The extremely silicious character of the ore enables leaching at considerable depth (8 feet), and the occurrence of the silver as chloride in the fractures of the altered limestone gives the cyanide solution an excellent opportunity of acting upon it, and this is the principal reason which admits of the high silver extraction from this ore at such a low cost by the cyanide process."

California State Miners' Association.

From Secretary Sonntag it is learned that the annual convention of the California Miners' Association will be held at Native Sons Hall, on Mason street, between Post and Geary streets, in San Francisco, commencing Monday, November 21st, at 10 A. M. It is hoped that a large delegation from the different counties in the State will be present, as many matters now under way will have to be acted upon by the convention.

Accompanying the notification Mr. Sonntag writes expressing the hope that the miners of California will note the fact that, in view of the valuable work done by the association in past years and matters now pending in Congress, it is of importance that there be a large and influential attendance at the convention. He adds that, while at the present moment a political struggle is going on in this State, it is sincerely hoped that the miners will not forget this annual convention, for there is important legislation pending in Congress, and matters of importance will come before the Legislature which convenes in 1899.

"If we work in conjunction with other mining States, there is no question but that we will secure a Secretary of Mines and Mining in the Cabinet."

"It is now time that the county organizations be called together for the election of delegates and plans made for an important session."

Record of Good Work.

On the first and second pages of this issue appears a record of some good tunnel work this past summer in Calaveras Co., Cal., with practical details and comments by the manager, who, with characteristic modesty has little to say on his part in securing such results. Noticeable in the record is the progress made—over 10 feet per day—and the economy of operation. It is of interest, also, to note the comparisons instituted by Mr. Ralston as to the record and cost of such California work in '88 and '98.

THE former owners of the largest tinplate establishment in the world have disposed of the works at Swansea, Wales, and are about to establish a manufactory in the vicinity of Pittsburgh.

A New Assay for Mercury.*

By R. E. CHISM.

The dry methods of assaying mercury ores and other combinations of mercury all rest upon the volatility of this metal as a beginning. After the separation of the mercury in the form of vapor from the matrix upon which the assay is performed, the mercurial vapors are either condensed upon cold surfaces, or received upon a gold plate into which the mercury is absorbed. In the first case the product is recovered and weighed as metallic mercury in an isolated state. The distillation processes are practiced in either earthen or iron retorts, sometimes made of gaspipes or in other provisional ways, or in glass tubes and upon quantities varying from a kilogramme or two down to a few grammes. In any case the results of a distillation assay are sure to be uncertain and unreliable, through loss of mercury, for close work. There is a great deal of difficulty in sealing all the joints of the apparatus, so as to prevent the escape of mercurial vapor. The metallic mercury after condensation is, at least in part, divided into minute globules, which are very elusive and frequently include particles of dust or other foreign bodies. As a result the distillation processes ought to be, and probably are, relegated to the class of "rough tests," in which capacity they are very useful. The sight of the metallic drops has often loosened the purse-strings of the doubting investor. The production of mercury on a large commercial scale is well known to depend upon the utilization of ores of very low grade; and where this is practiced it long ago became necessary to discard the distillation methods of assay in favor of others that would give more exact results and admit of closer comparisons.

The substance which I use to receive the vaporized mercury is pure silver foil, 0.02 millimeter in thickness. At each assay I use a piece about five centimeters square, weighing about 0.6 gramme; it can be used three times, so that the cost becomes less than 1 cent per assay. For cooling the silver foil I use a silver dish of wide pattern, it holding a little more than 20 cubic centimeters of water and weighing, empty, 29 grammes. It is kept highly polished, especially on the bottom, to betray any particle of mercury that might soak through, during the determination, from the foil which is under it. However, this has not happened in a large number of assays, and is not likely to happen if proper care be taken in making the charge of ore. If it did happen, there would be no great harm done, as the mercury could easily be driven out of the dish by heat. This would involve, of course, the loss of that particular determination, which would have to be repeated with a smaller charge of ore.

As a retort, if I may call it so, I use a Battersea annealing cup, size C. This is a crucible of unglazed white clay, in the form of a truncated cone, 2 centimeters outside diameter at the bottom, and 3.5 centimeters diameter at the mouth; the height is 4.5 centimeters. The mouth may be ground to an even surface in any convenient way, but generally this is not necessary.

Heat is applied to the bottom of the retort during the operation. To prevent the direct heating of the upper part of the crucible and of the silver foil and cooling cup, I make use of a circular tin shield, 13 centimeters in diameter, which has a hole in the center a little less than 3.5 centimeters in diameter. The annealing cup will pass almost through this hole and will remain firmly fixed therein, with about 1 centimeter of its upper part protruding. The tin shield serves also to suspend the crucible and the rest of the apparatus from the ring of a retort stand. The annealing cup used as a retort is of indefinite duration. The tin shield costs practically nothing. For heating the apparatus I use a small gas lamp, which holds about 60 cubic centimeters of alcohol filled.

For a flux I use iron filings, the finer the better. Those I have in hand would go through a 60-mesh sieve. A long time ago I secured several hundred grammes of these filings, and prepared them for use as a flux by first lixiviating them with strong alcohol to remove most of the grease, and then igniting the filings by heating them to redness for some time in a muffle. The filings are preserved for use in a glass bottle with a rubber stopper. The cost of this flux is practically nothing. The charge for a mercury determination is from one-half to one gramme of ore. This is intimately mixed with five grammes of the prepared iron filings. The mixture is accomplished in the annealing cup itself by means of a spatula. About one gramme of iron filings is placed on the charge as a cover.

After the crucible or retort has been charged, as above described, it is hung by its tin shield from the ring of a retort stand. A piece of silver foil is then cut large enough to cover the mouth of the crucible and leave a good margin of, say, one-half centimeter all round. The foil is carefully smoothed, and then ignited in the flame of the alcohol lamp. Care must

be exercised, for the foil is so thin that it will fuse at once if allowed to overheat. After cooling sufficiently, under cover, the foil is weighed on an analytical balance and is placed upon the mouth of the crucible. It is then gently pressed down with the finger until it moulds itself to the shape of the mouth of the crucible. The cooling cup is then placed upon the crucible on top of the silver foil and is filled with water. The alcohol lamp is placed under the crucible and is arranged to give a flame about four centimeters high, which shall just barely spread out at its point over the central part of the bottom of the crucible. The heating should continue in this way from ten to fifteen minutes. Ten minutes is too short for most ores, and anything over fifteen minutes is apt to lead to loss of mercury. Over twenty minutes is, in most cases, fatal. The water in the cooling cup may be renewed once or twice during the

weigh to 0.1 milligramme. With the above apparatus a content of 0.01 per cent of mercury is clearly appreciable. The stain produced by that amount of mercury is plainly visible on the foil. Owing to the extreme flexibility of the foil, a number or a date can be easily marked with a blunt point of any kind upon the corner of any one of the pieces of foil, and this can be preserved for future identification. Some of these foils have been preserved in my laboratory for several years, and still show the mercurial stain without apparent alteration, and with no perceptible loss of weight. On carefully igniting the foil over an alcohol flame, the mercurial stain disappears, and the foil can be used for other determinations, probably for an indefinite number of times, if desired. This test for mercury, viewed as simply qualitative, is more positive and more easily applied than most of the qualitative tests given in the books

with which I am familiar. Any prospector provided with a few ounces of iron filings, previously ignited on a piece of iron over a stove, a small crucible or annealing cup, an ounce of silver foil, a copper cooling dish and a spirit lamp, can test his ores for mercury in a very easy way. When the spirit lamp is not at hand the necessary heat can be had from a lump of ignited charcoal.

The Golden Gate Park.

Golden Gate Park is the pride of San Francisco and the delight of all classes of its population—but it is far more than a municipal belonging. It is the Mecca toward which pilgrimages are made from all regions around the Bay of San Francisco. But the park extends its influence far beyond the bay region and visitors to the metropolis from all parts of California eagerly apportion a good fraction of their leisure time to the enjoyment of the city's pleasure ground. Thus the Golden Gate Park becomes, as it properly should, a California institution in which all its people feel a proprietary interest. Nor do State lines enclose its fame nor limit its influence. All tourists have heard of it in advance and are loth to leave its charming precincts. In fact, that park is known throughout the world and reflects credit upon California among all civilized people. The development of Golden Gate Park from an area of wind-swept, shifting sands is in fact one of the triumphs of modern landscape architecture and is so regarded by landscapists, nature lovers, artists and humanitarians everywhere.

The view upon this page represents a unique feature of park improvement—a



HUNTINGTON FALLS IN GOLDEN GATE PARK.

heating; possibly it would be well to use ice water for this purpose. Water at ordinary temperatures, however, has always given me good results. When the heating is finished, the crucible and contents are allowed to cool at least five minutes. When the silver foil is removed, a distinct mercurial stain will be seen upon its lower surface, if there was the slightest trace of mercury in the ore. The amount and depth of this stain is a rough indication of the amount of mercury in the ore. The foil is conveyed, under cover to avoid dust, to the balance. The increase in weight of the foil shows the amount of mercury absorbed; and a simple calculation gives the amount of mercury contained in the original charge of ore. In order to check the first determination, and to make sure that all the mercury has been collected, I repeat the heating on the same charge for about ten minutes more, and then weigh again. If the weight is constant, or there is a slight decrease, the amount of mercury obtained by the first weighing may be considered correct. If more mercury has been absorbed on the second weighing, I repeat the determination with a new charge and heat for a longer time, say, from five to ten minutes longer, than at the first heating.

I use a Kohlbusch analytical balance, which weighs down to 0.05 milligramme; but I generally only

waterfall which is wholly a work of art, believed to be the only artificial waterfall in a public park on the continent. The basis for it was a sandhill practically devoid of rock or tree or shrub, everything shown in the engraving which ministers to beauty and realistic effect had to be hauled and constructed or planted to produce the waterfall. Even the water has to be furnished by pumping, for there is no flowing water in the park.

The war just ended was the first in which modern steam vessels have had a thorough trial, says Chief Engineer Melville in his annual report. He also says there was a remarkable absence of casualty in the machinery department of the fighting squadron during the war, but the torpedo boats could not show the excellent record. The report says: "It is a sad state of affairs that nearly every one has had some accident; and the machinery of some, at the close of the war, was in a condition that can be described as horrible. The boilers were burnt, the cylinder covers broken, the pistons and valves stuck and everything was in bad shape. This condition of affairs seemed attributable to two causes—the absence of trained engineering supervision and the handling of boats for duty, for which they were not intended."

*Transactions of the American Institute of Mining Engineers, Buffalo, N. Y., meeting, October, '98. Condensed.

The Refining of Base Lead Bullion Contain-
ing Silver, and High in Gold.*

NUMBER I.
By G. H. BLAKEMORE.

The operation of refining base bullion may be di-
vided into the following heads :

1. Softening.
2. Extracting the gold and silver from softened bullion.
3. Refining the desilverized lead from (2).
4. Liquefaction of gold and silver crusts obtained in operation (2).
5. Retorting the residue from (4).
6. Concentrating and refining bullion from (5).
7. Parting Dore bullion from (6).

Softening Process.—The end in view in this process is to remove all deleterious metals from the bullion. These undesirable impurities may be copper, arsenic, antimony, tin, tellurium, bismuth, sulphur, iron, etc. The elimination of these at the beginning of the process both cheapens and hastens the desilverizing and deaurumizing process, and they must also be ex-
tracted before the finished product of lead is fit for the market as "soft lead," to be afterwards used in the manufacture of pipe, sheet, tea lead, etc.

In a customs smelting works every possible impuri-
ty may be present in the base bullion produced from the blast furnaces, for the simple reason that smelt-
ing works of this class get all ores which mine own-
ers find unprofitable to work themselves on account of their base and refractory nature, with occasionally a little "good" ore. The latter supply is, however, a very precarious one, for if any considerable body of it is developed in the mine it comes from, the share-
holders always hanker after works of their own; whether it will pay or not is seldom a matter that is considered by them, and the unfortunate manager is worried into erecting them. So, therefore, although the customs smelter is a little uncertain about his "good" ore supplies, he never has to worry himself about his base ore supplies. He will get them!

The operation of softening the bullion is, then, one which takes considerable time when base or dirty bullion has to be worked.

The work is done in reverberatory furnaces. In small works one furnace of a size suitable to the out-
put is used for the whole operation of softening, but in large works, where not less than 500 tons of base bullion are treated weekly, two furnaces are used, each from forty to fifty tons capacity, according to circumstances. The first furnace is then used to ex-
tract the copper (arsenic and tin, if any). When the lead is free from these metals it is run off into the second furnace, where the antimony is taken out. Considerable time, and therefore expense, is so saved, but, as before hinted at, it would not pay to do this in works producing only fifty to seventy-five tons of base bullion weekly. If it were done there could be no continuity of work, as the softening fur-
naces would handle the lead faster than it was pro-
duced, and as a result the stoppage of refinery for a time and the loss of skilled hands, the latter not be-
ing a pleasant matter for the metallurgist in charge! At the end of every "run" the bullion would have to be allowed to accumulate again, and accumulation of valuable bullion absorbs too much capital; it is more than doubtful if the interest on the capital so locked up would not amount to more than the saving ef-
fected by using large softening furnaces. Hence, in works having a small output of lead weekly, the plant must be designed to fit, and this article is meant to deal with the conditions ruling in works with a small output of base bullion.

With an output of up to eighty tons weekly, softening furnaces of about fifteen tons capacity are large enough. The sides and ends of these furnaces are usually surrounded by a 2-inch water space, which extends some 2 or 3 inches above the level the charge stands at inside the furnace, but need not extend much lower than 6 to 9 inches below the level of the charge. If the brickwork is well laid in the pan (joints as close as possible) there need be no fear of the lead breaking through below the jacket, and as the water-jacketed belt on the pan holding the brick-
work extends above and below the limits of the level of the lead there cannot be any breakout there, for the erosion of the brickwork can only go to a certain depth, as it is then stopped by the cooling action of the water jacket. It is advisable to use bricks on end at the level of the lead, so built in that when the furnace is full the lead is about 1 inch down on the 9-inch faces of the bricks. This allows the lead to sink in the treatment process some 8 inches before its level reaches a horizontal joint.

At the skimming doors the water-jacketed belt is recessed down to the level of lead. The walls of the furnace need only be 9 inches thick. At the skim-
ming openings the brickwork is sloped away on each side to allow the tools to reach as much of the sur-
face of the lead as possible, and it also slopes down below the lead on the bottom edge of the door to make it easier to skim off the slag. The doors are simply plates of cast iron, sliding in a frame and counterpoised with weights. The brick bottom slopes to the tap hole so that all the lead will run out when required. At the tap hole end of the furnace

the water-jacketed belt comes down to below the tap hole which is pierced through it. Portion of the water required by the jacket is fed immediately under the tap hole so as to make sure of it being kept quite cool when the furnace is full of red hot lead. Before charging the furnace the tap hole is filled with a plug of fireclay, and the latter is held from being pushed out by a 1/4-inch iron plate fitting into grooves cut in the launder or spout which carries the lead to the zining or desilverizing kettles. It is apparent that the security of the stopping-in of the tap holes is very important.

In some refineries where the softening furnace is not fully emptied of its contents, a different arrange-
ment for the tap hole is used. The main water jacket is extended down in the same manner as be-
fore described, but it is pierced with an 8 or 9-inch circular hole; through this a water-jacketed tuyere 9 inches long is passed and fastened in place, clay being well rammed in between it and the bricks on the inside of the furnace to stop up any space left. This tuyere has a separate water supply, and the opening through it into the furnace is about 2 inches at the outside and may taper to 1 1/4 inches or less at the nose. To close it, a soft pine plug 12 inches long and properly shaped to fit the hole is driven in tight. The constant stream of cold water circulating in the tuyere prevents the hot lead from burning out this plug. When the furnace has to be tapped a hole is bored into the wooden plug for a distance that expe-
rience teaches is safe, and a few blows of a thin bar passed into the augur hole will let the lead flow. A fresh wooden plug is used at each stopping. With this kind of tap hole accidents happen occasionally at the tapping; the workman bores the augur too far, and before the iron launder can be put in its place a spouting stream of red hot lead comes rushing out of the furnace. Of course, no one can get near it and the result is that the whole contents of the furnace run all over the place, causing delay and expense in cutting up the lead in sizes fit to handle to remelt it. Everything must necessarily be of iron in the immediate vicinity—posts, floors, etc., or else such an accident would result in the destruction of the plant.

The Work of Softening.—The furnace is charged im-
mediately the previous charge has been tapped into the desilverizing kettle. The bullion may be put in at once, or in several portions, it matters little which method is followed; it is melted down very slowly: sweated down describes the operation per-
fectly. In this way the more infusible copper-lead alloy separates out and floats on the bath of lead which has formed underneath it; the dross is stirred up with a two-pronged rake every few minutes to expose fresh surfaces to the heat, and so get as much lead as possible melted out of it. If the fur-
nace is overheated in this operation some of the dross is melted into the lead again, and will not sepa-
rate out unless the furnace is chilled down. An ex-
cess of fine coal used in the attempt to "dry" the dross, i. e., expel the lead, will create too much heat, and with the reducing action of the carbon the same result happens. The effect of copper being left in will be shown later on. No matter how carefully the work is done, however, some copper always remains in the lead, but not in a sufficient quantity to do much damage. The time absorbed in the charging of the furnace, sweating the bullion down, drying the separated dross and skimming it off, occupies from five to eight hours, according to the amount of cop-
per present in the bullion being purified. The dross skimmed off is dropped into a slag pot, with a hole bored in it about 6 inches from the bottom. Consi-
derable lead is usually withdrawn with the dross. When full of skimmings the slag pot is wheeled over a couple of moulds and the lead poured out through the hole. This lead is returned to the charge in the furnace and the dross sent to the blast furnace for retreatment.

A series of assays of copper dross, with the assays of the bullion from which it was produced, are as follows :

| No. | Bullion Assay Per Ton. | | Copper Dross Assay. | | | |
|-----|------------------------|----------|---------------------|----------|----------|-------|
| | Ag. Ozs. | Au. Ozs. | Pb. % | Ag. Ozs. | Au. Ozs. | Cu. % |
| 1 | 143.03 | 12.25 | 63.10 | 67.36 | 6.00 | 5.1 |
| 2 | 168.68 | 12.00 | 66.06 | 53.46 | 5.66 | 3.8 |
| 3 | 117.49 | 12.92 | 60.70 | 41.31 | 1.32 | 1.8 |
| 4 | 118.04 | 12.48 | 69.10 | 39.86 | 1.32 | 1.5 |
| 5 | 121.16 | 14.78 | 73.50 | 60.66 | 1.49 | 3.6 |
| 6 | 105.30 | 11.28 | 54.10 | 38.24 | 0.54 | 1.9 |
| 7 | 117.42 | 13.52 | 72.70 | 53.67 | 3.53 | 3.9 |
| 8 | 114.08 | 11.95 | 76.80 | 52.40 | 4.92 | 6.4 |
| 9 | 81.12 | 6.61 | 67.60 | 43.77 | 6.76 | 1.8 |
| 10 | 115.30 | 11.26 | 60.70 | 37.86 | 6.78 | 3.3 |
| 11 | 148.54 | 16.94 | 68.80 | 58.14 | 5.86 | 1.5 |
| 12 | 220.02 | 21.98 | 73.50 | 62.24 | 6.48 | 1.4 |
| 13 | 179.40 | 42.28 | 82.40 | 60.96 | 10.00 | 1.5 |
| 14 | 139.32 | 16.08 | 62.40 | 35.56 | 16.00 | 6.1 |
| 15 | 340.04 | 37.38 | 62.20 | 87.34 | 8.40 | 1.9 |
| 16 | 157.34 | 16.52 | 70.80 | 28.98 | 2.86 | 1.4 |
| 17 | 141.53 | 14.30 | 71.00 | 31.20 | 3.36 | 1.1 |
| 18 | 121.74 | 12.94 | 78.40 | 53.08 | 6.00 | 1.6 |
| 19 | 132.72 | 12.90 | 76.10 | 60.06 | 7.50 | 1.7 |
| 20 | 246.38 | 24.04 | 60.80 | 114.14 | 20.44 | 9.3 |
| 21 | 154.52 | 13.34 | 75.10 | 48.56 | 5.44 | 2.6 |

From these assays it will easily be seen that two conditions decide the gold contents of the copper skimming, first, the assay of the bullion, and secondly, the copper contents of the dross. When both are combined, as in assays Nos. 14 and 20, the amount of gold and silver withdrawn in the dross is

rather serious, and it cannot be avoided in any way. I say serious, because after having gone to the ex-
pense of getting the gold into the bullion in the blast furnace operation, it is expensive to send it through the blast furnace once more in the copper dross.

Immediately the lead is skimmed clean of copper dross, the heat is raised considerably. Very soon a tin and arsenic skimming begins to appear. Its ap-
pearance is altogether distinct from the half pasty, black, copper dross; it is quite dry and resembles particles of clay, etc., which might have floated up off the bottom of the furnace. In an hour or so, this tin-arsenic dross may be skimmed off. It contains a little copper and the amount of tin in it (generally derived from the scrap "tin" used in the blast fur-
nace) is not worth saving; it may be weighed and put with the copper dross for retreatment in the blast furnace. Usually there is very little of this product. If the copper dross weighs a ton, the tin skimming may weigh a little over 200 lbs. After the tin skimming is removed the heat is further raised and occasionally a second tin skimming, small in quantity may rise. It is skimmed off and put with the other drosses. On further raising the heat, antimony begins to appear in black, boiling, oily drops, in time gathering together and forming one sheet all over the face of the lead. As the extraction of the antimony depends on oxidation, it is not ad-
visable to let too thick a coating of the antimony dross form. Therefore as soon as the face of the lead is covered with about half an inch of skimming, the fire door and the furnace doors are opened to cool off the furnace, and some slaked lime or ashes are thrown into the furnace on top of the oily slag of an-
timony. If this is stirred in with a two-pronged rake the antimony soon thickens up, and may be skimmed off easily and with a minimum loss of lead, using, of course, a perforated, rectangular skimmer. Time is also saved. After the first antimony slag has been taken off, the fire is urged once more for about an hour to two hours, the charge being well "worked" or stirred every fifteen minutes, and then another skimming will have formed and is removed in the same manner as that already described. As many as nine antimony skimmings may come off a fifteen-ton charge if the bullion is particularly dirty. The great point to bear in mind is to constantly stir the charge up, so bringing fresh surfaces to the air and hast-
ening the oxidation of the antimony. Steam deliv-
ered from a nozzle, or compressed air, is also used in some works for the purpose of hastening on the antimony separation. I have used steam, and my experience is not a satisfactory one. It certainly hastens the oxidation, but the spray of small drops of lead and skimming beating on the roof and sides, and the waves on the face of the lead caused by the jet of steam or air impinging on it, cut away the brickwork in disastrous fashion.

When the workman wishes to see how the elimina-
tion of the antimony is progressing, he takes samples of the skimming from time to time with an iron ladle about half an inch deep and an inch and a half wide. On letting the sample set hard it is broken in half; if the fracture shows a black, vitreous appearance, it indicates plenty of antimony yet in the charge. Later samples will look less black, and finally in the center of the sample a few tiny, yellowish streaks may be seen. This is the first appearance of litharge and also an indication that the charge is nearly "cooked." The next skimming will usually bring the charge ready for a litharge skimming to be "run." When this begins to form the lead gets a dappled appearance on it. It appears to form first immediately under the bridge. It melts like oil but shows the dappled look, and, if closely watched, the molten streak will be seen to pass right down the furnace to the flue end, and then come back up the furnace again. The litharge sets behind the streak as it goes down and up. By the time the streak of molten litharge comes back to the bridge, the skim-
ming of litharge will be a little over a quarter of an inch thick. A sample is taken out on a paddle and when cold is broken to see its appearance. If the antimony is all out the fracture should be quite yellow and the grain or crystallization of litharge long; a short grain indicates impurities still left in. In the latter case a second litharge skimming is some-
times "run." When the charge is clean the doors are thrown open to allow it to cool down to the cor-
rect temperature for tapping into the kettle.

| ASSAYS OF ANTIMONY DROSS PRODUCED IN THE SOFTENING PROCESS. | | | | |
|--|---------|-------|---|-----------------|
| Ag. Oz. | Au. Ozs | Pb. % | Pb. in metallic form included in previous column. | Sample of tons. |
| 15.24 | 1.70 | 48.20 | 1.8 % | 2.90 |
| 15.81 | 2.17 | 47.40 | 1.2 | 30.00 |
| 13.43 | 1.46 | 47.40 | 1.2 | 34.00 |
| 12.91 | 1.41 | 51.80 | 1.2 | 30.00 |
| 15.87 | 1.85 | 51.40 | 2.0 | 40.00 |
| 16.47 | 2.08 | 48.20 | 1.4 | 15.00 |
| 18.27 | 1.94 | 48.70 | 1.3 | 18.00 |

It may be added that the addition of litharge obtained at the end of the softening of the base lead and from the cupel furnaces considerably assists the production of antimony skimmings.

(To be Continued.)

* Australasian Institute Mining Engineers.

An English Colliery Ventilating Engine.

By way of variety is herewith reproduced from the *London Engineer* an illustration of an English ventilating engine, said to be the largest in use, and in operation at Garswood Hall colliery, Brynna. Its ventilating capacity and that of the fan is 500,000 cubic feet of air per minute, with 6 inches water gauge.

The machine is a two-cylinder compound condensing engine, stroke 5 feet. The high pressure cylinder is 26 inches in diameter, the low pressure 48 inches in diameter, steam pressure normally 100 pounds (probably the gauge or boiler pressure).

The engine is of the ordinary slide-valve type, fitted with expansion valves, in both the high and low pressure cylinders. These valves change the cut-off while the engine is at work and are in frequent use in England. The builders of this engine consider slide-valve engines preferable in mine ventilation, on account of their simplicity, reducing the liability to break down.

The engines are connected so that the cylinders may be operated separately, as simple engines; but if the low pressure cylinder is required to work alone the steam pressure is expected to be reduced through

admits steam through the opening in the center of stem of valve *C* to expansion chamber, where it acts upon the piston *D*, the area of which being larger than that of valve *C* forces same from its seat, and allows the steam to pass through the valve. As long as the auxiliary valve *A* is held open, the main valve *C* will be kept off its seat, and the valve will be open. When the pull on the lever is released the pressure of the steam closes the auxiliary valve *A*, and the main valve *C* closes easily and without shock or jar, as the steam which is entrapped in the expansion chamber tends to cushion and retard its movement. There is very little wear on the two valve seats, and they can be easily reground by taking off cap at end. These whistle valves are made by the Lunkenheimer Company, Cincinnati, O.

The Study of Coast Weather Conditions.

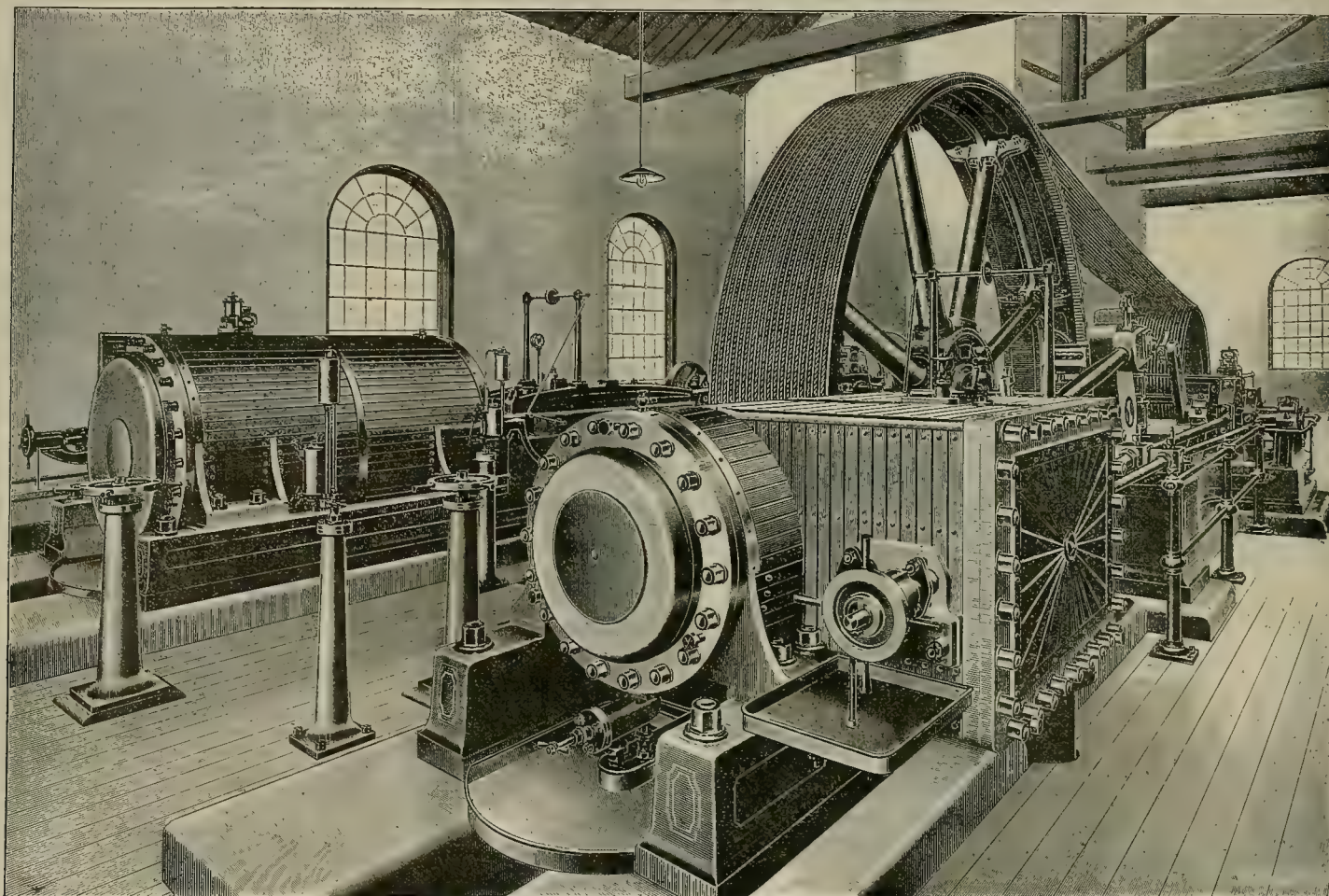
Written for the PRESS by L. E. BLOCHMAN.

Origin of the Weather Bureau.—Observations on the weather are more common, though less definite, than any other science. The results of accurate weather forecasts are of more intrinsic value than almost any other subject, but the subject does not receive its just attention from the Government to

at Washington, whence the name "Signal Service." It was only in the early '70s that sufficient data had been accumulated to justify the Government in maintaining a regular corps of observers and in establishing a permanent weather bureau. Since that time slow but very steady growth has been made.

Local Weather Forecasts.—The weather on this coast has idiosyncracies of its own, certain characteristics, on account of the influence of the Japan current and our mountain barriers, that make it essentially different from Europe or the States east of the Rockies; it is, therefore, a study by itself. The Signal Service charts the coast twice in twenty-four hours, through telegraphic communications from the several Government weather bureau stations. From these reports, of barometer-thermometer-wind-and cloud conditions, prognostications of one to two days are made by the two head officials west of the Rockies—one in San Francisco and one in Portland. The accuracy of their predictions depends on experienced observations and also on the number of stations that the Government makes available.

Some Rain Conditions.—Rain-bearing areas are borne in upon us from the Japanese current. In summer these strike way into the northward, and we do not feel their influence. In winter and spring

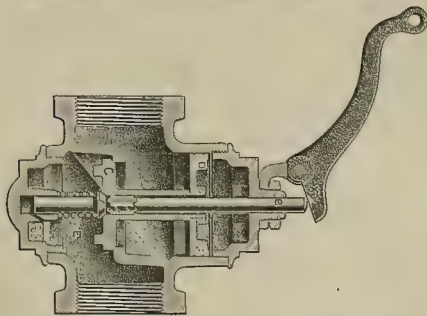


ENGLISH COLLIERY VENTILATING ENGINE.

a reducing valve. The fan is 30 feet in diameter and 9 feet wide across the vanes, and is driven by ropes from a 24-foot fly-wheel.

Automatic Balanced Whistle Valve.

In the Lunkenheimer automatic balanced whistle valve the disc is balanced and closes firmly without



shock or jar. In opening, the steam pressure acts upon the valve disc in such a manner that the disc is raised from its seat almost automatically.

Reference to the sectional cut will show its operation. The steam pressure on top of disc *C* normally holds it to its seat. A slight pull on the lever *X* is sufficient to open the small auxiliary valve *A*. This

the civilian. As late as 1855 nothing was known about scientific weather predictions. In that year of the Crimean war a fearful storm raged in the upper Black sea. It made havoc with the English shipping at the memorable siege of Sebastopol. But the then remarkable fact was observed that a day or two before an equally destructive storm struck in from the Atlantic and crossed over France. The storm that entered France was the identical one that afterwards, traced over the intervening land, was the fatal Sebastopol storm, and which, had the nature of storms been known, could have been forecasted. This was an eye-opener to the French savants. They traced up the storm by its moving low barometer area with high barometers preceding and succeeding it, and by the clouds and the changeable winds that were influenced by its movements. Thus began the scientific study of weather conditions. After observing certain invariable conditions that preceded these storms, they could forecast them several hours and finally a day or two ahead and warn people of their approach. Gradually other weather conditions were studied, other governments also entered into it, and predictions became accurate enough to be the basis of an exact science.

Our country, however, was rather later in the study and forecast of weather conditions. Following our Civil War, in the '60s, some few signalling officers were retained at certain stations to take weather observations and to report these telegraphically to one of the War Department headquarters

these storm areas usually strike in from Vancouver to northern California. Their usual trend is ther eastward; but when high, or resistant, barometers hang over the mountain and plateau regions, these storm areas are subject to deflection, and they trend down the coast. How far down the coast they will trend, is the question.

The firmness, or the yielding, of the high barometers over the plateau region now figures as the determining factor of the trend of these storms. There are a great many other factors about the storm area. It may have flattened out before reaching the coast and strike in more directly at a lower point as well which is foretold by the action of barometers adown the coast. It may also be reflected back again on the ocean and come in at a lower or a higher point referring to this peculiar condition that took place on the 25th and 26th of Sept., '98. These reflected storms are not at all uncommon up north, but they are very uncommon below the central part of the State, when accompanied by such heavy rainfalls.

Tracing Up an Early Storm Area.—The Weather Bureau does not consider any distant forecasts official. To myself, who have observed weather conditions in this one locality for seventeen consecutive years, the action of the weather from the middle of September till December is an instructive study. The first rains south are of particular interest. Eventually, as data accumulates, they may have considerable future weather forecast value.

We will follow up the first storm that struc

southern California this season. No heavy rain-falls usually trend down south till the latter part of October, and more generally not before November. They are also usually deflected down the coast, trending down with diminishing rainfall. But the storm area of Sept. 25th and 26th had a different course. About the 20th of September the first storm area of this season struck the Oregon coast; hung on over Washington and Oregon for a few days, making but a slight deflection towards northern California. Three days of south winds in California told of the influence of the storm, with rather light rains in the northern half of the State. By the 24th its influence had passed away; with depleted moisture it was passing over the mountain regions toward the east. But on the wake of this storm another seemed to follow. As the next storm approached the Oregon coast it hesitated on its course. This was told by the barometer which had been falling and then abruptly stopping short. The Weather Bureau noticed this and knew from previous observations that the storm would then be reflected back again on to the ocean, divided up and later at some other points. But they did not know where; nor is it to be wondered at. The storm area struck in centrally half way between San Luis Obispo and Los Angeles, and there is not a single weather bureau station between these two points, about 300 miles apart. The main part of this storm area in being reflected back became contracted in width, with the usual result of giving an intensive rain along the center of its course and little or no rain at 40 miles on either side. In January, 1894, we noted one of these contracted storm areas strike Sonoma county centrally and give a precipitation of 10 inches, causing creeks to overflow and a serious railroad accident. In San Francisco, within 40 miles, the rainfall had decreased to about one inch.

This last September rainfall struck southern Santa Barbara county centrally, took a northeasterly course and spread out a little more and afforded heavy rains for northern Kern, Tulare and a part of Fresno counties, passing thence due east over the mountains. At San Luis Obispo the rainfall was only .20 inch; at Santa Maria, thirty miles south, 1 inch; around Santa Barbara town 3 to 3½ inches was lodged; at Ventura a great deal less; at Los Angeles, nothing. In parts of Tulare county over 3 inches was reported, almost as much as the whole of the previous dry season. The impulse of the storm forced this extraordinary rain for even the drier interior.*

The single inferential value of this peculiar storm that such heavy early rains do not occur in southern California in drier seasons. On the other hand, when these storms come in thus early in the season, there is quite an interval before the regular rains set in, and which we may now look for.

We are also citing the history of this storm for another purpose—to evince the neglect and indifference that scientists show toward the study of meteorology. Every flower and plant that is seen is catalogued and scientifically described; every new chemical combination, even of indifferent value, is carefully noted, catalogued and accounted for. The same minutiae applies to every other science except meteorology, or rather that particular branch of it which refers to the climatology of this Pacific coast. Even the Weather Department is too conservative study recurring weather conditions with reference to distant prognostications. Before the middle of this century it was considered entirely unscientific to predict weather twenty-four hours ahead; now it is found to be a real science, and the certainty of predictions is with the accumulation of facts steadily increasing.

The Possibility of Distant Forecasts.—We realize that there are too many uncertainties entering into distant weather forecasts to as yet afford any scientific accuracy. But we must recollect that all science is at first tentative—mere theories for a few facts or for a few observations that seem at first but slightly related. Years of casual observation of weather seemed to me, after all, barren of results, but within recent years by observing the barometric character of weather, summer as well as winter, together with other observations, a few salient characteristics of wet and dry seasons are shaping themselves. When these characteristics shall have been accurately enough ascertained, their prevalence will be a determining factor as to the general shaping of the season—wet, average or dry. But the problem is not so simply disposed of. Let us illustrate: Barometric conditions for November and December, '95, were similar to those of November and December, '97, and the weather at first acted much the same for both seasons. But in the middle of January, '96, the weather changed and a heavy storm area entered central and southern California, which changed the "phase of the weather," but no such change came over the past year. This "change of phase" is the unknown element in weather predictions. It is as yet the unknown quantity that perplexes us for a solution.

We are just now on the threshold of investigating

distant prognostications, where the French scientists were in 1854 regarding immediate forecasts.

Meteorology and climatology are the latest of the sciences in progress of development. There are so few votaries of the subject and so few facilities for study, and the problems presented are so difficult, that but few enthusiasts will give the subject any attention.

There is, however, one element in our favor, the comparative placidity of the broad Pacific and its atmosphere, in which both our storms and calms originate; also our northern and eastern encircling mountain barriers, warding off the uncertain effects of northern colds—always an unknown factor East. We are conditioned by the direction and temperature of the Japan current, which can now probably be studied months ahead on the Alaskan islands. We have yet to determine what is summer normal, barometrically and otherwise. Suffice it to say just here that last season a different barometrical condition prevailed in Oregon last July and August from what has prevailed this season. Therefore the pulse of our ocean atmosphere has to be determined before we can begin the solution of this difficult problem.

A Little Bunch of Questions.

An average of 100 different questions are received by the MINING AND SCIENTIFIC PRESS every week. Some are answered in "Concentrates," more by mail; others are impossible of satisfactory answer. The following letter illustrates how they come. It is printed just as received:

(1) Given a belt moving rapidly, generating considerable electricity, where are the points of greatest difference of potential—near the pulleys or not, inside the belt or outside?

(2) What title have the owners of the oil wells described in the issue of Oct. 15th?

(3) Is there such a thing as a premium on gold bars above a certain fineness?

(4) Have you ever published a form of working bond?

(5) Did you know that a not unusual temperature here in summer is 123° in the shade?

Hedges, San Diego Co., Cal., Oct. 24th, '98.

Answers.—(1) Midway between the pulleys; on the inside of the belt.

(2) Titles to the Summerland oil field: Above ordinary high water mark is part of the pueblo lands of Santa Barbara, Cal., patented to the city of Santa Barbara and now owned by a number of people. Between ordinary high and low water mark, being the sandy beach of Santa Barbara channel, belongs to the State of California. We do not believe the State has passed any act by which private individuals can acquire the title to these lands for mining purposes, but suppose the party in possession can maintain the same as against any other party except the State. Below low water mark belongs to the United States, and it is presumed it is in the same situation and is governed by the same conditions as the property of the State as given above.

(3) No.

(4) On page 354 of the issue of May 2, 1896, appear three elaborate blank forms of mine working bond.

(5) Yes.

Gold Nuggets From Mexico.

W. S. Keyes who recently returned to San Francisco from a professional visit to Mexico, brought with him photos of two gold nuggets from which the



engravings herewith presented were made. They are from the placer ground of Felton Bros., five and one-half miles from the bank of the Sinaloa river, near Bacubarito, Sinaloa, Mexico, seventy miles from the Gulf. The smaller weighs 21 oz., the large round one 33 oz., worth \$18 per oz. The Felton Bros. have there 1600 pertenencias of 2.47 acres each. The river there makes a fourteen-mile loop, the distance across its narrowest part being but 750 feet, and over 100 men are making good wages with dry washers, besides the force of men tunneling to bottom the channel.

Questions and Answers in an Assaying School.

Written for the MINING AND SCIENTIFIC PRESS by O. H. PACKER.

Noting a discussion in some Eastern mining journals on the subject of "competency of practical assayers" vs. "students of assaying in our schools of assaying," I was led to make comparisons myself. A number of men with whom I conversed, and who called themselves assayers, were devoid of knowledge of the chemical properties of the fluxes used in assaying and of the reactions taking place in the furnace. My students have frequently checked the work of the Selby Sampling Works, agreeing within a few cents. I append a set of examination questions given at the end of a two months' course in assaying. The answers were by N. Peart, a student, who had no previous knowledge of chemistry or assaying:

Question 1.—Name the fluxes and re-agents used in the fire assay, giving the action of each.

Ans.—The chief fluxes and re-agents used in the fire assay are, (a)—Litharge (PbO). This is used in the crucible assays of gold and silver ores and is composed of lead (plumbum) and oxygen, one part of each. It is used to supply lead. The litharge on being fused in the crucible gives up its oxygen which unites with other metals as iron, copper, manganese, zinc, tin, etc., converting them into oxides, and these oxides being more fusible than their corresponding metals are slagged off with the gangue. The lead on being freed from its oxygen is distributed throughout the crucible, absorbing the precious metals, as gold and silver, sinking with them to the bottom. Thus, litharge serves two purposes—an oxidizing agent and taking care of the gold and silver.

Litharge contains 93% of lead.

(b)—Granulated lead is used chiefly in the scorification assays of gold and silver ores. In the scorifier a part of the lead is oxidized and volatilized. The volatilized lead takes with it particles of copper, arsenic, antimony and tellurium. Thus, a particle of any of these metals may be mechanically carried off by two particles of lead.

In this case, as in the case of litharge, the lead cares for the gold and silver.

(c)—Bicarbonate of soda (NaHCO₃).

This is ordinary bicarbonate that is bought in the stores and can't very well be done without in the crucible assays of gold, silver and lead.

Carbonic acid is H₂CO₃, and the sodium only takes the place of one atom of H in the acid. This is an oxidizing agent, that is, it gives up its oxygen to other substances, converting them into oxides. It is also a basic flux, requiring an acid to form a fusible salt. For instance, it would form with silicic acid a salt called silicate of soda. It is also a desulphurizing agent, i. e., takes away the sulphur from its combinations to form sulphate of soda. It also makes a thin slag and helps to keep the side of the crucible clean.

(d)—Carbonate of potash (K₂CO₃). In this case the potassium takes the place of both atoms of hydrogen. This has the same action as NaHCO₃, oxidizing, basic and desulphurizing.

(e)—Borax (Na₂B₄O₇).

This is the ordinary borax glass minus its water of crystallization, which is from 30 to 47%.

This is used in both the crucible and scorification process for gold and silver ores and also in the lead assay.

This is an acid flux, that is, it requires a base to form a fusible slag. Ores containing a large percentage of basic gangues, as lime, heavy spar, fluor-spar, magnesia, baryta and alumina require a larger quantity of borax and silica to flux them.

(f)—Silica (SiO₂). This is also an acid flux and as the percentage of base material in an ore increases so should the quantity of silica be increased in assaying it.

(g)—Nitre (saltpetre, nitrate of potassium or potassium nitrate KNO₃).

An oxidizing agent; basic flux and a desulphurizing agent.

(h)—Charcoal is a reducing agent. Consisting mostly of carbon, it reduces the litharge to lead and neutralizes the action of oxidizing agents. One part of charcoal reduces from 24 to 32 metallic lead.

(i)—Flour is a reducing agent, consisting mostly of carbon.

(j)—Black flux substitute (10 NaHCO₃) : (3 flour) is a reducing agent.

(k)—Potassium cyanide is a reducing agent. KCN.

(l)—Carbonate of ammonia (NH₄)₂CO₃ is chiefly used in aiding the roasting of "copper pyrites" ore. It is a desulphurizing agent.

Argol (KHC₄H₄O₆) is a reducing agent.

Iron, generally used in the shape of iron nails, is a desulphurizing agent.

Question 2.—What is meant by "oxidizing" an element? By "reducing" a compound?

Ans.—By "oxidizing" an element we mean that

On the crest of a storm area is a high barometer. The retarded movement of the first storm area on reaching land allowed its high barometer end to reflect back the incoming storm.

another element called oxygen is supplied to this element and is chemically combined with it, forming a compound. It is done by both natural and artificial means. Metallic iron exposed to the air absorbs oxygen therefrom and a reddish brown powder may be noticed on the surface. In a crucible assay we add nitre (KNO_3) to oxidize or keep oxidized the lead of the litharge. By "reducing" a compound we mean taking away the oxygen from a compound, reducing it to its metallic state. Thus, charcoal reduces litharge to lead—(PbO to Pb).

Question 3.—How would you vary the charge for varying amounts of copper in an ore to be assayed for gold and silver? What is the difficulty in assaying for lead in presence of copper in the ore?

Ans.—In assaying ores containing copper (Cu) for gold and silver I would increase the amount of lead in the scorification assay and increase the amount of litharge for crucible assay.

In the crucible the oxygen in the litharge oxidizes the copper and as such it may be either slagged out or volatilized. I would also put in a little more Na_2CO_3 and $\text{Na}_2\text{B}_4\text{O}_7$ and SiO_2 , the latter especially.

More nitre (KNO_3) would also be required to oxidize the excess of lead to produce the proper size of button. The chief difficulty in assaying for lead in the presence of copper is liable to form a matte, making the button brittle. With copper in the lead button you could not get the proper percentage of lead.

Question 4.—What are the objections to the use of nitre (KNO_3) for desulphurizing and oxidizing an ore?

Ans.—Nitre (KNO_3) is a desulphurizing and oxidizing agent and has a drawback on account of its making the contents of the crucible boil, swell out and expand, sometimes making the contents of the crucible boil over the edge and so spoiling the assay. Great care should be taken when using it to avoid using too large a quantity, as a loss of gold and silver may result thereby.

Question 5.—How would you assay an ore for gold containing tellurium?

Ans.—In assaying for gold in an ore containing tellurium I would proceed in same way as for ore containing copper enumerated above. The difficulty lies in getting the tellurium out of the lead button. This is done by putting into a scorifier with more lead, if necessary, and scorifying till a button is got that is malleable and free from it. Button may take from one to twenty times its weight of Pb . If a button containing tellurium is put in a cupel and cupelled the silver and gold will be spread all over the cupel.

Question 6.—How would you ascertain the various minerals in an ore before assaying it?

Ans.—To ascertain the various minerals in an ore before assaying it, the only way to do is to test it in various ways before the blowpipe. Each mineral acts in different ways. This is termed blowpipe analysis.

Question 7.—Give the chemical symbols of all the re-agents used in assaying.

Ans.—Litharge, PbO ; lead, Pb ; bicarbonate of soda, NaHCO_3 ; carbonate of soda, Na_2CO_3 ; carbonate of potash, K_2CO_3 ; black flux substitute (10NaHCO_3) 3 flour; potassium cyanide, KCN ; carbonate of ammonia (NH_4) $_2\text{CO}_3$; argol ($\text{KHC}_4\text{H}_4\text{O}_6$); iron, Fe ; borax, $\text{Na}_2\text{B}_4\text{O}_7$; silica, SiO_2 ; nitre, KNO_3 ; charcoal flour, C .

Question 8.—What methods can you use for determining the per cent of copper in an ore?

Ans.—I can use these methods for determining the percentage of copper in an ore: 1. Electrolysis: In this method the copper is precipitated by a current of electricity upon a sheet of platinum. It is the most reliable method and more copper can be got by this than by any other method. 2. Volumetric: In this method a certain percentage of the copper solution is titrated with KCN until a certain color is obtained.

The KCN having first been tested against a standard solution of copper, by proportion find the percentage. 3. Precipitation: In this method the copper is precipitated by the addition of iron in the shape of iron nails, the acid having more affinity for iron leaves hold of the copper, which falls to the bottom in a metallic state.

Question 9.—Give an outline of the chlorine gas method for extracting gold from ore.

Ans.—In the chlorine gas method the ore is crushed, sifted in tanks and chlorine gas admitted to the bottom. The chlorine chemically unites with the gold, forming gold chloride which will dissolve in water. Water is admitted to the tank and the chlorine dissolved out of the ore. The gold is then

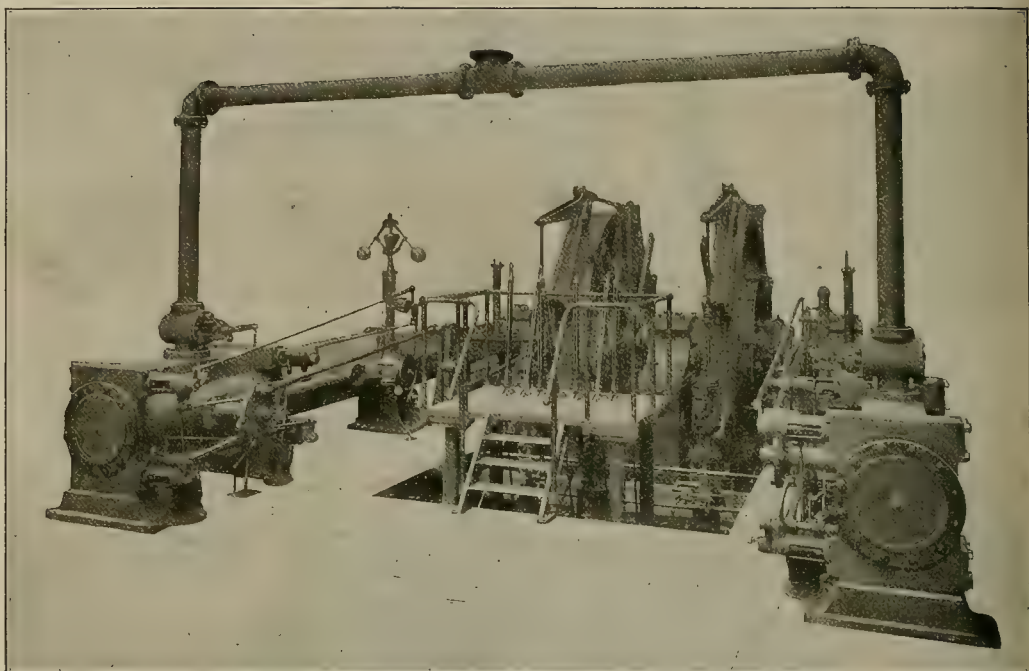
precipitated by the use of ferrous sulphate. The resulting gold sulphide is roasted and melted into bullion.

Question 10.—Why is a knowledge of chemistry and blowpipe analysis necessary for an assayer?

Ans.—A knowledge of "chemistry" and "blowpipe analysis" is necessary to an assayer because by the application of these sciences he can find out

the belt, has been a steady producer since 1887. The Tiger shaft is down to the 1400 level, a perpendicular distance of 1200 feet. The lower workings of this property are better than they were near the surface. The Helena and Frisco, in the same canyon, is down a depth of 1000 feet vertically, and with the same conditions.

"Heavy mining machinery of all kinds is used,

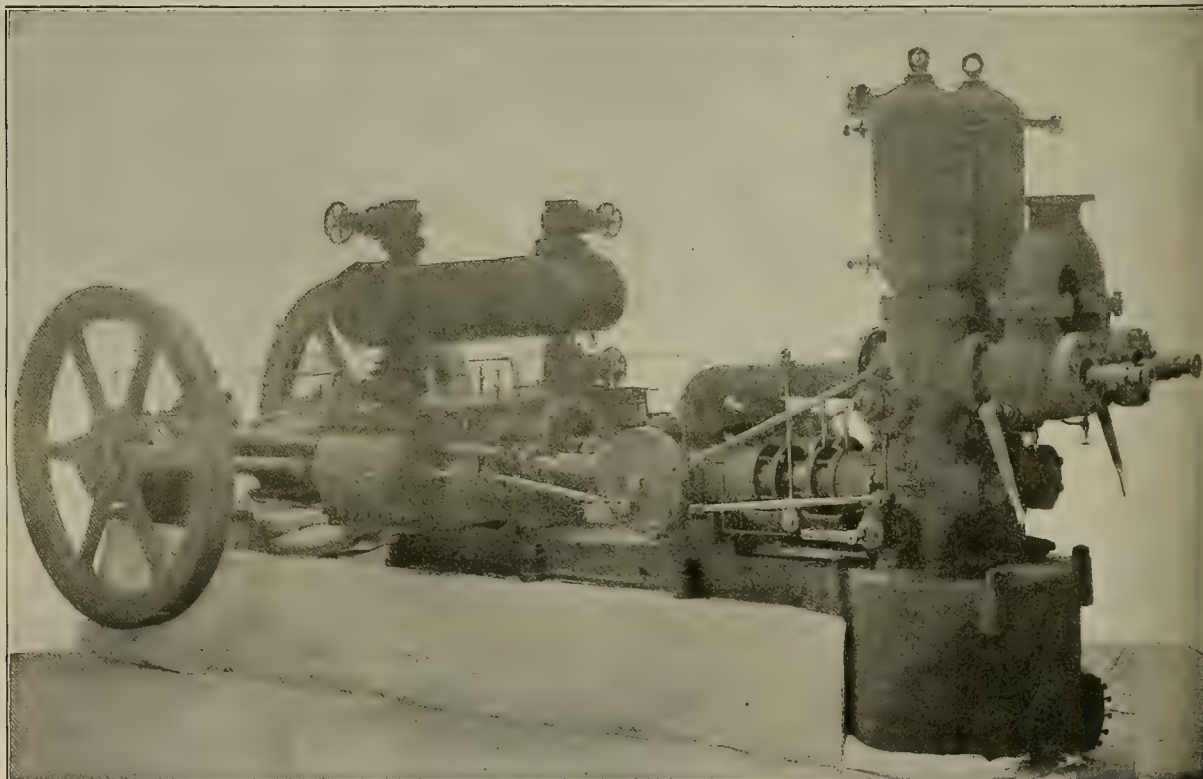


HELENA AND FRISCO HOIST, COEUR D'ALENES, IDAHO.

exactly what an ore consists of, and can give it its proper name and treatment. By perseverance in this science he becomes adept in telling at once what an ore consists of and if it is likely to contain a precious metal. They are very interesting studies and they are progressive sciences, something new always cropping out and new laws being found out that are of great importance. The greatest man

there being two 20x60 direct-acting hoists now working in the camp, situated on the Tiger and Poorman and Helena and Frisco properties. These hoists are built to go to a depth of 2500 feet, and handle from 600 to 700 tons of ore per day, besides handling the waste and necessary mining supplies, and requiring from 500 to 600 H. P. to operate them.

"Pumps of a capacity of 1000 gallons per minute



DUPLEX DIFFERENTIAL RIEDLER PUMP, FRASER AND CHALMERS, FOR THE TIGER MINING COMPANY, COEUR D'ALENES, IDAHO.

nowadays in this progressive world is the scientist.

The above answers are just as given by the student. Though some corrections are necessary, I suspect few practical assayers would answer the questions any better.

Mining Machinery in Idaho.

Deep mining on the lead belt of the Coeur d'Alenes, Idaho, gives promise of permanency, justifying the placing of heavy machinery. F. R. Culbertson, manager of the Tiger-Poorman, writing of that property, says:

"The Tiger and Poorman, the first location in

pumping 1000 feet in one lift, are to be found in these mines. Some idea of the size of these pumps and the amount of power required to operate same, may be formed when it is considered that few cities of 20,000 population have larger water works pumps for supplying the city than these same pumps, which are used only for the purpose of keeping some of our mines dry."

Herewith is illustrated the pump at the Tiger, and the hoist at the Helena-Frisco, built by Fraser & Chalmers of Chicago. The pump is a duplex differential Riedler, plungers $4\frac{3}{16}$ " and $6\frac{1}{2}$ "x18", driven by a horizontal cross-compound pneumatic slide valve engine, 14" and $12\frac{1}{2}$ "x18", capacity 600 gallons per minute against a head of 750 feet when run-

ning at 120 revolutions, but can be run somewhat higher. The engines are seen from the cut to be provided with Meyer's gear, the differential construction effecting a double-acting discharge with a single-acting suction, simplifying water connections and securing the desirable double action of discharge. The suction chamber is large, and divided, having two flanges, part of the arrangement for running either side independently if desired.

The Helena and Frisco hoist is a duplex direct-acting double reel machine driven by a pair of 20" dia. x 60" stroke Corliss engines. The reels are 5 feet in smaller diameter, and take 2000 feet of 4½"x½" flat rope. The hoist is intended to lift a double-deck cage with load, and is fitted with steam-operated clutches and post brakes, engines having steam reversing gear.

All auxiliary steam cylinders have oil cataract cylinders arranged tandem to give steady and easy motion. Between the reels is a heavy center-bearing for crank shaft having the same adjustments as the main bearings of the engines.

Of Interest to Claim Owners.

An Arizona miner who recently wrote for information to the General Land Office at Washington, D. C., received the following answer:

You state that you own the possessory title to a group of five contiguous mining claims in Arizona, relatively situated as shown by the diagram you inclosed. You also state that during the present year you have expended one thousand dollars in a shaft and drift on one of the claims, and you inquire in effect whether the amount expended is sufficient to maintain your possessory right.

In the first instance, it should be stated that, for obvious reasons, it is contrary to the policy of this office to undertake to render a binding decision upon an important question arising under the land laws, except in an actual case regularly submitted for adjudication upon the proven facts.

In order to legally hold the possessory right to a mining location not less than one hundred dollars' worth of labor must be performed or improvements made thereon annually until entry shall have been made.

In the case of Chambers et al vs. Harrington (U. S. 350) the United States Supreme Court held, syllabus:

When several adjoining claims to mineral lands are held in common, work for the benefit of all done upon one of them in a given year to an amount equal to that required to be done upon all in that year meets the requirements of Sec. 2324, U. S. Rev. Stats.

In the case of McNeil et al. vs. Pace et al. (3 L. D., 267), it was held: When the parties owned two adjoining claims and a drift in one of them was run in the direction of the other, under the advice of mining experts, with a view to the improvement of both, it is available for holding them both.

In the decision in the case of Dolles vs. Hamberg Consolidated Mining Co. (27 L. D. 269), the honorable secretary used the following language:

It is a well settled rule that where parties hold adjoining claims the annual work may be done on one of them, if such work is designed for the improvement or development of the group. But the burden of proof is on the owner to show that the work done or improvements made does, as a matter of fact, tend to the development of the property as a whole, and that such work is a part of the general scheme of improvements.

"LIFE IN THE COLDEST COUNTRY IN THE WORLD" is the latest bulletin of the Royal Geographical Society of Irkutsk. The name of the place is Werchojansk, in Siberia, longitude 133° 51' east, latitude 67° 34' north, where the lowest temperature of minus 90° Fahr. has been observed and the mean of January is minus 48° Fahr. It is inhabited by about 105,000 persons of the Yakut and Lama races. In a large part of the region, according to Prof. Kovalik, the air is so dry and the winds are so rare that the intensity of the cold cannot be fully realized. In the most distant part of the east there are sometimes terrible storms, which are most fatal to life in their consequences. During the summer time the temperature occasionally rises to 86° Fahr. in the shade, while it freezes at night. The latter part of the season is often marked by copious rains and extensive inundations, which invariably lay waste a vast acreage of land and prove to be a serious obstacle to the cultivation of the soil. Vegetation is very scanty. There are practically no trees—only wide, open meadows. The people hunt fur-bearing animals, fish and raise cattle and reindeer. It requires eight cows to support a family. The cattle are very small in size and are fed with hay in winter. Occasionally they are allowed to go out when there is the slightest break in the weather. Milk is the principal food. This is sometimes supplemented with hares, which are abundant, but not very relishable. The houses are constructed with wood covered with clay and, as a rule, consist of only one room, in which the people and animals live together.

Electric Safety Lamp.

There has recently been devised a portable electric safety lamp for use in special cases when an open flame or even one safeguarded, as in the miner's lamp, would prove dangerous. The combination consists of a dry battery arranged to be carried in a holder at the belt or in the pocket. The battery is controlled by a small rheostat, maintaining an even supply of current to the lamp and allowing it to burn with the same brilliancy during the life of the battery. Changing an exhausted for a new battery involves no electrical knowledge. The electric lamp,

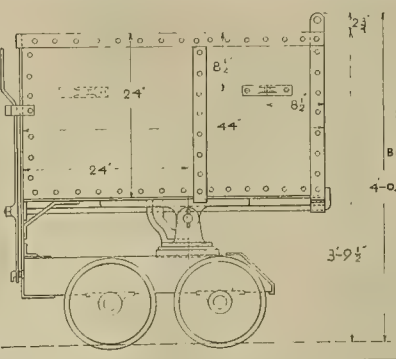


connected to the battery by a flexible cord, is the miner's lamp manufactured at the Edison Lamp Works of the General Electric Co. It is of six-candle power, and is set in a small white enamelled parabolic reflector, provided with a stick pin to allow it to be attached to the hat or any part of the clothing. The light is strong enough to allow ordinary matter to be read at a distance of 100 feet from the lamp.

The combination is manufactured by Elmer E. McIntyre of Pittsburg, and has been found very useful by gas inspectors in reading meters in dark cellars; by repair men exploring cellars and trenches for gas leaks and defective pipe connections or examining gaseous sewers; by miners and mine inspectors in gaseous mines, where the risk of explosion even from the miner's lamp is ever present; by watchmen in powder mills and warehouses storing inflammable oils and essences, or by workmen repairing oil and gas tanks or examining the riveting inside steam boilers. This lamp is especially valuable as it leaves the hands free, and its weight is so small—about two pounds—as to be hardly noticeable.

Standard Ore Cars.

The illustration herewith shows a mining car with Anaconda patent self-oiling axle and wheels, as manufactured by the American Engineering Works, 204 Dearborn street, Chicago, Ill. The car as shown in cut weighs 1000 pounds; capacity, 16 cubic feet.



These cars can be supplied with any size wheels that may be desired and for 18, 20, 22 or 24-inch gauge track. The car body rests on a cast-iron bolster and turn-plate bolted to the truck, permitting the car being swung in any direction desired, and the contents dumped sideways or endways. The discharge door in front is hinged at the top and operated from

the rear end with a wrought-iron handle fixed to the latch-rod, placed under the car body, by which the car can be locked or unlocked. The car body can be made of such thickness of steel as may be ordered, the manufacturers generally using 1½" for sides and 1" for bottom.

A Montana Jury Declares "Slag" Is "Tailings."

Recently, at Butte, Montana, the Butte & Boston Co. sued the Montana Ore Purchasing Co. for \$50,000 damages for tailings dumped on the ground owned by the former company. The case was tried in the United States Court before a jury.

The point in the controversy was as to the meaning of the word "tailings," and whether slag or the refuse of a smelter could be considered tailings. Supt. Heinze made an agreement in '92 with the superintendent of the Butte & Boston by which the former was given permission to dump tailings on a part of the Butte & Boston ground. Subsequently the Montana Ore Purchasing Co. built a tramway from its smelter to dump its refuse on the same piece of ground. The Butte & Boston Co. objected on the ground that the refuse from the smelter was not "tailings." The judge said "the term tailings does not in a general sense include slag from smelters." The matter was submitted to the jury to determine whether or not the word tailings included slag, and if such meaning was intended when the contract was made and the lease on the ground given to Heinze.

The judge, in his charge, declared that the ordinary meaning of the word tailings does not include the word slag. In mining, tailings are ordinarily understood to be the refuse matter eliminated from ore by means of water. In gold placer mining the tailings are the sand and gravel eliminated from the gold by means of water. It was claimed in the case that the word "tailings" has a scientific meaning and that this includes slag from a smelter. Another witness claimed that that word had no scientific meaning. A third witness said that in books upon metallurgy the word slag was always used as the refuse from the smelting of ores and tailings from the concentrating of ore by means of water.

After puzzling over the question for four hours, the jury brought in a verdict "for the plaintiff for the ownership and possession of the ground in controversy, subject to the leasements of the defendant, granted by the agreement of Nov. 16, 1892, in evidence, and assess plaintiff's damages at the sum of \$1."

The special findings of fact were as follows:

"Has the term tailings a scientific meaning?"

Answer—"Yes."

"If it has such scientific meaning, does it, in such scientific meaning, include the term slag?"

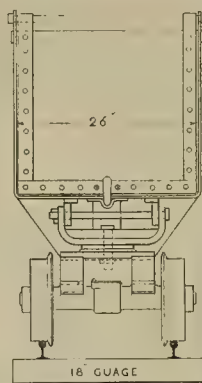
Answer—"Yes."

The verdict throws the costs on the Montana Ore Purchasing Co., but is in their favor, as it declares that slag is tailings, and the defendants will thus be allowed to dump the waste product of their smelter on the leased ground.

How Tacks are Made.

One of the first processes in the manufacture of tacks, remarks an exchange, is that of pickling the Bessemer steel or best quality iron sheets. These sheets are about 16x36 inches or 20x36 inches in size, and quite thin. The pickling solution is of blue vitriol, which removes all foreign substance and renders the metal more pliable to work. A bath of hot lime thoroughly dries the sheets, which are next taken to the cutter, when carefully arranged steel knives cut them into any width desired, ranging from ¼ inch to 2 inches. Each strip retains its original length. The strips now have jagged edges, but after going through a powerful machine the rough edges are removed, leaving a very smooth surface.

The strips are now ready for the tack machine, the knives of which cut the strips into the thickness required. Each little piece of metal as it leaves the knives is forced into a two-sided groove that closes tightly and gives to the tack the point and corrugations which lend to its holding qualities. At the same time a hammer strikes the broad end of the tack, putting a head on it, and then it drops into a receptacle beneath. The tack is now complete, save placing it in a revolving barrel or tumbler, which gives it a bright finish. Blue tacks are colored by heat, and tinned tacks after being dipped in the metal, having been previously pickled, are riddled and sieved together in a circular drum to prevent their sticking together.



Mining Summary.

ALASKA.

Four thousand dollars in gold is reported to have been taken from an 8-foot hole on C. P. Dyer's Gold Standard group on Cleveland peninsula, sixty miles south of Wrangle. Dyer is in Tacoma, Wash., and has this gold in the form of a brick worth \$3500 and some ore specimens which are filled with nuggets and wire gold. The gold was pounded out in a mortar in less than a month. An arrastra has been erected at the mines.

Navigation on the Upper Yukon river, between Dawson and the lakes, has closed for the season, and all the river steamboats have gone into winter quarters. Thirty Klondikers who left Dawson on Oct. 10th on the steamer Flora report that the Flora was the last boat to leave Dawson. The Yukon was filled with running ice, and it would be impossible to make another trip.

W. V. Radley, who spent two months in the Atlin Lake district, says there are good working prospects, but it is not a country from which any man is likely to take out \$100,000 in a season. If a man works steadily and takes out \$5000 in a season, he will have met with good luck. Claims will have to be bought; some will probably pay 50 per cent, while the majority will only pay about 20 per cent. The gold area may extend from Atlin or Pine creek to Teslin lake and Salmon river up to Lake Le Barge, covering the Marsh lake and Tagish country. Quartz properties are also met with and some free-milling quartz was found forty miles from Atlin. The snow is low down and before they came out the party camped three days in the snow at the head of Spruce creek, which had almost stopped work. R. S. Weeks, another pilgrim from the new gold fields, tells of a stampede to Lake Davis from Pine creek, which will in all probability, he says, result in great suffering for a number of the stampedeers. It was one of the most idiotic expeditions that ever I heard of, said Mr. Weeks. We had to carry our boat ten miles up Pine creek along with our provisions, a fearful job. We reached Surprise lake and rowed across, thirty miles. From there we had to pack our outfit ten miles further to Lake Davis. It is a large body of water, probably 100 miles long. We went up and down the shores for twenty-five miles, but could find no traces of gold. We met several who were almost out of provisions. Two had only a pound of rice and a pound of sugar on which to make the return trip. Out of the 200 that rushed in many are now suffering.

Reports come of the discovery of beds of copper on the Dalton trail, 100 miles inland from Haines mission. The find was made by Capt. Jarvis of the Canadian mounted police. The copper runs about 23 per cent and contains an average of \$46 to the ton in gold. It is mostly cuprite and gray copper, although some is native.

Juneau Miner: During the past season development has progressed on the California and Scotia lode at Berners bay, owned by J. G. Davies and others. One tunnel has been driven on the vein 100 feet, and another 108 feet. The average width of the ledge is 4½ feet and the ore averages \$13.50. The new mills being erected on the shores of Gastineaux channel are approaching completion. They will contain 520 stamps. Much work has been done this summer by the Indiana & Alaska M. Co. Eighty thousand pounds of machinery are being moved up the mountain. The main tunnel is in over 300 feet, and two other tunnels are making good headway. A full force will be employed all winter. Near Juneau are the Boston No. 1 and No. 2, on which a shaft has been sunk on the ledge and a crosscut 30 feet has been driven without finding the wall. The ore returns from \$5 to \$22 a ton. The estimated average value of the ore is \$7 per ton. On the Ready Bullion, one of the Treadwell group, a 120-stamp mill is being built. The mines at Sundum are progressing. The mill of the Bald Eagle continues to drop on the ore opened out early this season. The Sundum Chief mill of 10 stamps continues work. Both companies are under conservative management, and good results may be expected with the minimum of expense. The Treadwell properties are being increased to 520 stamps. The last report of the superintendent of this mine contains the statement that above the 220-foot level there are 4,477,500 tons of reserve ore available for the mill, and that in this measurement no account is taken of ore beyond the ends of the drifts. The further statement is made that between the 220-foot level and the 440-foot level there are 4,000,000 tons more.

On the shores of Gastineaux channel from the Ready Bullion mill to Juneau in a few months three miles of electric lights will illuminate the surroundings. The mills of the Ready Bullion, Alaska Mexican, Union, Treadwell new mill and the chlorination works, with numerous other buildings, will all be lighted by electricity.

ARIZONA.

(Special Correspondence).—On the 19th inst. the last official act throwing open the Deer Creek coal fields will be filed, approving the survey of the line segregating the ceded portion of the White Mountain Indian reservation, in the local land office at Tucson. This tract of country has long been known to contain large deposits of both copper and coal, the coal said to be of good coking quality. For many years persons have stealthily worked mines of coal and copper situated on this portion, until valuable mines had been located and opened. Mines of both copper and coal, situated in the same general vicinity, are held by persons who have subjected themselves to all the privations of doing their work by stealth, and by surfeiture of the officers having charge of the Indians, and who would now be glad to find purchasers from them of their holdings on terms that would remunerate

them, such properties being well situated in reference to transportation by railroad. There are now awaiting active men with energy and capital fairly developed copper mines accessible by railroad.

Solomonville, Nov. 1st, '98.

The group of copper mines near Fairbank station, being opened by M. Hardy, is producing ore that shows 60 per cent copper and some gold and silver.

At Globe the No. 1 water jacket furnace of the Old Dominion copper mine is reported turning out more copper with less losses in the slag than ever before, running out from 30,000 to 34,000 pounds of black copper 96 to 98 per cent fine every twenty-four hours. The company is employing over 300 men. The railroad terminus is now nine miles from Globe, at Cutter. The grading is near to Globe, and the railroad people are laying out switches toward the mines.

The shaft on the Mojave county Buckeye mine will be sunk another 50 feet. The Spenazuma M. Co. will erect a mill at their Graham county property. The mill is about ready for operation on the Belle McGilroy mine in Mojave county. Boston capitalists have been investigating the Black Rock properties in Graham county. The Arizona Copper Co. reports their output for August at 742 tons black copper. For the six months from March 1 to August 3 the total was 4446 long tons of black copper. At the Arizona Copper Co.'s property at Clifton the reduction plant has four smelting furnaces, three concentrators with a combined capacity of 759 tons per day, a leaching plant and converting plant. The mass of the ore treated is low grade, averaging not more than 6 per cent and a large amount running as low as 3 per cent. The company employs about 800 men and the product is near one and a half million pounds of copper per month. At Morenci the Detroit Copper Co. have in their reduction plant a new steel building for the smelters, where four large furnaces are in operation. A 400-ton concentrator has been commenced. A new hoisting works is being erected on the Yankee mine by which the ore from several adjoining claims will be hoisted. Copper-bearing ore has been found in the Copper King Co.'s mines at Solomon Springs. Larger ore bins are being built for the output.

Prescott Courier: A strike has been made in the Storm Cloud group of mines near Prescott of 6 feet of gold rock.

Tombstone Epitaph: The Tough Nut mining properties near Tombstone were sold last week under execution for \$8500.

Prescott Journal: G. C. Waddell & Co. are taking out good shipping ore from their gold claim near Prescott. W. C. Bashford is running the Chicago mill on ore from the Jersey Lily mine, and making a success in working the ore. F. Sattes & Co. are engaged in developing the Veteran mine near Prescott and they have good ore.

CALIFORNIA.

Amador.

Sutter Creek Record: The two hundred tons of ore from the Lincoln mine at Sutter Creek crushed in the Zeila mill at Jackson paid \$43 per ton, including sulphurets, amounting to \$8700. This ore was extracted while cleaning out the old shaft. This mine had been abandoned years ago. The company expects to erect a 40-stamp mill next spring. E. C. Voorheis is Supt.

Jackson Republican: Sinking continues at the Anita mine, near Jackson. The Amelia is making an upraise and is moving the work rapidly. The Kennedy mine is working its usual force and reducing the usual amount of profitable rock. The rock from the Median shaft at Amador City is being run through the South Spring Hill mill. Ten stamps are being used. The Argonaut maintains its record and last week the regular month's dividend was paid. The Emerson shaft is down 300 feet and in hard rock. There is a shortage of water; 80 of the 160 stamps of the two mills are dropping. The Zeila mill is crushing ore from the Lincoln mine at Sutter Creek. Sinking continues. Work on the Keystone mine at Amador City has resumed with a full force. The mill is running thirty stamps and will soon be able to run more. The new Wildman-Mahoney work involves a reservoir, a ditch 2000 feet in length and 4000 feet of pipe. W. F. Detert, owner of the Hoffman field, will probably begin development within the next year and sink two shafts simultaneously.

Butte.

Biggs Argus: Two new dredgers will soon be in operation and contracts are signed for building four more and another March 1st, '99. These dredgers cost from \$23,000 to \$30,000 each and the expense of running them reaches \$60 daily. Counting the original cost and the daily expense of running these eight dredgers for a year the promoters will have invested about \$390,000. The Argus is informed that Mr. Postlethwaite will superintend the building of five of these dredgers.

Calaveras.

A 4-foot vein of ore has been found in the Paragon mine, near West Point. The Gwin mine, near Mokelumne Hill, since Oct. 1st has forty stamps—hung up for a time on account of low water—all working. Pay ore is taken from the 1400, 1200 and 1000 levels. At the Thorpe mine at Fourth Crossing there is a large force employed grading for the gallows-frame, which will be 100 feet high.

The work preparatory to erecting a mill at the Ford mine is under way. Work in the mine has temporarily suspended. As the Lively mine mill receives its water from the Ford, the skips are kept running to the 700-foot level. When the mill is ready work will progress from the 100-foot level. The operation of the Marshall gravel mine is assured. Eastern people will continue. They are Fisher, Little & Coffman of Indiana. The Lively property will be lighted by electricity. Two shifts are working and the stamps are dropping. The big whistle at the Utica blew for

the first time since the shutdown last week, announcing the resumption of work.

San Andreas Citizen: Boston people have sent H. R. Ellis to investigate the Donnalán mine. His report was favorable and word has been received to sink a shaft. The work will be let by contract.

El Dorado.

Placerville Republican: The Marguerite mine near Diamond employs twenty men and is putting in a hoist and other machinery. At the Alabama mine near Mt. Au Kum the directors concluded to run the tunnel 150 feet farther. The electric power house near Diamond is nearing completion; the mines will then be run by electricity and the town will have electric lights.

Inyo.

Bishop Register: The Inyo Con. M. Co. which owns fifteen claims in Mountain Springs canyon, in the Argus range, are putting in a 3-stamp mill. The company has been prospecting the mines for a year, and a good showing of ore has been made. Fairfield, Sinclair and others composing the Geodetic and Coast Survey party which has spent several summers in these regions have arrived at Bishop and begun the writer's work. There are ten in the party. They work from the Pahump country to the Needles.

Kern.

Work on the Hard Cash mine near Garlock has resumed. The owners contemplate putting up a dry concentrating plant. The gold mine discovered last year in Tollgate canyon, Amalie district, by J. R. Smith and sons, is proving profitable. In a recent cleanup of three tons of rock, which required ten days' work by Smith and his two sons, \$412.84 was yielded. The ledge from which this ore was taken measures 2 feet in width.

A find has been made near Garlock in the Little Mesquite canyon of a ledge 10 inches wide of fair value.

Randsburg Miner: The Wedge mine is taking out rich ore at the 350-foot level. They have a vein of about 1 foot of this ore. The G. B. mine near the Stringer district has been sold to the owners of the Red Dog mill at Johannesburg for \$10,000. Much work has been done on it. The new owners will at once take out ore. The ore body is large but not high grade, though enough, however, to make it valuable property. The Kinyons have struck a good body of ore in their mine at a depth of 150 feet. The vein is nearly 3 feet thick. The Yellow Aster M. Co. will have their 30-stamp mill in operation about the 15th of Jan. It will have a capacity of 150 tons per day. It will be lighted by electricity and run by steam generated by an oil-burning engine. They have water enough, it is thought, to supply their mill, but their wells have not yet been thoroughly tested. W. T. Garrison at Havilah is getting out ore that will average \$40 per ton. The miners in Pleasant canyon, in the Panamint range, are taking out considerable ore and have it crushed in the Anthony mill. At the Ratcliffe mine in Tuba canyon sixteen miners are at work. The ore is hauled to the mill at Postoffice.

Mariposa.

Captain Ward, the mining expert and promoter of mining interests generally, tells the *Gazette* that the Mary Harrison mine at Coulterville has proven to be a dividend payer and a mine that has come to stay. On the 700-foot level a 10-foot vein of paying ore has been struck that will mill at least \$10 a ton. The Captain has made a particular study of the mother lode and says it is amusing to see Eastern experts prospect this main mammoth ledge. The main ledge that crops out so prominently, he says, rarely has any gold in it; as a rule the pay rock is found in the hanging, occasionally in the foot wall, but seldom in the main ledge; only in a few instances has gold been found in the main ledge.

Modoc.

The mineral discoveries made a few months ago near Lake City have been submitted to assayers and the result has interested local and outside people. Brown & Robinson of Redding have been examining the prospects and concluded to erect a stamp mill immediately. The assays are said to have yielded \$27 a ton gold and some silver.

Mono.

The Dunderberg mine at Bodie, with the mill and cyanide plant, was sold last Monday by the sheriff to J. Brown, in behalf of the creditors, for \$17,000.

Nevada.

(Special Correspondence).—At the Con. St. Gothard mine, near Columbia Hill, work is progressing on the new mill, and the ore output continues in the meantime, with a good storage stock ahead. The property from which the ore is produced absorbed the old Delhi mine, through whose tunnels most of the work is conducted. The location of the property is advantageous for cheap working, and the tunnels cut the ledges at considerable depth. The ore thus far found is low grade, and the company is proceeding upon business-like methods in placing improvements for treatment of the product.

North Columbia, Nov. 1st, '98. The Grass Valley Union is informed that the lead has been found in the Holbrook mine at Randolph Flat, and that the gravel is good.

Transcript: The South Yuba Co. has notified the following mines at Grass Valley that it cannot furnish them with water for hoisting or drilling purposes, but will keep their pumps going: Brunswick, Maryland, Massachusetts Hill, Empire, Central, North Star, Omaha and Allison Ranch. There must be four or five days' rain before the company can give them a full supply again. In the meantime 600 of the 800 men at Grass Valley will be thrown out of employment and the daily payroll at the mines be reduced from \$2500 to about \$500.

Union: In the New Eureka mine, Canada Hill, some high-grade ore has been found at

different times, but last week a ledge 1 foot wide was struck that yields \$20 a ton.

Transcript: The South Yuba Co. notified the Providence mine at Nevada City that until there is a good storm they can have only enough water to keep the pumps going. This will result in eighty employees of the Providence being temporarily laid off. The Champion mine can it is thought be kept going with water from the Excelsior ditch.

Riverside.

Los Angeles Review: Near Perris, cyanide plants have been established both at the Good Hope and the Santa Rosa mines to work the tailings of these mines. J. N. Boicourt has a force of men on his claim near the Good Hope. He has a ledge 30 feet wide, which by the cyanide process gives \$80 a ton. He will soon build a plant of his own. Some work has been done lately on the Red Jacket mine, adjoining the Good Hope, and belonging to that company. The ledge is 3 feet wide, and assays well in gold and silver. At the Good Hope things are quiet at present. The Gavalon mine is working forty men, and the 10-stamp mill is running continually. S. H. Robb has been operating for several years a dry washer in the gulches about the Good Hope and making it a success. The Santa Rosa cyanide plant shipped a bar of bullion weighing \$500. The plant is said to net its owners \$1800 per month.

San Bernardino.

The St. George mine, near Manvel, having been abandoned by previous owners and chloriders, is said to be paying well. A strike was made at the 200-foot level of 10 feet of ore. The whole ledge averages \$35 per ton. The mine has lately been bought by A. G. Campbell of Salt Lake City. The cyanide plant on the Desert Queen mine is running successfully.

Redlands Facts says that considerable prospecting has been done in that neighborhood, and ore has been found that assays from \$6 a ton upwards, but is of a refractory nature. It is locally reported that arrangements have been perfected to build a chloride plant at Redlands.

Downey Champion: The Peacock M. Co. is shipping ore from the mines near Lavic. Considerable development work is being done in the neighborhood of Lavic.

San Diego.

In Pilot Knob district, near El Rio, development work has been done on the Carmen and Muy Bien mines. On the Carmen a 100-foot shaft has been sunk, and the first 50 feet displays a ledge 3 feet in width running \$25 per ton. The Muy Bien has two shafts, 84 and 32 feet, and the ledge averages 9 feet. The ore ranges from \$7 to \$72.

San Diego Union: Workmen at Cuyamaca are building a tank-house 160x80 feet for a cyanide plant for the treatment of 200,000 tons of tailings from the old Stonewall mill. The tailings have been bought by Strauss and Shinn of Los Angeles and San Francisco. Experiments said to have been made by the cyanide process show the tailings to be worth from \$2.50 to \$7 in gold per ton. Receiver Pauly of the Golden Cross mines, in his eleventh report, for September, shows that the clean-up amounted to \$42,146.68 and there was received from other sources \$989.10. The expenditures amounted to \$43,407.55, which included \$23,000 paid to the defendants in the action. The payroll for September amounted to \$7500 and the fuel bill to \$1300. There remained \$70,363.66. The receiver reports that the properties show an increase in ore deposits and a vein of ore has been struck in the Queen mine, which, it is thought, will prove profitable. Within a few months, the receiver states, the debts referred to in the stipulation will be paid. The Pacific bank of San Francisco, which owned a half interest in the Helvetia mine at Julian, has sold its share to C. H. Dunsmore for \$10,000, who transferred the property to E. W. Sebben for \$6000. Mr. Sebben is one of three Denver capitalists who have entered into a contract with the mine owners to give it a six months' trial; and should it prove satisfactory, they will buy it. The other half interest is owned by nineteen parties, represented in San Diego by Holcomb & Utley.

Shasta.

The Mt. Shasta mine has put in a 10-H. P. gasoline engine. Thirty men are at work. Daily fifteen tons are shipped by teams to the smelter at Keswick.

Redding Free Press: Fox & Queen have been operating in the Philadelphia mine, near French Gulch, in an old tunnel, and found a ledge of ore of sufficiently high grade to ship to the smelter at the tide water. J. Blagrove, at French Gulch, is interested in two leases on the Washington mine. He has been successful and is shipping ore to the Selby smelter.

Sierra.

The Haskell Peak G. M. Co. at Haskell Peak is preparing for an early spring start at the mine.

Siskiyou.

B. F. Thornton, acting for New York capitalists, has bought the Jones & Daniels quartz mines in Quartz Valley. The purchasers will open up the mines on an extensive scale. J. O. Rusby, Supt. Oro Fino mines, near Fort Jones, has been rushing work to be ready for the rains. F. D. Fraser has men doing development work on the Golden Eagle quartz mine on Indian creek. He reports his prospects looking well. The Sheba G. M. Co. on Patterson creek, who lately bought the Fry & McCauley mine for \$35,000, are crowding work. The company will put up a 10-stamp mill at once.

Yreka Journal: Brokaw & McClaime bought the mining property of the R. H. Campbell G. M. Co. in Quartz Valley, comprising 2500 acres of placer mining ground and ditches and water rights connected with this property for \$50,000. They will work the mine on a large scale.

Yreka Reporter: The Gold Bar Co. near

Sawyer's Bar are making improvements. This winter the 20-stamp mill will be kept running. —H. Finley's arrastra is grinding good rock at his mine near Sawyer's Bar. As soon as the water season opens he will put on more men and open the mine on a large scale. —A tunnel is being run to crosscut the vein at the White Swan mine on Tanner's Peak. —A good ledge has been found in the Live Yankee mine in the Salmon district. —Good ore comes out of the Great Eastern mine, Sawyer's Bar. —T. J. Dunn has sold his Indian Bar placer mine in the Salmon country to the Golden Jubilee M. & M. Co. for \$1600.

TOULUMNE.

It is reliably stated that work on the Lost Fox mine near Sonora will soon be resumed. The Fox has a double-compartment shaft 65 feet on the vein, which is 7 feet wide, of fair quality, with a streak of high grade. It carries some free gold, but most of the values are in the sulphurets. A steam hoist will be put on immediately. —In the Turner Flat gravel mine the pay gravel varies from 2 to 12 feet thick, but the width of the streak has not yet been ascertained. Bed rock was struck at 73 feet. The daily output is about 180 buckets of 800 pounds each.

Sonora Independent: At the Atlas mine on Jackson Hill eighteen men are employed in driving a tunnel, 2000 feet in length. The property was sold recently to a Scotch company. —Mgr. Doyle of the Alameda G. M. Co. has struck water at the 900 level, and the shaft and lower drifts have been allowed to fill; at the 600 it is lifted and passed to a reservoir, where a 4-inch double-action pump returns it to the tanks which supply the batteries, boilers and hoist. The return water from the mill passes into the same reservoir and is filtered and repumped. It enables the mill to work during the dry season. —At the Bawn mine the shaft is down 300 feet. —P. Mullins is developing a vein on the east portion of the mother lode. —W. Long will open the old Patterson mine and put in from 60 to 100 stamps. It is a low grade property, but by milling in large quantities it is thought the mine can be made to pay. —On the Republican mine, near Jacksonville, three eight-hour shifts are working the ledge from a 180-foot shaft. —The Rawhide is down 1550 feet. The ore body looks well. Work at the 1500-foot level is stopped until the electric power plant is completed. Supt. Turner is doing general repairs. —The Arborea has a shaft 300 feet on 3 feet of quartz. —Cross-cutting at the Rappahannock is in progress at the 400 level.

Jamestown Magnet: At the Bonanza mill, Sonora, the two stamps are crushing sixteen tons of ore daily, steam power being used. —The Maryatt-Gagnere mine began last week a three-compartment shaft to be sunk upon the Gagnere claim 1000 feet. —At the Alexander Stewart pocket mine near Sonora Wainwright & Co. took out \$2000 last week. In the past year they are reported to have taken out \$15,000. —Widening the shaft at the Star mine to a double compartment is completed to a depth of 200 feet. —Three eight-hour shifts are employed at the Over mine, Saw Mill Flat. Work on the shaft, down 250 feet, is in progress. They hoist pay ore daily. —The Valparaiso mine near Tuletiown has been bonded to F. Miner of Chicago. —At Stent the Jumper mill started up and is dropping twenty stamps. —The New Era shaft at the Jumper has been completed to a depth of 700 feet. —In the Dutch mine at Quartz the shaft is below the ninth level. The chutes and ore bins are full of ore. —In the Santa Ysabel mine in No. 1 shaft on the 400 level they have cut into a vein of high-grade ore. —The Jumper Co. uses its water supply by pumping back the water after it passes through the mill and reusing it again and again. By this means it is hoped to keep the mill running steadily. —The water right owned by the Big Oak Flat Ditch Co. near Groveland was bought by J. Rosenfeldt for the Shavmut-Eagle Co., who will construct an electric power plant to operate its mines and mill.

Sonora Democrat: At the Buchanan work is confined to sinking the new shaft, which is down over 350 feet. It is proposed to keep sinking until a drift can be run 100 feet under the deepest of the old workings; if the vein meets expectations the old workings will be unwatered and a big force put to work.

Sonora Banner: A large vein has been discovered at the Santa Ysabel, which is said to be good grade. —A shaft 1000 feet deep is to be sunk at the Maryatt-Gagnere, near Tuttle-town. —Power drills have been put in the Hazel Dell mine, near Soulsbyville and work on the tunnel has begun. —Forty M. feet of lumber has been engaged for the Buchanan mine to reconstruct the old mill.

Yuba.

Developments at the Golden Trout mine near Strawberry valley show encouraging results. The company expect to install an electric plant for lighting purposes and eventually for motive power. J. R. Watson, Jr., is president of the company.

COLORADO.

BOULDER COUNTY.

Ward Miner: The B. & M. mine near Ward in the past thirty days shipped 302 tons of ore to the Culbertson mill and 41 tons to the smelter. —R. Smith and associates have leased the Milwaukee mine at Sunnyside for two years and have begun work. The Milwaukee shaft is 325 feet deep and five levels have 800 feet of drifting. The leasers give a royalty of 30 per cent.

CHAFFEE COUNTY.

Near Whitehorn the Lillie mine is producing ore that yields \$95 gold a ton. —On the Urania group the ore runs \$50 a ton.

CLARK COUNTY.

Idaho Springs Gazette: The Foxhall tunnel near Idaho Springs is in 1400 feet. It cuts the belt of vein in which lie the old Seaton mine and several producers of gold and silver

ore. The workings are reported to be in fine ore. —The Chesapeake crosscut tunnel is in over 900 feet. The lodes cut are the Salamander, the Enterprise and the Curlew. The tunnel cuts this vein at a depth of 400 feet and shows 5 feet of quartz of good value. One streak of this runs from ten to twenty ounces in gold.

CUSTER COUNTY.

At Silver Cliff the Jay Gould has opened, with a diamond drill, 200 feet of mill ore. A new mill is to be built soon. —A New York company is developing the Song Bird and Gray Eagle properties and will build a mill.

DOLORES COUNTY.

Rico Star: Hall & Co., on the Newman lease near Rico, have 200 sacks sorted for shipment. —H. Herr made a 30-ton shipment of ore from his lease on the Yellow Jacket to Durango. —The carload ore shipments for the second and third weeks in October were twenty-two carloads. The shipments as compared with last year are: Jan. 1 to Oct. 21, 1898, 618; Jan. 1 to Oct. 21, 1897, inclusive, 372; gain over last year, 246 carloads.

EAGLE COUNTY.

Red Cliff Blade: The Black Iron mine is making extensive shipments of ore. —Shipments from the Battle Mountain district were six carloads last week, making 333 cars for 1898.

EL PASO COUNTY.

The output of ore in Cripple Creek district in October is valued at \$1,488,130—the highest for any month in the history of the camp. —It is locally reported that within the next thirty days work will be resumed on the Jewel property on Womack hill by the Cripple Lawrence Investment Co. of Denver, who hold a lease for \$75,000 on the claim.

The Moon Anchor, Cripple Creek, last week produced 300 tons of ore, of which 240 tons went direct to the smelters and 60 to the mills. —Shipments from the Specimen last week by four lessees were 53½ tons, with a bullion value of \$3068 60. —The F. O. Wood lease on the Garfield Con. is producing 130 tons a month, four ounces to the ton.

The production of the Independence, near Victor, is about 1200 tons per month. Half of this ore is high smelting grade, while the remainder is mill ore that will average about \$30 to the ton. —The Elkton Con. M. Co. at Victor this week purchased the Apple Ellen, a fractional claim of three acres, for \$25,000—\$5000 cash and \$20,000 in sixty days.

Denver Mining Record: A lawsuit involving the title to the Pike's Peak placer will be heard in Denver Nov. 12th. The property in question, situated on the south slope of Mineral hill, has been patented for more than two years, yet the contention of the plaintiffs, McKelvey et al., if allowed, would invalidate the principal placer claims in the Cripple Creek district, if not in the entire State of Colorado. The ground of the proceeding is that the Black Jack, a lode claim, was located before the issuance of the patent to the placer. Several other locations were also attempted, but not consummated, and fissure veins were known to exist in this placer territory. The fight over the Hull City placer involved practically the same contention and was decided adversely to lode claimants.

Victor Record: Last week a new strike was made on the seventh level of the Vindicator at Victor, and this week another equally important find has been made in the Anna J. shaft. The vein is from 12 to 14 feet in width, returning values of \$30 to the ton, while the screenings show an average of \$50 to the ton. —Work has been resumed on the Santa Rita. The shaft is to be put down 500 feet below present depth. —Three tunnels are being driven into the mountain, of which number two, the Columbine-Victor, already in 1500 feet, and the Squaw Mountain tunnel are using air drills.

Returns from two shipments from the Porcupine, the first, one ton of carefully sorted ore from the Sill and Osborne lease, gave \$1197 to the ton, and the other, of 1704 pounds from the Tanney sublease, yielded \$94.60 a ton. —The Portland G. M. Co.'s output is maintained at 100 tons daily. —Returns from a shipment from the Silver Tip gave \$578 to the ton. —The daily production from the Creston lease on the Jack Pot is from 25 to 30 tons of the average value of two and one-half ounces. —The new machinery for the Lucky Guss is nearly all on the ground. —W. S. Stratton's Independence is producing forty tons daily. —Keith & Grube have resumed sinking on their Vindicator lease and will put the shaft down another lift from the 110-foot level. The output is about two carloads a day. —The Baltimore Leasing Co., operating on the Vindicator end of the Christmas, marketed seventy-five tons of two-ounce ore and twenty-five tons of mill dust.

GILPIN COUNTY.

Central City Call: The Lillian mine on Pewabic mountain, worked by D. McKay & Co. under a lease, are receiving returns of \$220 per ton for first-class and \$65 for second-class ore, and with their small plant they clean up about eight tons of smelting ore a week, running about half and half. The coarse screenings are saved. —At the property of the Penna Central G. M. Co. sinking is progressing with three eight-hour shifts. A depth of 550 feet has been reached. There is a smelting streak from 6 to 8 inches wide and in between there is about 4 feet of a milling ore. —At the Meeker-Pittsburg shipments of smelting ore are being made, the first-class running \$90 while the second-class runs \$35 per ton. The shaft is down 325 feet. Besides the smelting ore the mine is producing from eight to ten cords of mill ore every month.

Central City Observer: The Ross G. M. Co. have lowered their station pump to the 500 level of the Central City mine. They are re-tilting and getting in shape for a steady ore production throughout the winter.

LAKE COUNTY.

The Mahala M. Co. are hoisting seventy

tons daily from the 250-foot inside shaft on the 900-foot level. —The Mab M. Co. made an output of 3300 tons of lead sulphides in October. This tonnage, with the amount of waste from the drifts, is all that the 1000-foot shaft can handle. It requires about four minutes to make the round trip. The average value of the ore is \$20 net from the smelter.

Leadville News-Reporter: Brown & McAllister, owners of the Gordon, near Dayton, have given an option on that property for \$250,000. The Gordon has lain idle owing to a disagreement among the owners. There is a vast amount of milling ore, that will range in value from \$16 to \$20, that can be profitably handled by amalgamation. —The Fanny Rawlings mine, Leadville, continues to increase the payroll and tonnage daily. The shipments are close to sixty tons daily of carbonates of copper oxide and copper-iron sulphides. —The Snow and Karus property, in Adelaide park, is to be again tested by a diamond drill. Some time since the drill was put down 100 feet, but the hole made such a rush of water that the operators became discouraged, but they have reconsidered their decision. —Nine sets of lessees are working on the Lillian G. M. Co. property. More ore is being shipped than for a year past. —Mgr. S. S. Robinson is getting in readiness at the Iron Silver for a big production. The levels are being unwatered and the stopes and drifts put in shape. The bodies of sulphides are large—some are known to be 100 feet thick of good pay ore. The unwatering of these immense workings and resumption of shipments is as important as any mining undertaking in the Leadville district to date. The two cages on the Moyer can easily hoist an output of from 150 to 200 tons daily when the mine is in shape.

MINERAL COUNTY.

The Ridge mine, at Creede, for the first time in its history is producing gold ore. —The following are producing mines in Creede district: New York, Last Chance, Amethyst, United, Park Regent, Commodore, Batchelor, Ridge, Solomon, Ethel and Mollie S.

SAN JUAN COUNTY.

The Silver Ledge mine at Chattanooga is producing fifty tons of ore a day of an average value of \$9 a ton. This through a 10-stamp mill produces ten tons daily of concentrates. A body of silver-lead, showing some zinc, is in the workings.

The shipment of the Ridgway mine at Silverton aggregates three carloads weekly. The ore yields \$1200 a carload.

SAN MIGUEL COUNTY.

From Ophir fifteen carloads of ore were shipped last week. The amount shipped since Jan. 1 is 565 carloads.

The Shoemaker continues its daily shipment of ten tons that will plate \$20 per ton.

The Carribeau has been shipping six cars of concentrates and crude ore per week. The mill is kept busy day and night and a high grade of concentrates is turned out.

In the Silver Pick mine in the Telluride district 150 men are employed. The mill is running on low grade ore.

Telluride Examiner: Test runs from the Keystone Placer give an average of 50 cents to the square yard. —From a mill run of ore from the Sweetheart mine six ounces in gold, thirty ounces silver and a percentage of lead were received.

SUMMIT COUNTY.

Breckenridge Journal: The Germania, near Breckenridge, made a 22,195 pound shipment which brought the leasers something over \$700 net. The ore ran 189 ounces silver and 4¼ per cent lead.

IDAHO.

The Standard mine near Wallace employs 150 men and the daily ore shipments average 300 tons. It is developed to a depth of 1100 feet. The company has recently ordered new hoisting machinery at a cost of \$40,000.

The American D. M. Co., at Gibbonsville, are said to have reduced in the three months prior to February, 1898, in their 30-stamp mill and chlorination works, 100,000 tons of ore from their own group of mines, yielding an average of \$12 per ton in gold. Owing to an accident to their mill within a year, which resulted in the foundation under two of the batteries settling and throwing the machinery out of line, and the collapsing of a high trestle over which the ore was conveyed from the mine to the mill, in which a number of people were badly crippled, resulting in numerous law suits for damages, the company was forced to suspend operations, throwing 150 men out of employment. These suits have recently been settled, and it is locally reported that the property is likely to be operating at its full capacity soon. They have kept a small force on development work with machine drills all summer in the lower levels of the mine, which is opened to a depth of 1000 feet. —The Anderson group, owned by local people, worked by leasers, has produced nearly \$200,000 worth of gold bullion, ground out in old-fashioned arrastras. The ores usually work from \$20 to \$50 per ton in the arrastra.

The Montana & Idaho Co. own a group of claims which is extensively developed. The company employs twenty men. Their veins run from 6 inches to 4 feet thick and are worth \$15 to \$50 per ton. They contemplate the erection of a plant on the ground.

The foundation for the new pump on the 1600 level of the Helena-Frisco, at Gem, is completed and getting the machinery in place has begun. The pump weighs 200,000 pounds. It had to all be made in sections or cut after casting, so that no piece would be too large for the shaft.

Boise Statesman: Near Halley, the Big G M. Co. of Chicago has ten men employed. The company intends to put in a 40-ton concentrator. S. Gundaker is Supt. Four carloads of ore have been shipped from the property. The vein is 9 feet wide and the ore averages \$35 a ton in gold, fifty-five ounces of silver and 22 per cent lead. —The 10-stamp mill on the

Daisy property at Pine Grove is running on good ore.

Idaho City World: The Morning Star Co. at Grimes Pass contemplates putting up a 100-stamp mill next year. This company owns twenty-eight quartz claims. —On the Bulldog group of claims in Sea Foam mining district, Custer county, C. Crane of Salt Lake City, Utah, has opened a property that runs well in silver and in gold. He has 1400 sacks of ore that will average 100 ounces silver and \$20 in gold. He will arrange for putting up a plant next season that will enable him to handle the ore on the ground. Work will be resumed early in the spring. —Work has resumed in the Mountain Queen mine at Grimes Pass. This claim is owned by a Boston company, who put up a 20-stamp mill several years ago and worked the mine three seasons. The ore was low-grade, but paid a small profit above mining and milling expenses. When dead work was required for greater depth the company suspended operations.

MONTANA.

The Garnet Co., of Pony, shipped a lot of amalgam last week; they have had a successful run this season. The mill has handled an average of forty tons a day.

As a result of the compromise of the suit as to surface and underground rights between the Revenue Co. and the Monitor G. M. Co. at Butte, the Revenue was granted the low grade ores on the dump of the Monitor, aggregating 1000 tons of an average value of \$12, and the privilege of extracting from the Monitor mine such low grade ores as were left when the high grade shipping ore was taken out.

Since Jan. 1, '95, the Montana O. P. Co. has paid \$800,000 in dividends.

The shaft in the Carbonado, Montana, coal mine is 900 feet deep. The vein is from 5 to 11 feet thick and is said to cover 6000 acres.

Clancy Miner: Continual bad weather has made it impossible to haul ore from the Mockingbird mine. New ore bins are being constructed at the mine, and in the meantime twenty men are building a gravity tramway from the mine, which will run two four-ton cars, will be about 1600 feet in length, and cost about \$3000. At the receiving end below the Mockingbird a 200-ton ore bin will be constructed. It is expected to have the work in operation in three weeks. At the mine the shaft has reached 200 feet and will be driven another 50 feet before drifting begins. There are 2 feet of ore at the 200. The tramway will be trestle-work almost its entire distance and will reduce the cost of transportation to the railway \$1 per ton and will pay for itself in less than a year. It is expected that when it is finished the output of the mine will be 500 tons of ore per month.

Butte Inter-Mountain: Work has been discontinued at the new Parrott smelter at Parrott, and in all probability it will not be operated for a long time. The smelter cost \$750,000 and will probably cost \$350,000 more to complete. The plant, it is believed, will not be completed until the development work at the company's mines in Butte is far enough advanced to justify a sufficient supply of ore to keep the smelter in operation. —W. A. Clark has secured about 220,000 shares of stock of the Ruby and a cash payment of \$20,000 has been made to bind the agreement. Mr. Clark now holds a controlling interest in the property. —The water is out of the Hope mine at Basin to the 400-foot level and sinking begun.

Whitehall Zephyr: Work on the Twin Bridges smelter was begun last week. It is stated that the enterprise will not be dependent upon custom ores, but upon the mines of the company. It is thought that the work of rebuilding and fitting the plant will be accomplished within 60 days.

Mission: Last month there were seven carloads of concentrates shipped from mines of the Vermilion M. Co. to the smelter, from which good returns are reported. This month double that number of cars will be shipped.

NEVADA.

The Magnolia mine of De La Mar last Monday placed another lot of high grade gold ore at the sampler in Salt Lake City. Although the haul from the mine to the smelter is long and expensive, the ore yields a good profit. The owners, of whom T. R. Jones of Salt Lake City is one, will very likely undertake the building of a mill early next spring.

Reno Gazette: At Escarora the Dexter mine is equipped with steam hoisting works and a 40-stamp mill, besides a cyanide mill. The power is electrical, transmitted twelve miles, and has a capacity of 80 H. P. The company will soon have new electrical plants which will give them 300 H. P. An ore body 1200 feet long and 150 feet in width has been uncovered which is estimated to net \$4. The deepest workings are 150 feet. The ore is hoisted in ore cars and run to the mill. About 65 per cent of the metal is saved by plate amalgamation. The tailings are then run to large ponds near the cyanide mill. The company will double its capacity the coming year.

The Slip mine in Olinghouse district finished a cleanup of eleven tons of ore, out of which they secured \$1500 in gold. —The Elra shipped from Tuscarora bullion and concentrates to the amount of \$1500, the result of the first eight days' run of the Navajo mill.

The Glasgow & Western M. Co. last Saturday placed a carload of ore from its mine at Cherry Creek in Salt Lake City, the value of which is estimated at \$20,000. According to the assays, the silver contents alone amount to over 1500 ounces per ton, while with this is 26 per cent lead and 6 per cent copper. This is the third consignment of ore for last week.

Virginia Chronicle: Work on the Suro tunnel level of the Brunswick and shaft No. 1 was suspended last Monday and will probably not be resumed until after the drainage of the Comstock begins. The directors of the Justice M. Co. have authorized the purchase of the Washoe mill. It will enable the com-

pany to reduce at a profit a lower grade of ore than that lately taken out.

Winnemucca Silver State: A 1-foot vein of chloride ore, carrying 300 ounces in silver to the ton, was found last week in the Pennsylvania location in Trinity district, near Winnemucca.

NEW MEXICO.

At Mogollon in the Confidence mine 130 men are employed. The poles for electrical appliances at the mine are being placed and the machinery will soon be operated and the mine lighted by electricity.

The Pinos Altos G. M. & M. Co. have started their mill on a test run of ore from their properties near Pinos Altos. M. Stanley, who owns properties in the Pinos Altos district, has completed a test run, and it is said it yielded more than expected. The Good Hope mine at Bland has begun work, after a lengthy shut-down. Good ore is said to be taken out of the Washington mine at Cochiti. The Alice and Carrie mine, near Pinos Altos, has struck ore assaying 36 per cent lead, \$4.20 silver and \$9.50 gold. The Cochiti G. M. Co. shipped an 82-pound brick of gold, the product of the week's run. This output will be doubled when the addition to the big mill is completed. It will contain six leaching tanks 20 feet in diameter. The Timber Peak M. Co. of Socorro county has secured claims in the Magdalena mountains, and built a wagon road from Water mountain to their mines. It is claimed that one body of ore measuring 20 feet across will yield \$12 to the ton, and another large vein will not give less than \$6.50 a ton.

A concentrating mill is being built to handle 150 tons of ore daily, and cottages for the workmen are being built. The anthracite coal pits at Cerrillos have started up for the winter, and there are 500 men on the payroll. The output is 1000 tons of coal per day, the bulk going into old Mexico. Several strata have been discovered in the Common Sense mine at Santa Rita. The American mine's shaft is being drained preparatory to the resumption of operations. A. Preisser has made a lead-carbonate strike in the Iron Blossom mine that assays 74 per cent lead and \$8 in gold and silver. The September output of dry washer gold, bought by Keller, Miller & Co. and Robbins & Crew, was \$1200.

Wheeler & Co. are shipping 30 tons of first-class ore from the K K mine to the El Paso smelter. The Andrews mill is treating 150 tons of Trippie mine ore. Santa Fe New Mexican: The Old Reliable M. Co. at Golden is working a good force and meeting with good results. A mill run went \$12.38 per ton in gold; the veins are large. The Monte Cristo Co. is working the big dredger with success.

Silver City Independent: The Atlantic people have started their mill on a test run on ore from the company's properties, which have proven better than expected. It is thought the mill will soon be in constant operation. The Mountain Key mine, Pinos Altos mining district, owned by Chandler, Collier & Co., has decided to start up their mill to make a test run on ore taken from Mountain Key.

OREGON.

In the John Day country the Urie Dredge Co. has its machinery on the ground and will soon have everything in running order. The company is prospecting all the time and the results have been satisfactory.

Sumpter News: The Badger mine, near Sumpter, employs forty miners. The 10-stamp mill recently built is running day and night.

Baker City Democrat: The reduction plant of the Golconda M. Co. will be in operation by December.

Ashland Tidings: A half interest in the Tunnel Six mine, Glendale, was sold for \$30,000 cash. The company will run a tunnel 120 feet in the clear and over 1000 feet in length with double track. A 20-stamp mill is in process of erection and chlorinating works will be built. Lighting and power by electricity are to be installed.

Jacksonville Times: The cyanide plant being put up at the Eureka Mining Co.'s plant on Soldier creek, Josephine county, will be in operation soon. T. Gilmore of Kerbyville, who owns a placer mine in Indian Creek district, brought several hundred dollars in nuggets to Grant's Pass last week.

Ashland Record: The Rogue River Dredging Co. intends to put in a number of dredges, and this fall there will be one put in perhaps at the mouth of the Applegate river. This company has control of 120 claims which cover all of the river supposed to be fit for operation. The bridge and flume across the Big Applegate recently completed by the Swain M. & M. Co. fell to the bottom of the stream last week. The company paid \$10,000 for the mine and has expended \$7000 for improvements. The bridge was built to support a flume of 2200 inches capacity. The mine has been in operation only a week. The wreck is supposed to have been caused by dynamite.

Baker City Democrat: Near Granite the Red Boy mine is dropping twenty stamps ninety-five times a minute and crushing sixty tons of ore a day. Worsham & Clark at Malheur City struck a 6-inch vein from which in one day they took out \$75 in gold, besides rick ore. They will erect a 2-stamp mill.

Ashland Tidings: The Golden Key Mining Co. has twenty-five men at work upon the Braden mine in the Gold Hill district. This company has also bonded several properties in the Kane's Creek district. Twenty-two

hundred feet of 22-inch pipe has been added to the hydraulic plant of the Lance Mining Co. operating on Foothills creek; they will work day and night all the season. B. N. White of Spokane is negotiating for an interest in the Free Silver mine in the Sampson Creek district near Ashland. The property has made a good showing as far as prospected. The Oregon and California M. & M. Co.'s property near Pogeama has been bonded to Tryer & Kile, from Colorado, who began operations Oct. 1.

Baker City Republican: G. Barrett of the May Queen near Bourne contemplates building a 50-stamp mill on his mine.

UTAH.

Tintic District: (Special Correspondence).—The old and well-known mines of the Tintic district, which are prompt dividend payers, are keeping up the steady pace as regards tonnage production that has so long characterized them. The Bullion-Beck is shipping fifty tons per day of crude ore, which runs 15 per cent lead, 40 ounces silver and small values in gold. It ships 300 tons per month of ore that runs 10 per cent copper, 30 ounces silver and \$5 per ton gold. It is storing the milling ore, having 10,000 tons on hand.

The Eureka Hill, which mills about 100 tons per day by its combination process, also ships a large tonnage in the crude. Its mill ore averages 18 to 20 ounces silver, \$3 gold and 4 per cent lead. Its smelting ore runs high in lead and from 50 to 100 ounces in silver to the ton.

The Centennial-Eureka shipments run from 100 to 200 ounces silver and \$18 to \$20 in gold to the ton.

A year ago the Grand Central was a new property and was beginning to attract attention. To-day it is the largest and one of the richest shippers in the district. Its ore runs from 60 to 100 ounces silver and from \$12 to \$20 in gold to the ton. It is practically all rich enough to ship to the smelters.

The Mammoth, which mills its large tonnage of ore, saves large values on the plates and ships about two cars per week of concentrates.

The Star mine, now under the active management of Messrs. Hubbard and Lawrence, seems destined to become the next property in Tintic district to enter the list of heavy producers. It is located between the Dragon iron mine on the one hand and the Ajax and Mammoth on the other. It is thoroughly exploited by shafts, tunnels, winzes, stopes and drifts, which reveal remarkably extensive bodies of milling and smelting ore. In all the great network of drifts and winzes which I followed, there was practically no dead work. The ores appear to be similar to those of the Mammoth and Grand Central, in a formation between porphyry and white lime. The management is making various tests with the view of erecting a mill for treating the ore. Some of it appears adapted to cyanide work.

In the month of September 400 tons were shipped. Two cars of dry ore returned 72½ ounces silver, \$27 gold and 9 per cent lead to the ton. Another 100-ton shipment resulted 42 per cent lead, 18 ounces silver and \$3.80 gold. In the average of ore shipped it is asserted that over half the values were gold. The property comprises fourteen claims and is being well equipped with machinery and buildings. Supt. Lawrence claims there are 100,000 tons of mill ore in sight, which will average \$15 per ton. The ores are mainly silicious. In some parts of the mine, however, there are rich carbonates of lead.

The principal mines comprising Tintic district encircle a spur of the Tintic range in a peculiar manner.

The Sioux-Ajax tunnel has been driven 4200 feet without, it is claimed, encountering any large ore bodies, though barren fissures were crossed. Several well-known producing mines, notably the Swansea, South Swansea and Treasure Hill, are situated outside of this apparent circular zone. The deepest workings in the district are in the Mammoth, which have reached 1700 feet. All the properties in the circle described are dry mines, while in the Treasure Hill, a mile south of the Iron mine, there is a profusion of water in the shaft and drifts.

Eureka, Utah, Oct. 22nd, '98.

(Special Correspondence).—A recent estimate of the tonnage production of the Mercur district is as follows:

| Mine. | Tons per day. |
|----------------|---------------|
| Mercur | 300 |
| Golden Gate | 600 |
| Sacramento | 100 |
| Geyser-Marion | 150 |
| Daisy | 100 |
| Chloride Point | 100 |
| Total | 1,350 |

Mercur, Oct. 29th, '98.

Mgr. Dern says it had been decided to remodel the company's mill at Manning and replace the wooden with metallic tanks. The set will consist of ten tanks, each with a leaching capacity of 150 tons. The Overland mill at Sunshine will be started soon. Mgr. Peyton has built a plant with every device, by which the cost of milling is to be reduced.

Drifting in the Old Jordan and Galena, at Bingham, has begun under the old workings, which have been above the water level, although the output has reached several millions. Returns from ore in the Black Tunnel Co.'s mine at Tintic show sixty ounces silver and \$4.80 in gold. The White Swan mine, in Box Elder county, will continue work through the winter. They have 3 feet of ore,

averaging \$38.20 per ton. The Queen of Sheba, Deep Creek country, made a shipment of gold bullion and a lot of high grade concentrates. The ores average about \$10 per ton in gold, and twenty tons a day are treated.

The Sevier G. M. Co. will resume work on Gold mountain, and the blocking out of ore continued until the mill starts next spring. It is said there is enough ore blocked out to keep sixty stamps going, that will average \$14 a ton gold. There are in addition 3000 tons of tailings worth \$6 per ton.

At Fish Springs, in the Galena, a strike was made off the 500-foot level of ore that runs high in silver and lead. The report issued from the railway offices for last week shows there was delivered to the local and outside smelters 4450 tons of ore, while thirty-one carloads of bullion were billed to the refineries. No reference is made to aurocyanides sent through the express companies. Tintic furnished the greatest tonnage, Bingham next and Park City third. The report shows increase in tonnage out of Stockton. The report shows that Eastern smelters have drawn largely on the output of the camp, and at no time has so much rolling stock been required to handle it. One consignment of copper bullion was sent to Central Falls, Rhode Island.

The bullion shipment of the Eureka Hill mine, Eureka, for September, was sixty-four bars, containing gold, silver and copper. Work is to start on the Electric group of claims at Sunshine this month. The Sacramento M. Co. of Mercur made a shipment of aurocyanides last week.

The Ajax M. Co. at Mammoth shipped 100 tons of ore that runs high in copper with good values in gold.

At Park City, in Ontario preparations are being made to increase the output until it shall have become as great as it was before the closedown a year ago. The Anchor is putting out twenty-five tons of concentrates, in the production of which a little over sixty tons of crude ore is required. The zinc tailings dump is about as large as that which was purchased by the Peck concentrator, who moved 20,000 tons to the plant, where they are waiting treatment.

The Salt Lake Tribune is informed that there will be no less than four new gold mills erected on Gold mountain next season; that the Golden Star M. Co. will put up a plant is practically assured; the Chicago men purchasing four-fifths of the stock in the Deseret Co. will provide themselves with one; the Annie Laurie will put up a mill and the Mammoth has also concluded to put up a mill. In the Swansea at Silver City although large bodies of ore are blocked out, the company has decided upon a large amount of prospecting and development of new ground.

Tintic Miner: The shaft in the Joe Bowers has reached the 300 level, and stoping has begun. The shaft has gone through a good body of ore. In Tintic district on the 300 level in the Star Consolidated lead carbonate has been found which runs well in gold also. The company is placing an air compressor and machine drills and expects to sink 200 feet a month. Ore shipments for last week were 110 cars, eight carloads of concentrates and 74 bars of bullion. From Silver City shipments for the week were 39 cars of ore. The Regulator of Alta made a shipment of ore that netted \$30 a ton, and another consignment is on the way.

Bingham Bulletin: Shipments from Bingham last week averaged five carloads daily. At the Dalton & Lark work progresses on the 850 level. The face is all ore, and has a streak 18 inches to 2 feet wide of solid galena. Outside of this streak the ore carries 4½ to 35 per cent copper. The shipment for October will exceed 500 tons.

Mercur Mercury: The Columbia made another shipment of high grade ore, which brought \$50 to the ton. The Mercur mine made a shipment of cyanides amounting to 1184 pounds. The Silver King at Stockton has a body of high grade ore and is making good shipments. In the Honoline a large force is prospecting the ground. Good ore is being taken out of the Tip Top, while the Hercules, Argent and Catherine are yielding satisfactorily.

WASHINGTON.

A strike is said to have been made last Sunday in the Republic mine at Republic, on the north half of Colville reservation, of ore averaging nearly \$300 to the ton at a depth of 400 feet. The drills cut through 24 feet of ledge matter. The last 16 feet averaged fifteen ounces and the farther wall of the pay streak has not yet been encountered.

At Republic the Treasury mine has a ledge 6 feet wide, but of low grade. Work is progressing on the Golden Harvest claim. The tunnel has reached 309 feet and is driven 3 feet a day.

At Northport progress is made on the extension at the smelter. A large force is at work. Both blasts are in operation. At Wallace the Lexington mine has 3½ feet of quartz, sprinkled with galena. F. W. Fisher has taken a year's lease on the Blind Discovery and Giant claims near Kettle Falls and put men at work to develop them.

Near Chewelah the Copper King mine is developed to a depth of 325 feet by a tunnel driven 650 feet. The ore assays 40 per cent copper and \$4 per ton in gold. The Bay State has been opened by a 325-foot tunnel to a depth of 150 feet. The ore assays from \$5 to \$18 per ton gold. The ledge is 6 feet wide.

At Republic the Republic M. Co. built from two small lakes reservoirs, fed by springs, in

natural basins, the largest of which is 400 feet across. A dam has been constructed 180 feet in length and 15 feet in height. The lake is in the center of a meadow, ten acres in extent, surrounded by low bluffs. It is estimated that when full the ten acres will be covered by water an average depth of 10 feet. To utilize these lakes it was necessary to build 3200 feet of ditch.

At Colville, A. Hocksworth, a prospector, was committed to the county jail to await the sitting of the Superior Court in November, to answer to a charge of having torn down the stakes and notices of the Wild Oats claim. This is the first case brought in this county, and perhaps the first in the State, under the 1897 statute governing and protecting the stakes and notices on mining claims.

WYOMING.

In the Grand Encampment district four mines are in operation near Battle Lake, the Doane, the Haggerty, the Haskins and the Ledbetter. The Doane and Haskins are making shipments to Chicago, fifteen teams hauling the ore to Fort Steele, and the others are taking out ore to ship in the spring. Seventeen miles east of Battle Lake seven mines are said to be taking out ore. The Haggerty mine is said to have 8 feet of ore that will run 64 per cent copper and \$8 in gold to the ton. The camp at Battle Lake has about 150 men at work.

FOREIGN.

BORNEO.

The Borneo M. Co. has been in operation three years, near Sarawak. The deposits rest in a basin between high walls of rock. The gold is extracted with the aid of cyanide of potassium. The ore contains an average of \$12.50 in gold per ton. This is associated with antimony, the whole suffused with arsenious properties. The ores are silicious and readily leached. The company is crushing 250 tons a day, the mass being allowed to leach five days in a solution in which one-third of a pound of cyanide is used to the ton. The native miner is employed at 25 cents a day. In the early history of the diggings the Chinese made \$1 a day mining the antimony and casting aside the auriferous ores because their contents were not visible. The zone on which this company is operating extends into Dutch possessions about twenty miles, but its people have never undertaken to mine it. It has been traced to Sumatra, and the opinion prevails that it continues into the Philippines. Sir Charles Brooke continues undisputed ruler of the empire, and to mine there it becomes necessary to obtain a concession from the Government.

BRITISH COLUMBIA.

The Bullion group on Quartz creek, near Ymir, is to be equipped with complete machinery next spring. The property is owned by the A. I. G. M. Co. The corporation held its annual meeting recently in Rossland. The most important business transacted was in regard to the machinery for the Bullion. The Yellowstone mine, near Ymir, has been bought by the Gooderham-Blackstock corporation for \$50,000.

The Hall mines, near Nelson, will install an electric plant at the Silver King mine.

The trustees of the Cariboo M. & S. Co. announce that the assets of the company in Camp McKinney are transferred to the Cariboo Con. M. & M. Co., Ltd., of British Columbia. The output of the mine for October is about \$27,000. The output for the first half of October was 870 ounces in the cleanup, which is worth about \$13 per ounce, and about \$2000 worth of concentrates.

Victoria Times: At Texada island the Everett smelter people have bought 50,000 tons of ore from the big mine on the island owned by the Union Iron Works of San Francisco, and which is one of the most extensive iron beds to be found anywhere. The shipments the company have already taken out, which included a contract of a like amount to the present one, have only served to open it up. The smelter is paying \$50,000 for the privilege to mine. For two years the Payne mine, near Sandon, has shipped an average of fifty-eight tons of ore daily. After deducting freight, duty and smelter charges this nets the owners over \$80 per ton, or \$4640 per day. There are 125 men employed. The breaking down of the ore necessary to get these large returns has not interfered with the development of the property. A year ago the new tramway was started and assisted the economical handling of the product. The tram runs on the surface and is 5700 feet long, connecting the mine with the Kaslo & Slocan railway a mile from Sandon. Each of the cars holds four tons of ore, and can be loaded at one end and dumped at the other in five minutes. The Payne is worked largely by tunnels. The property consists of four claims.

MEXICO.

The importation of Mexican ores through El Paso averages 500 tons per day. The Sierra Mojada mines, between Chihuahua and Coahuila, are the heaviest shippers, while Parral, Pachuca and Sonora come next as to quantity, and the city of Chihuahua is third. The influx of ores by the new Sierra Madre Railway is increasing. Large quantities of Sonora ore are tributary to that line. The Sierra Mojada mines produced from Oct. 1st, '98, to July 31st, '98, 651,490,224 kilograms of ore, from which were extracted metals to the value of \$20,178,640.46. At Parral the Hidalgo M. Co., which heretofore has been shipping from \$300,000 to \$400,000

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of silver bullion, is doubling its capacity, and other companies are increasing their output. —The first system of compressed air motive power in Mexico has been completed at the Rincon mines, near Temascaltepec, in the State of Mexico. The plant cost \$100,000.

M. C. McDonald, owner of the San Cristobal mine, Zacatecas, struck the veins on his second lead and finds the ore of good quality. (Note: W. S. Morrow of the Mesa Quemada mining district, Sonora, Mexico, has completed his tunnel into the Guillermina mine and cut a good vein of ore.)

A. M. Lohis has opened a gold mine near Ocampo, in western Chihuahua. He is running four arrastras, but contemplates building a mill.

It is estimated that the mines at Bacerac, Sonora, which G. W. Wood recently leased, will produce a large quantity of ore. The mine has been opened up along the length of the property 3600 feet, all in ore. The value of the ore shipped to El Paso has been 225 ounces silver. The gold value of the ore averages 1 ounce to the 100 ounces of silver contained in the ore. The vein varies in width from 18 inches to 13 feet.

A strike has recently been made by H. Smith in the Capulin mountains of northwestern Chihuahua near the Sierra Madre railway. The vein carries 7 feet of ore, averaging 45 ounces silver to the ton. —The Rio Concho M. Co. have begun to work the placer deposits at Santo Domingo, Chihuahua. They have put in about \$250,000 worth of machinery, pumps, roads and buildings. The placers are worked by hydraulic mining. About 5000 tons of dirt are being handled daily, which is said to yield 40 cents gold per ton, and 250 men are employed.

Two Republics: The mines of Burns & Daily near Villa Ahumada, Chihuahua, are shipping large quantities of ore. The owners shipped to El Paso one ton of ore from a pocket recently struck which yielded \$15,000. The ore is a black sulphide, though the vein carries considerable chloride of silver of high grade.

ONTARIO.

The Olive G. M. Co. have taken out enough gold with a 2-stamp mill to pay the expenses of operating the mine, installing machinery and a 10-stamp mill with air compressor plant which in a short time will be in operation.

THE PHILIPPINES.

Admiral Dewey has forwarded to the Navy Department a memorandum on mineral resources of the Philippines, prepared at the admiral's request by Prof. G. F. Becker of the United States Geological Survey. Professor Becker made considerable researches and consulted all the available authorities. Only about a score of the several hundred islands, he says, are known to contain deposits of valuable minerals. He includes a table showing the mineral-bearing islands and their resources. This table is as follows:

Luzon—Coal, gold, copper, lead, iron, sulphur, marble, kaolin.
Cataanduanes, Sibuyan, Bohol and Panay—Gold only.
Marinduque—Lead and silver.
Mindoro—Coal, gold and copper.
Carraraybatan, Rapu Rapu, Samarara and Negros—Coal only.
Masbate—Coal and copper.
Romblon—Marble.
Samar—Coal and gold.
Panay—Coal, oil, gas, gold, copper, iron and perhaps mercury.
Biliran—Sulphur only.
Leyte—Coal, oil and perhaps mercury.
Cebu—Coal, oil, gas, gold, lead, silver and iron.
Mindanao—Coal, gold, copper and platinum.
Sulu Archipelago—Pearls.

Of the coal, Mr. Becker says that it is analogous to the Japanese coal and that of Washington, but not to Welsh or Pennsylvania coal. It might better be characterized as a highly carbonized lignite, likely to contain such sulphur as iron pyrites, rendering it apt to spontaneous combustion and injurious to boiler plates. Nevertheless, he says, when pyrites seams are avoided and the lignite is properly handled it forms a valuable fuel, especially for local consumption.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING OCTOBER 25, 1898.

612,814—SOFA BED—M. Brilliant, S. F.
612,938—ROPE GRIP—H. M. Brittan, S. F.
612,883—NAIL HOLDER—L. W. Dexter, San Jose, Cal.
612,897—TUBE CONSTRUCTION—B. F. Ellis, Berkeley, Cal.
612,903—CORN PLANTER—R. L. Hoffman, Santa Ana, Cal.
612,929—INSULATOR AND HANGER—W. C. Keithly, Cal.
612,856—LAWN MOWER—P. C. Mabury, San Jose, Cal.
613,169—CARBURATOR—F. L. Martenette, Chico, Cal.
613,169—DOOR KNOB—J. W. T. Morris, Summerland, Cal.
613,075—WAVE MOTOR—J. W. Pitts, Hueneme, Cal.
613,020—TRAY TURNER—M. L. Rupp, Fresno, Cal.
612,917—STOCK FEEDING DEVICE—J. Shepard, Aptos, Cal.
612,919—SOFTENING FROZEN EARTH—J. H. L. Tuck, S. F.
612,910—WATER CYCLE—Winquist & Olsson, Oakland, Cal.

NOTE: Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Recently Declared Mining Dividends.

Swansea, Utah, \$5000; Oct. 31.
South Swansea, Utah, \$7500; Oct. 31.
Grand Central, Utah, \$31,250; Oct. 31.

Coast Industrial Notes.

—The U. S. retains the Philippines.
—Spokane, Wash., has a population of 40,000.
—California's '98 wheat crop is estimated at 500,000 tons.

—The Oakland, Cal., Industrial Exposition begins next Saturday.
—It is estimated that 25,000 freight cars are now in use in California.

—Over 5000 men are employed on railroad construction between Robson and Greenwood, B. C.

—"Good coal" is reported discovered in American territory, Alaska, 100 miles below 40-Mile river.

—Atlin lake, Alaska, is announced as a gold producing district. There have been 1500 claims recorded.

—On the 15th ult. the Oregon Legislature reduced the legal rate of interest in that State from 8 to 6%.

—The *Two Republics* says that Chihuahua capitalists will build a system of electric railways for their city.

—The total seal catch this season in Arctic waters and the North Pacific was 27,865 skins, the lightest for years.

—Hop sales in Washington county, Oregon, involving 97,000 pounds were made last week. The price paid was 15 cents.

—The Summerland, Cal., *Advance* states that the Robinson Oil Co. has leased twenty-one acres of land at Serena and will sink for oil.

—The Acme Wrecking Co. of San Francisco has made a request upon the Navy Department for authority to raise the battleship Maine.

—The Canadian government will build a railway from North Vancouver to the Lake Atlin gold fields via Bridge river and Lil-loet, B. C.

—The exportation of henequen from the port of Merida, Yucatan, Mexico, amounted during September to 4,404,161 kilos valued at \$1,026,045.25.

—San Francisco, Cal., supervisors will ask Congress to there establish a plant for the manufacture of steel armor plate. A gun plant is also in order.

—The Administration will urge the construction of the Nicaraguan canal by government aid in connection with the concession of the Maritime Canal Co.

—The water of the Bear river, southern Idaho, is to be made to irrigate 500,000 fertile acres. A dam and canal will be built. G. C. Parkinson, Preston, Idaho, is at the head.

—Redlands, Cal., contemplates changing from the horse-car to the electric street railway system. The line is three miles long and the estimated cost of the change is \$35,000.

—The Puget Sound Reduction Co., Everett, Wash., shipped sixty tons of lead last week to the American Trading Co., in Shanghai, China. It was shipped in bond to Vancouver.

—The Clearwater Valley Railroad Co. has incorporated at Salem, Or., capital \$3,000,000, to build and operate a railroad from Lewiston, Idaho, up the Snake river to Wallula, Wash.

—It is estimated that 50,000,000 pounds of freight were handled at the Keswick, Cal., railway station in October, due almost exclusively to the Mountain Copper Co.'s operations at that place.

—Hawaiian postage stamps are now recognized at their face value for the prepayment of postage on all articles mailed in Hawaii, whether addressed for delivery in the United States or elsewhere.

—A survey is being made for an electric railway between Index and Galena, Wash. The road would reach the Sunset, Silver Creek and Keystone mines, all of which would become shippers.

—Torreon, Mexico, will have the second largest cotton mill in the republic. It will be known as the La Fe. At the start it will employ over 600 hands and when in full running will carry over 2000 people on the payroll.

—The Santa Fe stockholders act on the S. F. & S. J. Valley road transfer at a special meeting to be held December 8th. The company issues a circular giving full details, which shows that they are in earnest in intent to enter San Francisco.

—The receipts of quicksilver in San Francisco the first eight months of the year were 15,935 flasks, against 10,760 the same time in 1897. The exports by sea during this period were 4257 flasks valued at \$154,966, against 3368 flasks valued at \$120,619 in 1897.

—The Robson-Pentiction branch of the Columbia & Western Railway employs 5000 men. It is 105 miles long and extends from Robson, a small town located at the junction of the Columbia and Kootenay rivers, through the Gold range of mountains to Midway, B. C.

—At San Diego, Cal., last Monday, President Ripley of the Santa Fe said that the traffic arrangement with the Southern Pacific to use its Tehachapi line as a connection had not yet been made and he thought it likely the Santa Fe would build its own line over the Tejon pass.

—The new steamship company to ply between France and San Francisco, touching at South American, Central American and Mexican ports, among which are Manzanillo, Mazatlan, Santa Rosalia and Guaymas, has notified the government at Sonora, Mexico, that the first steamer of the line has started from France.

—*Two Republics* says the Campaña Industrial at Chihuahua, Mexico, has received forty carloads of machinery for the steel works to be erected there. New buildings, all of iron, will be erected, for which the material has been ordered in the United States. These will be the first steel works in the re-

public of Mexico and will have a capacity of twenty tons daily.

—C. F. Gardner, Gen. Mgr. Westside Flume & Lumber Co., Sonora, Cal., expects by July next to have a sawmill on the north fork of the Tuolumne, and that the Sierra railroad will then have reached that point. It is proposed to establish a concern that will handle a yearly output of 15,000,000 feet of lumber.

—If the much-rumored story is true that the Union Pacific is to throw open all gateways, the Salt Lake *Tribune* thinks that the most important question to all the prairie lines and Colorado roads will be whether the Silver Bow gateway will be opened to let the Northern Pacific and Great Northern into southern Idaho.

—The issue in London, England, of £250,000 securities will be made a first charge on the first division of the line from Skaguay, Alaska, over the White pass to Lake Bennett, N. W. T., about fifty miles. The rate of interest is 6 per cent, which the contractors guarantee for two years. The line is now operated as far as the top of the pass.

—Beginning November 15 the Southern Pacific will advance rates on the following articles from California terminals to New Orleans and New York, via Sunset Gulf route—the basis of calculation being cents per 100 pounds: Antimony ore, from 50 to 60; manganese ore, 50 to 60; chrome ore, 50 to 60; canned salmon, 40 to 60; rags, 50 to 60; borax, 50 to 60; rubber junk, 50 to 60; wine in wood, 40 to 60.

—*Modern Mexico* says that the result of the war has improved the general standing of Americans in Mexico, and through the same cause many Spaniards find that they do not receive quite the same homage from the native populace that they did before their recent ignominious defeat. These changes are not marked to the casual observer, but they exist and will work to the advantage of American enterprise and trade in the Republic.

—From San Francisco to Yokohama is 4500 miles; from San Francisco to Honolulu is 2100 miles; from Honolulu to Sydney, Australia, is 3500 miles. With the exception of that from the United States, only a very small part of the trade of America goes to the Pacific. The imports of this country to Asia and Oceania, according to the latest figures, were \$119,000,000, and the exports \$67,000,000, making a total of \$186,000,000. Include the entire trade of the western continent in the Pacific, and total imports reach \$261,000,000 and the total exports \$212,000,000. Added to the trade of the older countries, the entire commerce of the Pacific is not less than \$3,600,000,000 each year, which means that \$1 in every \$7 of the world's trade now passes over those waters. Of this enormous traffic Great Britain secures the lion's share, importing \$265,000,000 and sending out goods to the value of \$335,000,000, or a total trade of \$600,000,000. The United States stands next, with a total trade in the Pacific of \$200,000,000, or one-third of that of Great Britain. Germany stands a close third, with \$100,000,000 of imports and \$45,000,000 of exports. France is fourth on the list, with about one-half the trade of Germany. The greater part of the remaining trade is divided among the eastern countries which border on the Pacific.

—W. T. Stead, writing from St. Petersburg, says: "Americans are coming to the front in Russia, which is at the beginning of a new epoch of industrial development. No one realizes the great resources of the immense country through which the Czar is running an iron highway, 8000 miles long. Americans are supplying many of the rails, American engineers are everywhere. One American is superintending the construction of the new steel works near St. Petersburg, American dredgers are to deepen the Volga, the Dnieper, the Don, and other Russian rivers. The representatives of an American pump are laying down 200 miles of 8-inch piping in the Transcaucasian region, through which the Rothschilds' oil combination will pump petroleum by means of four pumping stations, all of which will be supplied with the latest American pumps. The other day I met an American geologist and engineer who, having quit the post of City Engineer in a great American city, has been spending the summer examining the gold mines of Northern Siberia, and before the day was over I stumbled on another who had been reporting on copper mines in the Kirgi steppes. The testimony of these Americans was favorable to the labor value of the Siberian workmen. The Russian is docile, quick to learn, and does quite as good work as the skilled laborer in the States. As a craftsman, he is a past-master with his own tool, the ax."

Commercial Paragraphs.

Two 800 H. P. cross-compound, condensing Reynolds Corliss engines, built by the E. P. Allis Co. of Milwaukee, are now being erected at the works of the Butte & Boston Co., Butte, Mont.

R. J. COREY of the E. P. Allis Co., with headquarters at Butte, recently sold to the Highland Boy Gold Mining Co. of Salt Lake City 700 tons of machinery for the Highland Boy smelting plant, to be erected near Murray, Utah. This company's mines are at Bingham.

"IMPROVED BRUSH ARC LAMPS" is the title of a brochure just issued by the General Electric Co., dealing with the modifications introduced in the latest types of single and double Brush arc lamps as experience with the operation of past types has dictated. Each detail of improvement is clearly explained in conjunction with illustrations, so that any one unfamiliar with the Brush lamp mechanism will find no difficulty in grasping the import of the various changes and improvements. The pamphlet is issued from the General Electric Co.'s own printing office, and will be sent to those interested on application to any of the company's sales offices.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

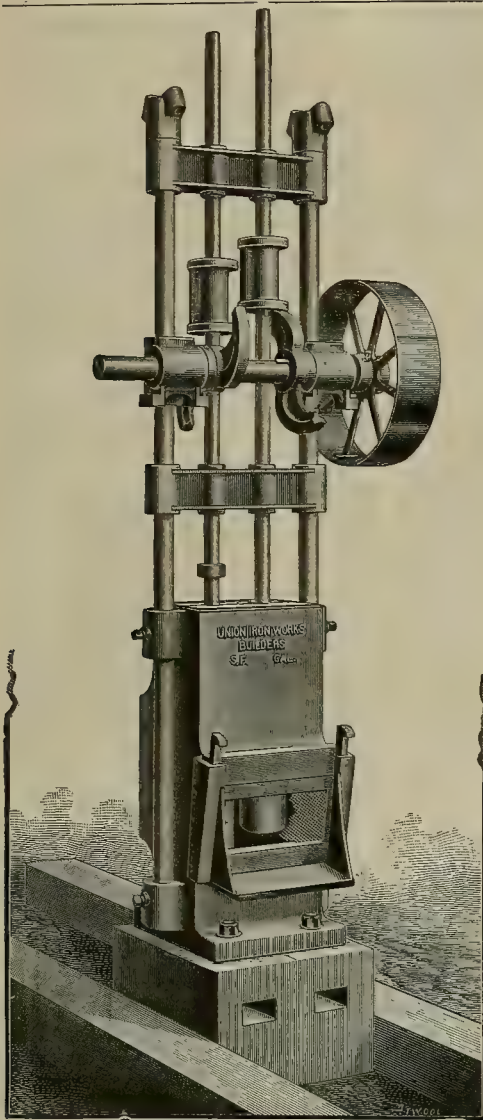
APPARATUS FOR SOFTENING AND EXCAVATING FROZEN EARTH.—J. H. L. Tuck, San Francisco, Cal. No. 612,919. Dated Oct. 25th, 1898. This invention relates to an apparatus which is especially designed for softening and excavating frozen earth, so that any precious or valuable metals contained therein may be extracted. It is especially applicable to mining in high latitudes where the earth remains frozen to a great depth throughout the year. It consists of an open front caisson having a closed rear end and a cover, means for holding the caisson in contact with the surface to be excavated, a universal joint and a movable tube passing through said joint adapted to loosen and excavate the material within the caisson, a pipe extending outwardly from the cover of the caisson, a heating furnace with which the pipe is connected, a fan blower by which air is forced into the pipe, and thence into the caisson and a preliminary heater fixed to the smoke stack of the furnace having an inlet valve at one end and a pipe connecting the opposite end with the fan blower.

INSULATOR AND HANGER FOR ELECTRIC RAILWAYS.—W. C. Keithly, San Francisco, Cal. No. 612,929. Dated Oct. 25, 1898. This invention relates to improvements in insulators and hangers by which the trolley wires of electric railways are suspended. It consists essentially of an improved construction of the porcelain insulator, means for securing it within the exterior metal cap, means for securing the bolt from which the trolley wire is suspended within the interior of the insulator, means for protecting the insulator from damage by the upward spring of the trolley pole, and means for suspending the whole device above the line of wire, comprising channeled lugs upon opposite sides, arms, the upper ends of which are adapted to interlock with said lugs and the lower ends having attachments for transverse wires approximately in line with the suspending trolley wire.

WATER CYCLE.—F. O. Winquist and E. Olsson, Oakland, Cal. No. 612,920. Dated Oct. 25, 1898. This invention relates to improvements in apparatus for traveling upon the water and employing the propelling power of the rider. It consists essentially of a pair of floats with a uniting framework by which they are retained in a substantially parallel position, seats, pedal shafts and steering mechanism mounted upon the framework above the floats, a propeller shaft journaled longitudinally between the floats having propeller blades fixed thereto at a distance apart, and independent of each other, sprocket wheels and chains through which motion is communicated from the pedal and counter-shaft to the propeller shaft, the chains having their links made in a wedge shape so as to divide the water through which the links pass and reduce the friction. The steering is effected by means of rudders upon each of the floats connected with tiller ropes and steering handles in such a manner that the two rudders are turned in either direction in unison. The floats are subdivided by bulkheads and have diagonal interior braces and exterior braces which form a continuation thereof and connect with framework so that the whole apparatus is made rigid.

FOLDING SOFA-BED.—M. Brilliant, San Francisco, Cal., assignor of one-half to F. M. Plaisted of same place. No. 612,816. Dated Oct. 25, 1898. This invention relates to furniture of that class known as folding beds, sofas, chairs or couches, and is so arranged as to be conveniently extended for reclining purposes or folded into form for day use. It consists of a permanent seat frame, a back having separated pivotal and slidable supports about which it is turnable from an approximately vertical to a horizontal position, a cap piece with links by which it is hinged to the extension section so that it fits over and forms a finish for the upper end of the back and extension section when the two are in vertical position, said cap piece swinging about the connecting links so as to drop below and out of the way when the extension is unfolded. The arms have rolls divided longitudinally and hinged so that the upper part may open outwardly and form transverse extensions.

ROPE GRIP AND PROPELLING DEVICE.—H. M. Brittan, San Francisco, Cal., assignor to the Washburn & Moen Manufacturing Company, Worcester, Mass. No. 612,923. Dated Oct. 25, 1898. This invention relates to an apparatus which is especially designed to apply propelling power to a rope by means of grips which will prevent the rope from slipping, said grips grasping the rope and holding it firmly during a portion of its travel, then releasing it to allow it to continue its movement without impediment. It consists essentially of a link chain and wheels or pulleys around which the chain passes and through which motion is conveyed to it. The gripping jaws are pivoted to the links and carried by them. These jaws and the chain travel upon one side of the pulleys in the line of travel of the rope to be propelled, and they diverge to admit the rope between them having internal gripping dies. Anti-frictional bearings are carried upon the outer ends of the jaws, and these pass between ways which act to close them against the rope, thus maintaining a grip upon it during the travel of the jaws in the same direction with the rope, and at a point where the rope is to escape the grips diverge and may have devices by which they are absolutely separated to clear the rope at the point where it leaves the line of travel of the grips.



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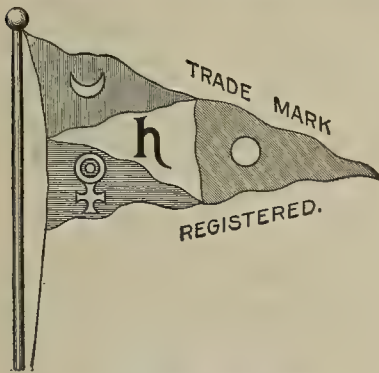
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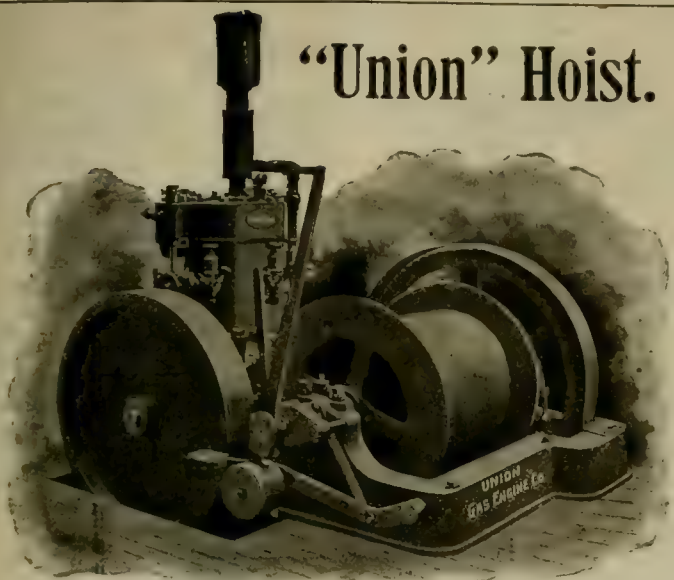


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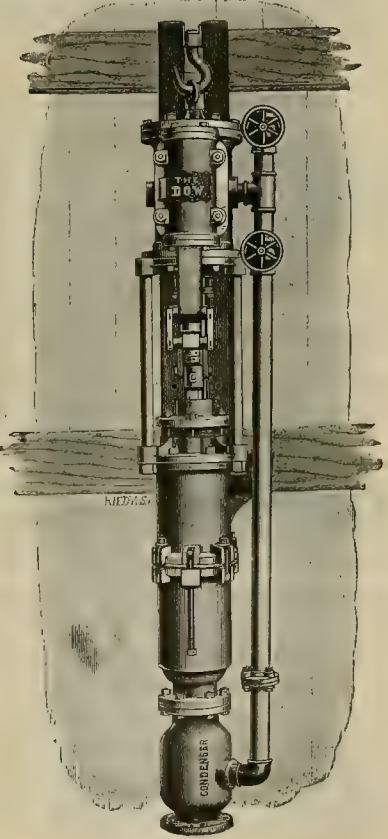
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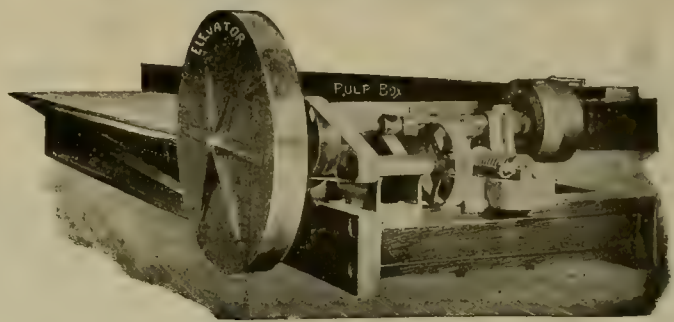
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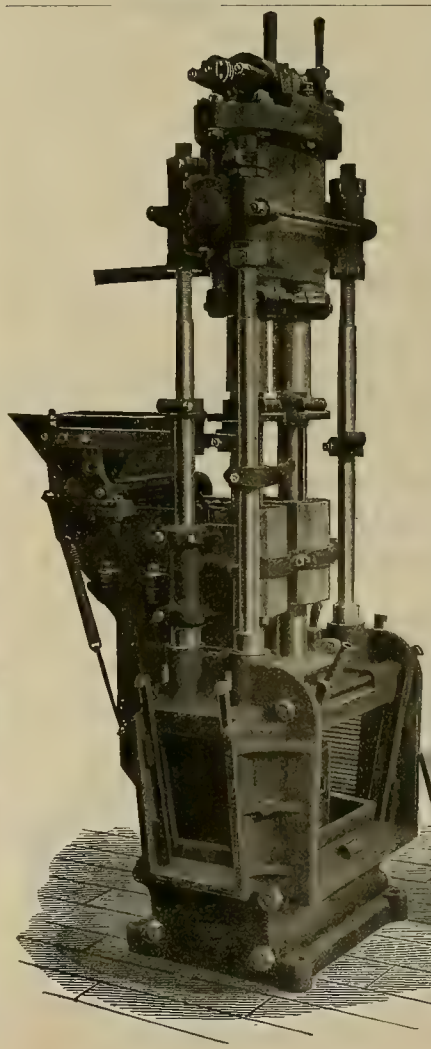
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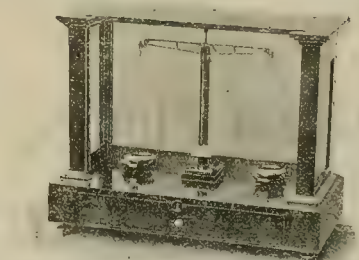
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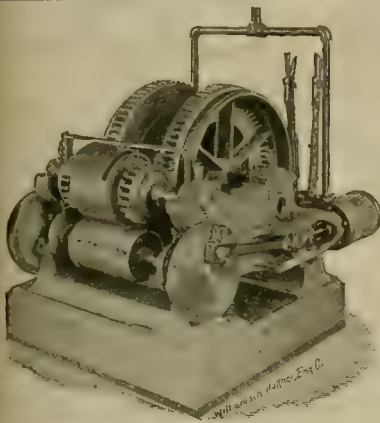
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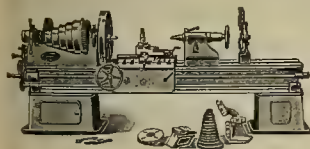


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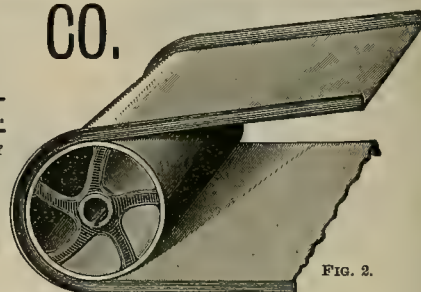
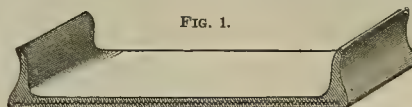
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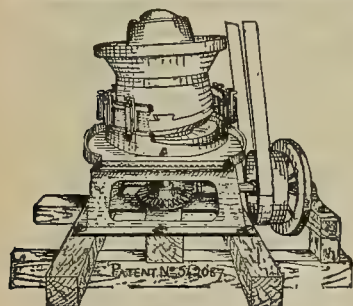
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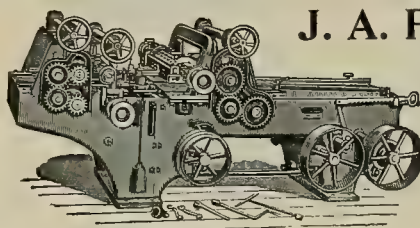
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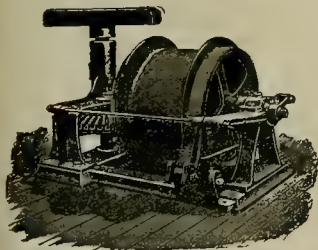
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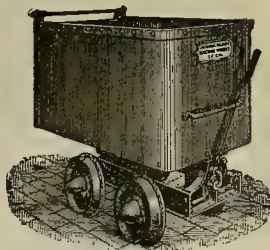
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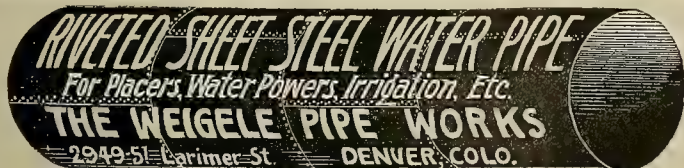
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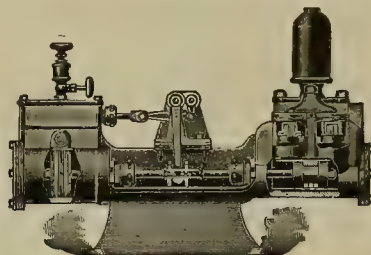
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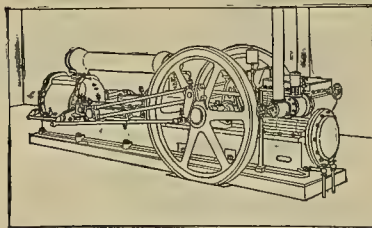


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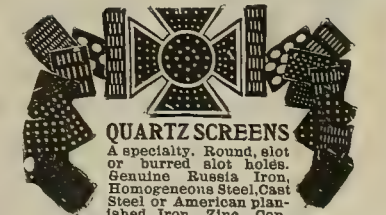
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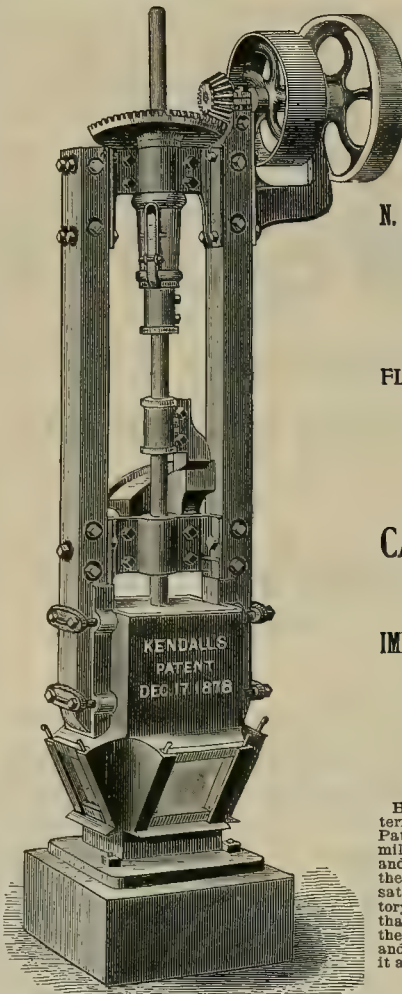
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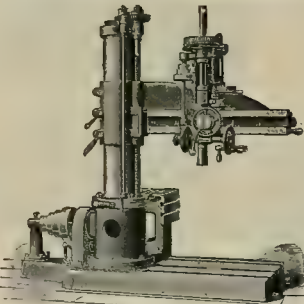
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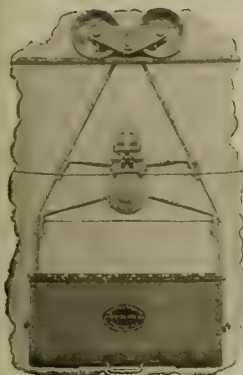
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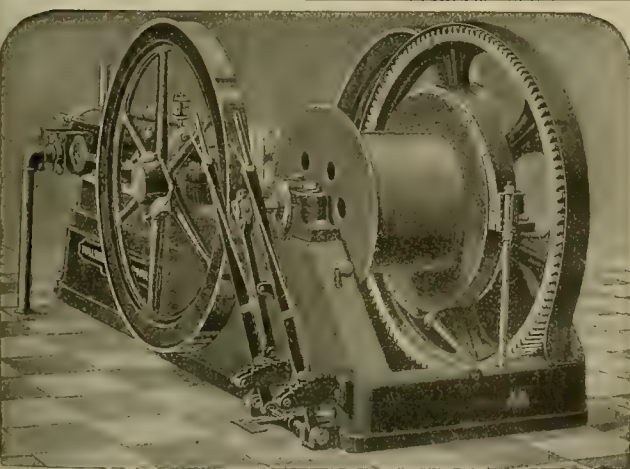
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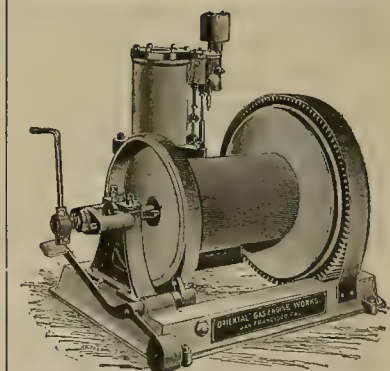
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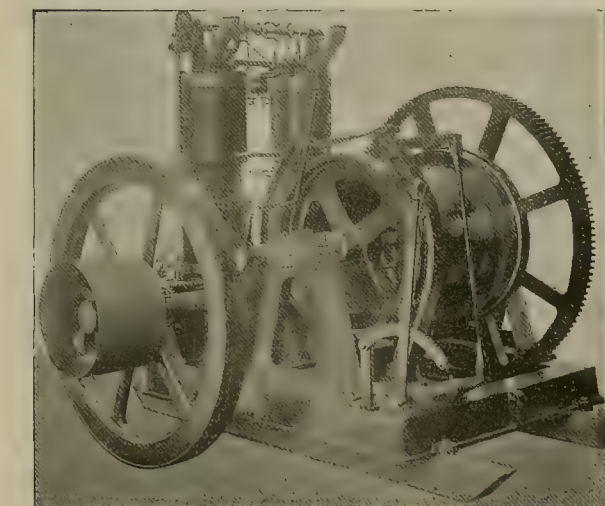
WATER WORKS.—Sealed proposals will be received on or before 12 M., November 15th, 1898, for the construction and completion of certain additions to the existing water works, owned and controlled by the City of Seattle. The said additions include a gravity water supply from Cedar River, reservoirs and portions of an auxiliary high-service system in the city. The contract to be let will embrace the following general items of construction: Head works on Cedar River, consisting of Diverting Weir, Intake Canal (400 feet long) and Settling Basin, Pressure Pipe to City, 42 inches diameter, 28.4 miles in length; of which 6.4 miles are to be riveted steel and 22 miles to be stave-pipe banded with steel bands 1/4 inch in diameter. High-service Reservoir in City; capacity 16 million gallons. Low-service Reservoir in City; capacity 20 million gallons. Auxiliary High-service Steel Stand-Pipe, 30 feet diameter by 60 feet high, incased in Ransome concrete. Pumping Main to Stand-Pipe, 13,200 feet 12-inch Kalamain Pipe; 2600 feet 16-inch Kalamain Pipe; 36-inch Stave Pipe, connecting reservoirs, about one mile in length; 30-inch Stave Pipe, 3000 lineal feet, waste from High-service Reservoir; 30-inch Riveted Steel Pipe, 4800 feet length, connecting Low-service Reservoir with distribution system. Changing Cedar River Channel, 60,000 cubic yards excavation. Clearing, Dam and Connections at Swan Lake. Two Gate-houses, Specials, Valves, etc. The contract to be entered into will provide that payment shall be made for this work only by warrants upon the "Cedar River Water Supply Fund of Seattle," as created and established by Ordinance No. 3994 of the City of Seattle, and the contractor shall have no claim against the city except as therein provided. By said ordinance 75 per cent of the cash receipts of the entire city water system are invariably set aside and pledged to the payment of interest at 5 per cent per annum and the gradual redemption of said warrants. In addition to the warrants, which will be issued in payment for the construction of said additions, the contractor will also be required to purchase at par any and all warrants which shall be drawn on said fund by the city in such amounts as shall be required to pay for any real estate, rights, easements or privileges necessary for the prosecution of the work of construction and the perpetual control by said city of the additions to the water works herein specified, whether obtained by purchase, agreement or condemnation proceedings, and also such warrants as shall be drawn upon said fund by the city in payment of engineering and other expenses necessarily incurred in connection with said additions; provided that the amount of the warrants thus required to be purchased by the contractor shall in no case exceed the sum of Sixty-four Thousand (\$64,000) Dollars. Each bid must be accompanied by a certified check, payable to the order of the City of Seattle, for a sum not less than five (5%) per cent of the bid, and no bid will be considered unless accompanied by said check. The successful bidder will be required to enter into a contract and furnish satisfactory bond for the amount required by the City Charter and the laws of the State of Washington, within ten days after being notified of the award of the contract to him; failing so to do, the said check and the amount fixed therein will be forfeited to the city. No person is eligible as a bidder who has within two years prior to the letting of said contract made default in payment of any just claim for any work or labor performed, or any skill or material furnished pursuant to any such contract as herein advertised, or who within said two years failed to complete any such contracts. Special attention is called to Article XXIII of the City Charter, as now in force, relating to "hours of labor," and to Article XIII, Section 31, Subs. 1 and 2, relating to bonds and sureties. All bids must be made in accordance and comply with the plans and specifications now on file in the City Engineer's Office, and in compliance with Ordinance No. 3990. The City of Seattle reserves the right to reject any and all bids. Proposals must be indorsed on envelope "Bids for Constructing Certain Additions to the Water Works of the City of Seattle." By order of the Board of Public Works.

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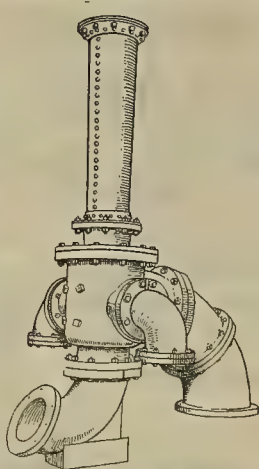
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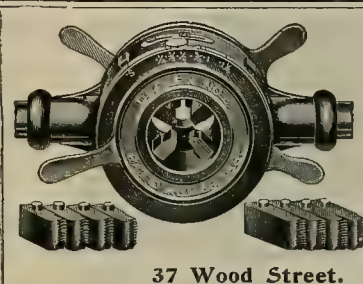
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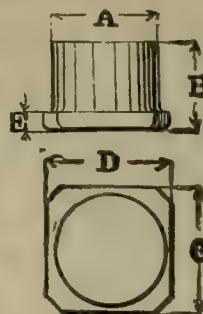
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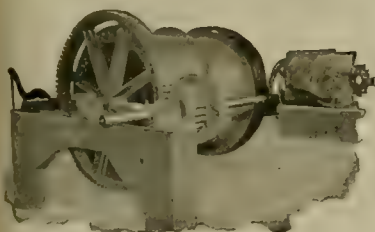


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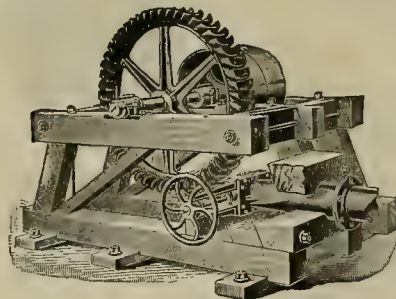
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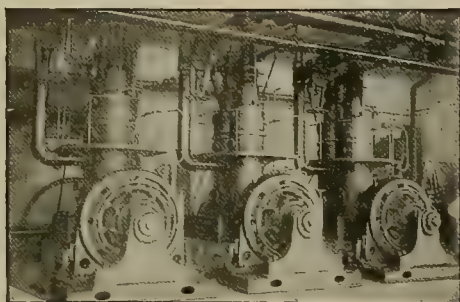
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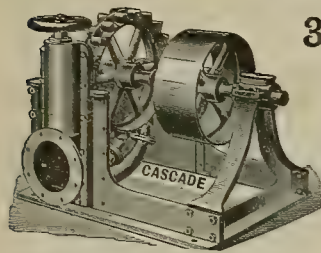
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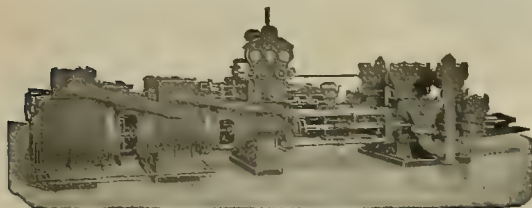
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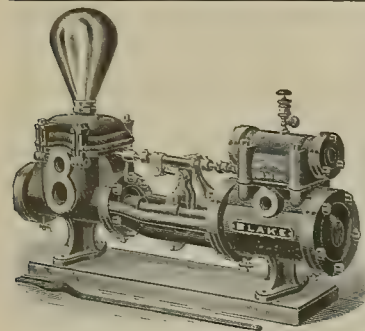


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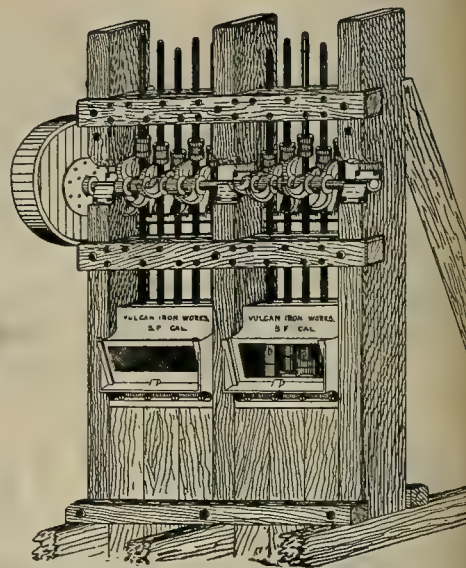
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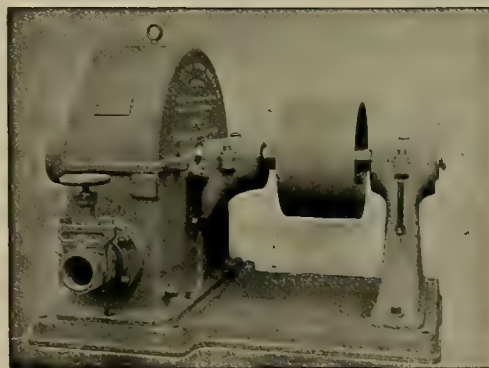
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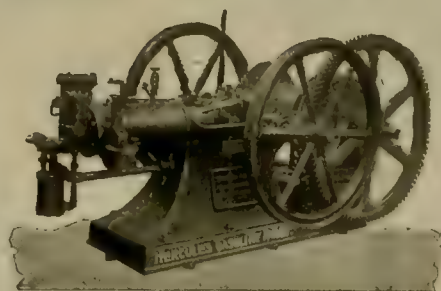
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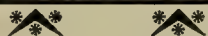
Suction or Deep Well, that throw a STRAIGHT STREAM. No cranks. No air chamber. Water travels a uniform speed. Shows no pulsation. Can be direct connected to engine shaft, geared to motor, or driven by belt. Suction pumps are packed without removing any part. A piston pump with valves. It has no equal for gasoline engines and hoists.

S. W. LUITWIELER CO.,

200-202 NORTH LOS ANGELES ST., LOS ANGELES, CAL.

Mining Timber

WRITE TO-DAY



The L. W. BLINN LUMBER CO.,

Main Office, 348 E. Second St. = LOS ANGELES, CAL.

and let us make an estimate on your next order for LUMBER, SHINGLES, SHAKES and R. R. TIES. We make a specialty of MINING TIMBER and PLANK for Arizona and Mexico shipment.

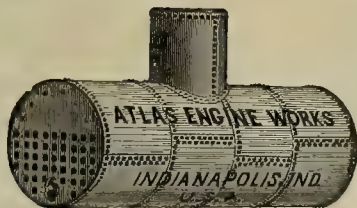
BAKER IRON WORKS, LOS ANGELES, CAL.

Stamp Mills a Specialty.

**ATLAS ENGINES AND
BOILERS.**

**HOISTING
ENGINES.**

**Agents for Henry R.
Worthington
Steam Pumping
Machinery.**



MANUFACTURERS OF

**MINING AND MILLING
MACHINERY.**

**General Foundry
Work
And All Kinds of
Heavy
Forgings.**

PIPE!

We manufacture Water
Pipe for



**Hydraulic Mining
and Irrigation.**

IRRIGATION SUPPLIES OF ALL KINDS.

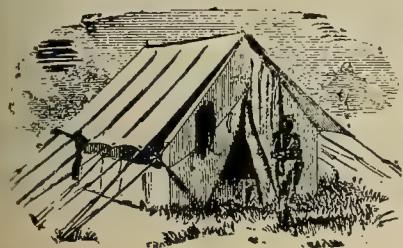
WELL CASING, OIL TANKS,

**—AND—
General Sheet Iron Work.**

Write to us for an estimate on your next job.

Lacy Manufacturing Co., LOS ANGELES.

Office, Room 4, Baker Block,



WM. H. HOEGEE,

— MANUFACTURER OF —

**Awnings, TENTS, TARPAULINS, Sails, WAGON COVERS, ORE BAGS, RUBBER BOOTS, RUBBER,
LEATHER and CANVAS CLOTHING, Sporting Goods.**

**Tents and Canvas Floor Covers for Rent. Fancy Awnings for Residences. Camp Furniture.
JOBBER IN COTTON DUCK.**

Write for Price List.

136 South Main Street,

= LOS ANGELES, CAL.

Personal.

M. W. MATHER, Supt. Croesus G. M. Co., Alleghany, Cal., is in San Francisco.

M. GUNTHER has been appointed Supt. Little Pittsburgh mine, Mercur, Utah.

P. J. McCLELLAND has been appointed Supt. Golden Trout mine, Strawberry, Cal.

F. DERN of the Mercur M. Co. has returned to Salt Lake City from Fremont, Neb.

D. FRICOT, owner Independence mine, Grass Valley, Cal., has returned from San Francisco.

F. KLEPETKO, Mgr. Boston & Montana Co., Butte, Montana, is visiting Salt Lake City, Utah.

GEO. P. PFUNDER has resigned as Supt. Virginia and Monte Christo mines, Rossland, B. C.

S. T. GODSE of the Nevada M. Co. has returned from Pioche, Nev., to Salt Lake City, Utah.

W. VERCOE, Supt. Gavilan gold mines, Riverside, Cal., has returned from London, England.

F. LEONARD, Pres. and Supt. Comstock Tunnel Co., is in San Francisco from New York City.

W. MAITLAND, Supt. Nash Deep Gravel M. Co., has returned from San Francisco to Abrams, Cal.

I. COPELAND managing owner Gold Bluff mine, Downville, Cal., is at his home in Alameda, Cal.

E. GAYFORD succeeds M. Bamberger as metallurgist at the Mercur M. Co.'s mill, Mercur, Utah.

J. C. DIAMOND, managing owner Limpensell mine, Placerville, Cal., has returned from San Francisco.

W. L. WATTS of the California State Mining Bureau is still investigating the oil fields of southern California.

C. ALLENBERGER, Gen. Mgr. Altoona Q. S. M. Co., Chinabur, Cal., has returned from the mine to San Francisco.

J. M. HARPER of San Francisco is at Forest, Cal., on business connected with his mining properties in that locality.

W. G. LONG, Supt. Maryatt-Gagnere mine, Tuttleton, Cal., has returned from a business trip to San Francisco.

H. E. STEWART has been appointed Gen. Mgr. Butte & Boston and Golden Harvest Co.'s mines at Republic, Wash.

H. VISCHER of the U. S. Debris Commission, San Francisco, is making a trip through Nevada and Sierra counties, Cal.

MGR. MULROONY of the North Swansea at Robinson has returned from Leadville, Colo., where he is also engaged in mining.

W. B. ANDREW, Mgr. Young America M. Co., Tuscarora, Nevada, has returned from San Francisco to Salt Lake City, Utah.

MATT W. ALDERSON of Whitehall, Montana, has gone to Goldenville, Nova Scotia, to erect the first cyanide plant in that section of country.

W. A. M. VAN BOKKELLEN has been chosen Sec. Central Eureka M. Co. of Amador county, Cal., with offices at 320 Sansome St., San Francisco.

P. KERVIN, Supt. Con. Virginia mine, Virginia, Nevada, has returned from the Allison Ranch mine, of which he is Gen. Mgr., at Grass Valley, Cal.

C. A. MOLSON, Gen. Mgr. Tomboy mine, Telluride, Colo., has returned home from Idaho, where he has been examining mining properties for Eastern people.

S. NEWHOUSE, of the Highland Boy mine, Bingham, has gone to Durango, Mexico, to inspect operations on properties owned by himself and associates in that country.

K. S. AGAPOFF, an M. E. from Siberia, is in Grass Valley, Cal., commissioned by the Russian Government to visit mining localities to study the modern methods of working mines.

D. A. MACDONALD, an experienced prospector and old California miner, has returned from Golovan Bay, Alaska, and will winter in San Francisco. He returns early in '99 to a rich claim that he secured.

COL. SAMUEL L. MANSFIELD, corps of engineers of the United States army, has been appointed a member of the California Debris Commission. Col. Mansfield is a native of Connecticut and a graduate of the Military Academy.

OTTO STALMAN, Gen. Mgr. for the Glasgow & Western Co. of Golconda, Nevada, has returned to Salt Lake City from the West. On his trip Mr. Stalman went as far as California, whence he reports to the S. L. Tribune greater interest in mining than at any period since the boom in Comstocks. Some of the big properties are suffering, he says, through a lack of water, which promises to be overcome with the installation of electrical energies, while a large amount of work is being done on prospects.

Recent Mining Incorporations.

Red Banks M. Co., San Francisco; capital stock \$100,000, subscribed \$250; A. Wartwister, H. Bratnober, J. Solinger, T. Mein, L. H. Mooser.

Sam Houston M. Co., San Francisco; capital stock \$100,000, subscribed \$25; H. M. Owens, J. H. Henderson, R. T. Owens, J. C. Owens, C. M. High.

Star Gulch M. Co., San Francisco; capital stock \$50,000, subscribed \$5; R. H. Blake, L. R. Han, F. Reichert, J. H. Barnard, A. J. Robinson.

Bob Roy M. Co., San Francisco; capital stock \$100,000, subscribed \$1000; N. Davis, R. Davis, A. Davis, E. Davis, A. Appell.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 3, 1898.

SILVER.—London, 28½d; New York, 61½; San Francisco, 61½; Mexican Dollars, 47½@47¾. New York exchange, sight, 17½; telegraphic, 20 cents premium.

The Boston News Bureau of Oct. 25th says: "The cashier of the Bank of California tells us that the accumulation of gold in California is making it a kind of a drug on the market there. There is so much of it that it is driving out paper money. Travelers to California recently notice that it is difficult to get bills and that gold is in common use there. Some merchants in some of the leading business centers in California say that they hardly see a bill from one day to the other. This condition of things is expected to lead to a sending of a lot of gold to this market before long." There never was any "paper money" in California to "drive out." "Travelers to California," and others have for forty years "noticed that it is difficult to get bills." The excerpt sounds funny to coast residents, especially the announcement that "gold is in common use there."

Government receipts for October were about \$40,000,000, of which \$17,000,000 represented customs payments and \$23,000,000 internal revenue. Customs collections in this collection district in October were \$478,880, against \$426,100 in October, 1897, and for the first ten months of the year \$5,095,608, against \$4,278,700 in 1897.

LEAD.—New York reports "firm;" \$3.70 bid, \$3.75 asked. The firm naming the settling price for mines and smelters quotes lead at \$3.50. Local, pipe, 6@6½c; sheet, 6½@7c; pig, 5½c; bar, 6c.

COPPER.—New York reports Lake unchanged, \$12.50@12.70. Boston reports:

"Mail advices under date of Oct. 15 show a rise in Anaconda copper shares at London to £5 2s 6d. Rio Tinto's on same date were quoted at £29 7s 6d.

"Anaconda is paying stockholders 10% per annum and Rio Tinto 40% per annum on their respective capitalization. The former has no bonded indebtedness, while the latter has outstanding £3,489,860 of 4% first mortgage bonds. Rio Tinto produced last year 75,989,760 pounds fine copper, against 124,417,471 pounds fine copper by the Anaconda. With about 50,000,000 pounds less output than Anaconda, the Rio Tinto pays in dividends over \$3,000,000 yearly on its ordinary shares, besides 5% on its preference shares, compared with the Anaconda's dividends of \$3,000,000 annually.

"Rio Tinto's share capital amounts to £3,250,000, divided equally into 5% preference shares, and ordinary shares both of £5 each fully paid up. Anaconda has 1,200,000 shares of \$5 each paid in, or \$30,000,000. The Rio Tinto divided last year equivalent to over 4c per pound on its copper output, compared with a little less than 2½c per pound on Anaconda copper output."

IRON.—American, soft, \$21.50 and \$23.50 per ton; Scotch, \$24.

SPELTER.—5½@5¾.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c; Bar, 19c.

ANTIMONY.—9½, 10.

BABBITT METAL.—10-12-14—best 16c.

QUICKSILVER.—Domestic, quiet, \$41; export, \$37.00@37.50; carload lots, special rates.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1** 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8 00 Coos Bay, \$8 00 Seattle, \$6 00 Southfield, \$7 50

Cargo lots, Eastern and foreign: Wallsend, \$7 50 Cumberland, \$9 00 Brymbo, \$7 50 Cannel, \$9 50 Pennsylvania, hd., 14 50 Welsh Anthracite, 12 50 Scotch, \$8 00 Rock Springs, \$7 60

Receipts of coal at San Francisco in October were 156,327 tons, against 134,300 in October, 1897. For the first ten months of the year they were 1,221,000 tons, against 1,150,400 during the same time in 1897, and included 466,135 tons Puget Sound, 169,200 Australian, and 443,000 British Columbia.

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.08 per gal.; bbl., \$1.03; pure No. 2, cs., 85c; bbl., 80c; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.06; less than 200 gals., \$1.10; in bbls., 4c per gal. less than case; Baker's Crystal, \$1.26; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 44c; cs., 49c; raw, bbl., 42c; cs., 47c; lots of 5 bbls., 1c less; Lucid, boiled, bbl., 39c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17½c; Astral, 17½c; Star, 17½c; Eocene, 19½c; Extra Star, 21½c; Elaine, 22½c; Water White, bulk, in tanks, 11½c; Mineral Seal, iron bbls., 21c; wooden bbls., 23½c; cs., 26c; Mineral Sperm, 27c; Deodorized Stove Gasoline, bulk, 13c; do., cs., 18c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½c; do., in cs., 16½c; Lard Oil, Extra Winter Strained, bbl., 56c; cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatsfoot Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs.,

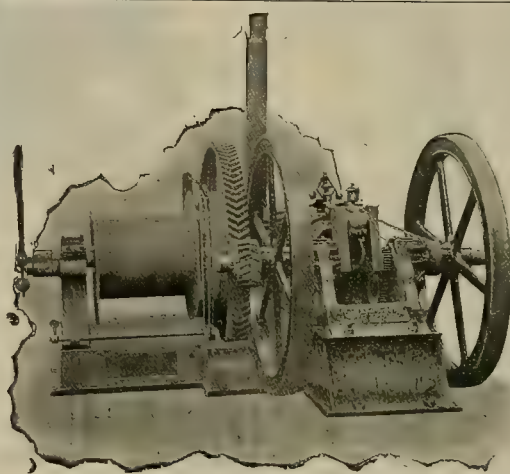
Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.



FRESNO, June 25, 1898.

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gasoline engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LODE
M. & D. CO.,

Per N. W. Moodey, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

Acetylene Gas.

A handsome new illustrated catalogue will tell you where and by whom the new light is being used, and what the verdict is. Mailed upon application. PACIFIC ACETYLENE GAS CO., 115 New Montgomery St., San Francisco.

Mines or prospects operated on contract to purchase, MONEY loaned, under lease or fixed royalty or percentage, property appraised, financed and managed, MINES, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated, EXAMINE mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.
EDW. N. BREITUNG, Marquette, Mich.
Cable address Edue Code, Lieber's Bedford, U.S.A.
McNeil's A B C Universal Commercial.

UTAH

Mines—Dividend Paying
and Investment Stock.

W. E. HUBBARD & CO., 15 W. 2d So. Street,
SALT LAKE CITY.

J. D. BETHUNE,

(Late Associate Justice Supreme Court.)

Attorney at Law,
Mining Law,

PRESCOTT, ARIZONA.
A Valuable Gold Property for Sale.

WANTED.

Position as Mine and Mill
Superintendent.

Thoroughly practical. Highest references furnished. California preferred. Address L. care of Mining and Scientific Press, San Francisco.

Mine Wanted.

Mining man of experience wants partially developed mine with ORE CHUTE IN SIGHT, either in the United States or Mexico. Will develop further for one-half interest, or build mill if ore in sight justifies, or will bond whole mine and develop. Describe conditions fully. State length, width, course and dip of pay chute. State values free and concentrating, also percentage and value of concentrates. Give diagram of present development, showing position of ore chute. Mark places where samples were taken. State if samples were an average of the whole vein. How values are determined: by pan, fire, assay or mill run. Give careful attention to details, saving time and correspondence. Will treat with owners only. Satisfactory reference. Address Box 887, Los Angeles, California.

PACIFIC EXPLORATION COMPANY
Finds buyers or working capital for meritorious mines or good prospects. Correspondence invited.
W. E. Holbrook, Pres't. L. F. Haskell, Sec'y.
29-30 Chronicle Building, S. F.

San Francisco Stock Board Sales.

SAN FRANCISCO, Nov. 3, 1898.

9:30 A. M. SESSION.

| | |
|-------------------------------|---------------------------|
| 100 Alta.....06c | 500 Mexican.....22c |
| 1300 Best & Belcher.....29c | 50 Ophir.....70c |
| 400 Bullion.....07c | 300 Potosi.....15c |
| 100 Caledonia.....27c | 600 Savage.....20c |
| 500 Con. Cal. & Va.....\$1 10 | 1600 Seg. Belcher.....03c |
| 400 Gould & Curry.....24c | 500 Sierra Nevada.....81c |
| 100 H. & N.....\$1 00 | 300 Utah.....07c |
| 100 Justice.....06c | |

2:30 P. M. SESSION.

| | |
|-----------------------------|---------------------------|
| 700 Ophir.....67c | 300 Belcher.....12c |
| 1000 Best & Belcher.....27c | 300 Sierra Nevada.....79c |
| 100 C. Cal. & Va.....\$1 10 | 1000 Utah.....07c |
| 400 Savage.....20c | 500 Seg. Belcher.....03c |
| 500 Chollar.....13c | 1200 Union Con.....25c |
| 100 Yellow Jacket.....21c | 100 Potosi.....14c |
| 1000 Con. Imp.....01c | |

Catalogues Received.

The finest trade publication received this week comes "with the compliments of the Denver Fire Clay Co.," 278 pages, quarto; maroon binding. It contains description, illustrations and prices of articles in daily use by assayers, smelters, mill men and metallurgists generally, with a particularly valuable catalogue of chemicals, and their prices. The work is divided into six parts, and is most conveniently indexed. A copy will be mailed to any address upon request. It is issued by the Denver Fire Clay Co., 1742 Champa St., Denver, Colo.

Books Received.

"Elements of Sanitary Engineering," by Mansfield Merriman; octavo, pp. 216. Five chapters, on sanitary science, water and its purification, water supply systems, sewerage systems, disposal of garbage and sewage. John Wiley & Sons, New York; \$2.

Assessment Notices.

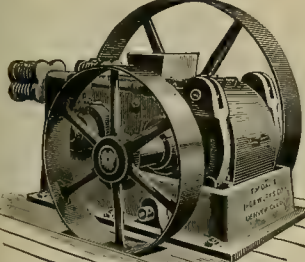
EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Forest Hill, Placer County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 23rd day of October, 1898, an assessment (No. 14) of one-half of one cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, No. 1209 Claus Spreckels building, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 23rd day of November, 1898, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 14th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
J. J. CRAWFORD, Secretary.
Office—No. 1209 Claus Spreckels Bldg., San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of October, 1898, an assessment (No. 21) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 106 Leidesdorf street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 7th day of November, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 28th day of November, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
CALVERT MEADE, Secretary.
Office—106 Leidesdorf street, San Francisco, California.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of October, 1898, an assessment (No. 11) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 237 12th street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 7th day of November, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 5th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
F. METTMANN, Secretary.
Office—237 12th street, San Francisco, California. The Secretary will also receive payments from 12 to 6 P. M. at his business office, 225 Sansome street.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from the Excelsior Mining Co., in the Excelsior Mine at Lowell Hill, Nevada Co., to deposit tailings in the North Fork of Steep Hollow; from Toy Kee, in the Fair Play Mine near Seales, Sierra Co., to deposit tailings in Fair Play Ravine; from S. F. Bullard and A. M. Gray, in the Gravel Hill or McCutcheon Placer Mine near Nevada City, Nevada Co., to deposit tailings in Little Deer Creek; and from Elmore Rutherford, in the Plumas Bonanza Gravel Mine near Buck's Ranch, Plumas Co., to deposit tailings in Sherman Ravine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on November 7, 1898, at 1:30 P. M.

—THE—
F. M. DAVIS IRON WORKS CO.,
723 to 743 Larimer St., Cor. 8th St.,
DENVER, COLO.
The Davis Crushing Rolls.



SIMPLE. DURABLE. EFFICIENT.
These machines are built in five sizes.
27 in. x 14 in. belt driven, \$950; weight 13,000 lbs.
Send for Catalogues and Discounts.

JEFFREY
Roller, Steel and Special CHAINS
ELEVATORS AND CONVEYORS
COAL MINING MACHINERY.
WIRE CABLE CONVEYORS.
For long and short distance conveying.
THE JEFFREY MFG. CO., Columbus, Ohio.
Send for Catalogue. 41 Dey Street, New York.

Western Branch, Denver, Colo.,
F. R. FIELD, Representative.

DELINQUENT SALE NOTICE.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Riverside County, California.
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 16th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | Shares. | Amt. |
|----------------------------|-----------|---------|---------|
| W. H. Bailey, Trustee..... | 240 | 2,000 | \$30 00 |
| W. H. Bailey, Trustee..... | 261 | 2,000 | 30 00 |
| W. H. Bailey, Trustee..... | 262 | 10,000 | 150 00 |
| C. A. Bailey..... | 133 | 1,000 | 15 00 |
| C. A. Bailey..... | 135 | 1,000 | 15 00 |
| C. A. Bailey..... | 136 | 1,000 | 15 00 |
| C. A. Bailey..... | 138 | 500 | 7 50 |
| C. A. Bailey..... | 109 | 2,000 | 30 00 |
| C. A. Bailey..... | 210 | 4,532 | 67 98 |
| R. L. Cheney, Trustee..... | 245 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 246 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 247 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 248 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 249 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 250 | 250 | 3 75 |
| R. L. Cheney, Trustee..... | 251 | 2,500 | 37 50 |
| R. L. Cheney, Trustee..... | 252 | 1,000 | 15 00 |
| W. H. Bailey, Trustee..... | 256 | 3,300 | 49 50 |
| W. H. Bailey, Trustee..... | 259 | 7,500 | 112 50 |
| W. H. Bailey, Jr..... | 147 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 148 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 149 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 150 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 151 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 152 | 2,000 | 30 00 |
| W. H. Bailey, Jr..... | 208 | 4,000 | 60 00 |
| W. H. Bailey, Jr..... | 209 | 532 | 7 98 |

And in accordance with law, and order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, Room 508 Safe Deposit building, San Francisco, California, on TUESDAY, the 1st day of November, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
R. L. CHENEY, Secretary.
Office—Room 508 Safe Deposit building, San Francisco, California.

POSTPONEMENT.
The day of sale of the above delinquent stock has been postponed to THURSDAY, December 1st, 1898, at the same hour and place. By order of the Board of Directors, J. W. PEW, Secretary.
Office—310 Pine St., Room 15, San Francisco, Cal.

DELINQUENT SALE NOTICE.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the 22nd day of August, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | Shares. | Amt. |
|-----------------------|-----------|---------|----------|
| C. Rehn..... | 75 | 2,000 | \$200 00 |
| C. Rehn..... | 77 | 1,000 | 100 00 |
| C. Rehn..... | 79 | 500 | 50 00 |
| C. Rehn..... | 81 | 499 | 49 90 |
| C. Rehn..... | 82 | 1 | 10 |
| C. Rehn..... | 161 | 150 | 15 00 |
| A. Rehn..... | 176 | 250 | 25 00 |
| M. Schiffmann..... | 8 | 100 | 10 00 |
| G. F. Ochs..... | 9 | 250 | 25 00 |
| G. F. Ochs..... | 105 | 200 | 20 00 |
| G. F. Ochs..... | 170 | 100 | 10 00 |
| E. S. Heller..... | 10 | 100 | 10 00 |
| A. Schiffmann..... | 12 | 50 | 5 00 |
| C. Warrick..... | 153 | 250 | 25 00 |
| I. Hebeemann..... | 15 | 200 | 20 00 |
| E. Fey..... | 17 | 100 | 10 00 |
| E. Fey..... | 74 | 200 | 20 00 |
| E. Fey..... | 108 | 200 | 20 00 |
| T. J. Sullivan..... | 18 | 500 | 50 00 |
| F. Knottner..... | 20 | 1,000 | 100 00 |
| F. Knottner..... | 110 | 500 | 50 00 |
| F. Knottner..... | 111 | 500 | 50 00 |
| E. Schulz..... | 41 | 200 | 20 00 |
| E. Schulz..... | 133 | 50 | 5 00 |
| J. Forbes..... | 43 | 500 | 50 00 |
| C. Ebbecke..... | 45 | 100 | 10 00 |
| M. Martin..... | 98 | 50 | 5 00 |
| N. Stands..... | 59 | 50 | 5 00 |
| J. Green..... | 104 | 200 | 20 00 |
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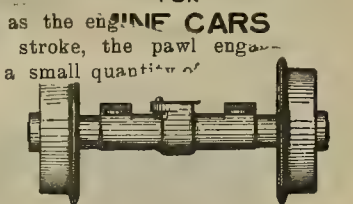
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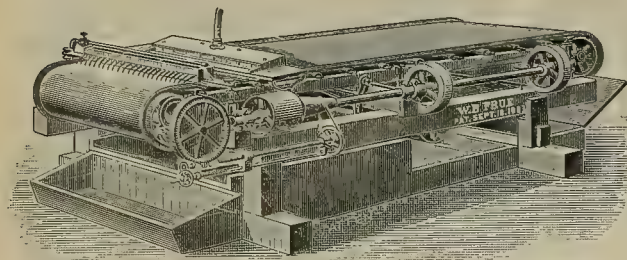
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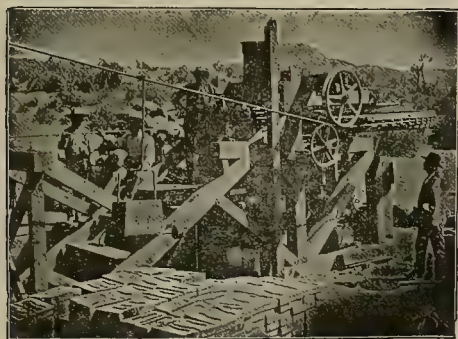
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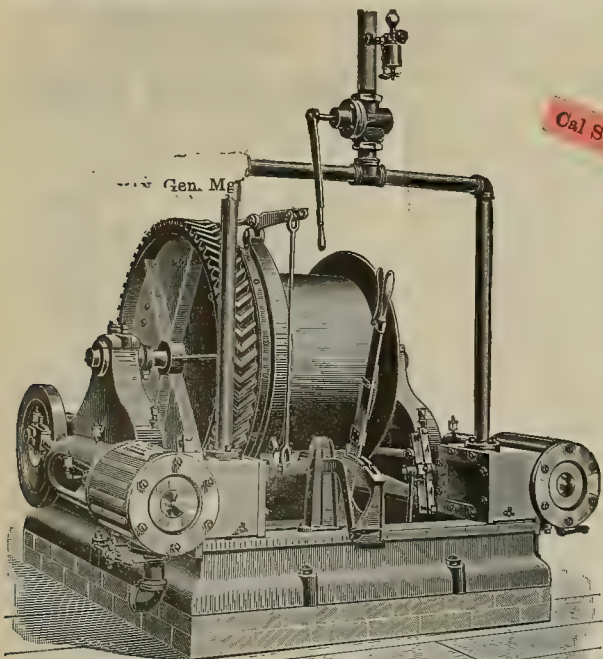
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No. 2001.— VOLUME LXXVII. Number 20. SAN FRANCISCO, SATURDAY, NOVEMBER 12, 1898. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

The Diesel Motor.

The explosive force of suddenly liberated heat has long been utilized as a motive power, and for the last fifteen years a Bavarian, Rudolf Diesel, has been working on a heat motor which, as now building at Augsburg, is attracting some attention.

Fig. 1 is a theoretical diagram of the engine. The operation is as follows: On one down-stroke the main cylinder is filled with pure air, the next up-stroke compresses this to thirty-five atmospheres, creating a temperature sufficient to ignite the fuel and the pressure rises along the line marked P_1, P_2 . At the beginning of the next down-stroke, the fuel valve opens, and the petroleum, atomized by passing through fine wire netting, is injected into this red-hot air, resulting in combustion keeping the temperature up to that at P_2 ; the resulting expansion P_2, P_3 being made while the air is at a constant temperature. At P_3 the fuel is cut off and the temperature falls, but the amount of heat in the air remains the same, the pressure continuing to fall along another curve P_3, P_4 , similar to the compression curve P_1, P_2 , until the end of the stroke is reached.

The mechanism of the Diesel motor is illustrated in Figs. 3, 4, and 5. Fig. 3 is a side elevation of the engine, Fig. 4 is a vertical section through the line 1-2, Fig. 3. Fig. 4 also shows a plan of the bedplate, the pillow-block and the crank shaft. Fig. 5 is section at right angles to that in Fig. 4. Each part of the engine is designated by the same letter in each figure. Referring to the figure, A is the cylinder, B the piston, and C the compression space, which is about 6 per cent of the volume behind the piston when the piston is at the extreme lower end of the stroke, or about 7.5 per cent of the volume swept over by the piston during one complete stroke. The piston is not of the trunk type so frequent in gas-engine practice, but has a piston rod D , necessitating the use of a cross-head k to keep the motion of the rod in a straight line. Motion is transmitted to the crank shaft S by the connecting rod N and the crank pin U . A water-jacket surrounds the cylinder, as shown at J , and water is also passed about the valves through the space J' in the cylinder head.

The air pressure required for starting and for injection of liquid fuel, when such is used, is supplied by the pump p , operated by levers x, y and z , from the connecting rod N , the pump having a stroke equal to one-half that of the piston. The pump cylinder is water-jacketed, as shown at j, j . The compressed air is stored in the starting tank T , at a pressure of about 100 pounds above the maximum pressure obtained after compression. That the pressure may be kept at the proper point, the suction pipe of the air pump is controlled by an automatic valve, which contracts the opening when the pressure rises in the tank T .

A small oil pump, bolted to the base plate, supplies the fuel to the fuel valve m . The oil enters this

through the small pipe at o and falls to the bottom of the valve compartment o' . When the piston reaches the end of its compression stroke the fuel valve m opens and the fuel in o is blown into the compression space C , where it is ignited by the hot air

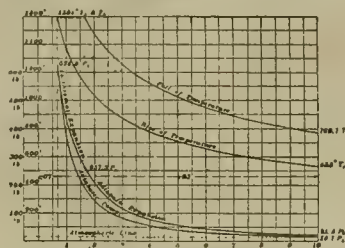


FIG. 1.

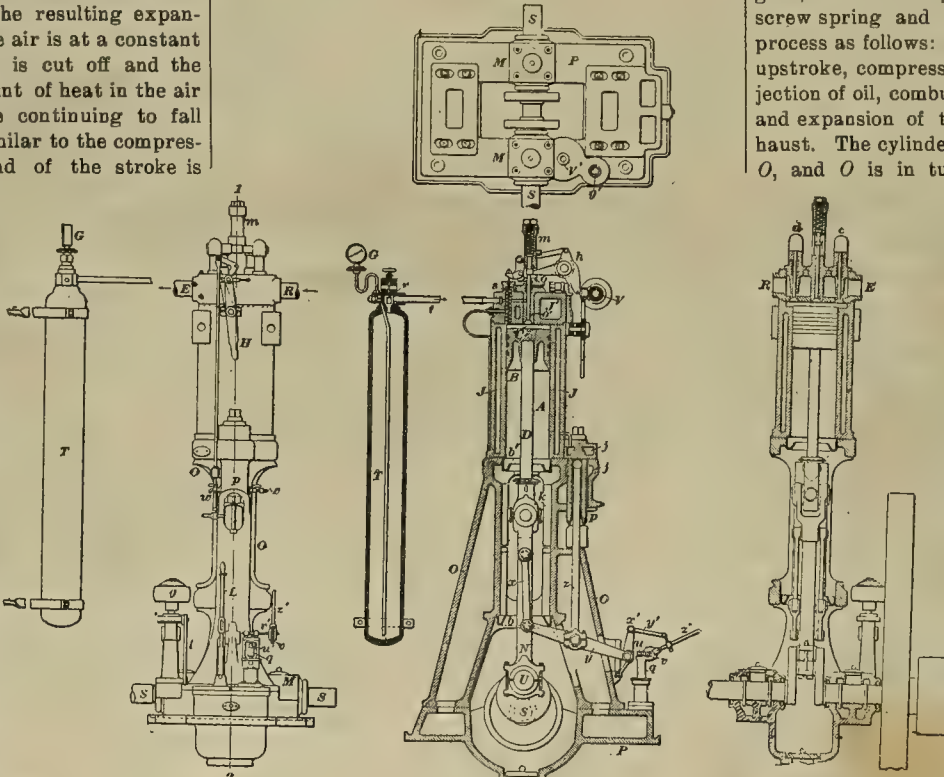


FIG. 3.

FIG. 4.

FIG. 5.

THE DIESEL MOTOR.

in C . The amount of fuel varies according to the requirements of the engine and is regulated by the governor g . The governor controls the fuel pump by the lever l . Part of the oil returns to the tank through a by-pass valve.

The exhaust valve c , air valve d and fuel valve m are all of the poppet type, operating by means of cams from the valve shaft V and a system of levers, as shown at h , Fig. 4. The valve shaft V is horizontal, and is driven from a vertical shaft V' by means of bevel gears. V' is also driven from the crank shaft S by means of a pair of bevel gears, the gear on V' making but one revolution to two revolutions of the crank shaft. The bevel gears, by which the horizontal shaft V is driven from V' , have the same number of teeth; hence, both V and V' revolve at the same speed, and V makes one revolution to two revolutions of the crank shaft.

In starting the motor a hand valve is pulled to one side, throwing all the cams, except the exhaust-valve cam, out of gear, and throwing a special cam into gear with the starting valve. The fuel pump is

disconnected from the engine and attached to the hand lever L . The flywheel is then turned by means of a bar, supplied for that purpose, until the crank is upon the upper center, or in the position shown in Fig. 4. The tank valve r is then opened, admitting air to the starting valve s . Valve s is thrown open by means of the starting lever H , admitting air from T into the compression space. The flywheel is then turned by means of the bar until the crankpin is far enough from the center to permit the air pressure from T to start the engine. At 30 per cent of the down stroke the starting valve s is closed, and the admitted air expands until the end of the stroke. During the next upstroke of the piston, exhaust takes place; and, just before the piston reaches the top of the stroke, the starting cam is thrown out of gear, the fuel cam put into gear automatically by a screw spring and the engine takes up its regular process as follows: (1) Downstroke, suction of air; upstroke, compression of air. (2) Downstroke, injection of oil, combustion to 10 per cent of the stroke and expansion of the burned gases; upstroke, exhaust. The cylinder A is bolted to the engine frame O , and O is in turn bolted to the bed P . Catch

basins for the oil are placed below the crosshead at b and at the end of the piston travel at b' .

The pressure within the starting tank is shown on the gauge G . The air enters the cylinder at R , and the exhaust gases escape at E . The tank T is fastened to the wall of the engine-room by means of the brackets f . To oil the piston regularly the lever arm y has another arm x' attached to it which drives the oiling device by means of the levers y' and z' . The arm z' carries a pawl, which engages a ratchet v . The ratchet v is fastened to the shaft v' , which carries a worm, engaging the worm-wheel u . The worm-wheel u is threaded, making it a nut which turns on the threaded plunger u' . The plunger u' sits on top of the oil in the

cylinder q . Just as the engine piston reaches the lower end of its stroke, the pawl engages the ratchet, forcing a small quantity of oil just below the top piston ring, oiling the piston at a point from which the oil will be thoroughly distributed.

In the device thus described Diesel makes a sharp distinction between the temperature of ignition and the temperature of combustion; the first is a constant value at each pressure and dependent only on the physical qualities of the fuel; the higher the pressure the lower the temperature of ignition. The temperature of combustion, on the other hand, is variable, depends on many conditions, and especially on the quality of the air by which the combustion is maintained, but it is always higher than the temperature of ignition. Diesel's radical departure from all previous practice is in generating a combustion temperature by mechanical compression of pure air, utilizing this temperature to ignite the fuel, and by so introducing the fuel that the heat lost by expansion is practically balanced by the heat added by combustion.

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Miners' Associations.

Now that the elections are over, it is in order to bring up the matter of miners' associations. In common with other trades and business, it is requisite that mining men should have regularly organized associations in their several States for mutual aid and advancement. This has been recognized in a variety of instances, more especially in this State, where for the last seven years has existed what is known as the California State Miners' Association. In nine days will be held the seventh annual convention of that body in San Francisco. As a well wisher of that organization, it is believed that some changes in its policy and mode of operation would be beneficial to it and the interests it represents. The California State Miners' Association from its inception has been fortunate in securing the unpaid services of men of skill, intelligence, integrity and practical ability. Men connected with it in every capacity have been noted for unselfish effort, singleness of purpose and devotion to all that it represents. It is often the fate of such an organization to become the prey of designing men, who use it and drop it when it has served their own private interests. In this case the California State Miners' Association deserves congratulation, and that its good fortune may continue in this as in all other regards is, of course, the earnest wish of everyone connected with it. The general plan of the Association is excellent, but it needs revivification; life should be infused into it by earnest effort, and the great body of miners in the commonwealth should be given opportunity to realize its benefits to them and to join it. The first question a man asks regarding any association is, "What good is it going to do me?" The purpose of any association, fraternal or otherwise, is for the individual as well as for the general good, and if it fails in aiding the one it does in the other. The California State Miners' Association is of value to every miner in the State, and could be made more valuable. It needs an officer whose pleasure and privilege it would be, and whose province and purpose it should be, to visit every part of the State of California, giving mining men full knowledge of the objects and work of the Association, securing their membership, active interest and friendly co-operation, and organizing county miners' associations in each of the thirty-seven mining counties. As it is at present, it is a State Association only in name. There are large areas of this State in which there is not one member of the Association. Take, for instance, seven of the southern counties where a great deal of mining is going on, and where the mining interests are of importance. In each of those counties there should be a county miners' association. This missionary work is a present need. To the MINING AND SCIENTIFIC PRESS it seems to be an equally present requirement that a considerable portion of the revenue of the Association be devoted to suitable headquarters, and to the maintenance of a secretary or other officer whose sole business it

should be to attend to the Association, to make it headquarters for miners, to reply to their answers, and to supply all just requirements connected with their membership. It would take every moment of a busy man's time to attend to these things, and to a competent man filling such a position it should be worth as much money as a business man would pay an intelligent, active and competent man to do such work for him.

What has been done in this regard is but the index of what could and should be done, the possibilities being so manifest and the time so opportune. It is manifest to every member of the Association that new membership and more active interest are necessary.

It would be well to have similar associations in every State and Territory in this west half of America for the sole purpose of advancing mining interests. Organization is essential in all things, and it is by State and Territorial organization and mutual co-operation and effort that some necessary factors in progress can be best secured.

Tunnels and Tunnel Sites.

In answer to several questions from Colorado and California, it is stated that the bill introduced by Congressman Bell of Colorado at the last session of Congress, to change the Revised Statutes of the United States relative to tunnel sites, passed the House of Representatives, but did not pass the Senate. It will probably be acted upon affirmatively by both Houses at the coming session. Meanwhile the law stands unchanged. The Congressional Committee recommending the bill last April said:

A discovery from the surface entitles the miner to 1500 feet in length and 600 feet in width, and also the same area when the discovery is made in a tunnel. Tunnels are usually run at right angles to the general course of the veins. The Supreme Court has held that the tunnel claimant may take his whole claim on either side of the tunnel that he may desire after he cuts the vein, and he is required to give no notice nor to protest against any one applying for a patent on any ground within 1500 feet of the line of the tunnel. Yet when he cuts a vein in the tunnel he may take his claim all on one side, though it covers ground actually purchased of the Government by others within the 1500-foot limit.

The evil that section of the bill seeks to cure is to confine the rights of the tunnel claimant to 750 feet on each side of the line of the tunnel, should the extension of the claim beyond 750 feet from the line of the tunnel conflict with the rights of any prior locator. If the tunnel claimant does not conflict with any other locator, he may, under Section 1 of this bill, take a full claim on one or both sides of the line of the tunnel. As the law now stands, the claimant is entitled to only 1500 feet of the vein; but, not being confined to either side or to any portion on one side and the remainder on the other, and having the right to choose his whole claim on either side, or a part on one side and the remainder on the other, renders any one locating a claim within 1500 feet of the line on either side of the tunnel subject to the will of the tunnel claimant if he cuts the same vein, or in effect severs it, and there are 3000 feet in width out of which he can only extend his lines 1500 feet.

Section 2 simply requires a tunnel claimant to stake his claim at the surface and record the claim within sixty days from the time the vein is cut; otherwise it will be deemed that he has abandoned the same, should any locator discover the same claim outside of the tunnel and locate the same. These lands are sold by the Government to the claimants for \$5 per acre; and the interest of the Government, as well as that of the prospectors, requires that there should be no ambiguity about the intention of claimants or as to the specific ground desired.

Section 3 of the bill gives the claimant all ore from the point touched to the surface, even though the apex of the vein may depart from the side lines.

The above excerpt applies to the proposed change.

The following, relative to the law as it stands, is furnished by the Commissioner of the General Land Office and the Secretary of the Interior:

SEC. 3223, R. S. Where a tunnel is run for the development of a vein or lode, or for the discovery of mines, the owners of such tunnel shall have the right of possession of all veins or lodes within three thousand feet from the face of such tunnel on the line thereof, not previously known to exist, discovered in such tunnel, to the same extent as if discovered from the surface; and locations on the line of such tunnel of veins or lodes not appearing on the surface, made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid; but failure to prosecute the work on the tunnel for six months shall be considered as an abandonment of the right to all undiscovered veins on the line of such tunnel.

The effect of this is simply to give the proprietors of a mining tunnel run in good faith the possessory right to fifteen hundred feet of any blind lodes cut, discovered, or intersected by such tunnel, which were not previously known to exist, within three thousand feet from the face or point of commencement of such tunnel, and to prohibit other parties, after the commencement of the tunnel, from prospecting for and

making locations of lodes on the line thereof and within said distance of three thousand feet, unless such lodes appear upon the surface or were previously known to exist.

The term "face," as used in said section, is construed and held to mean the first working face formed in the tunnel, and to signify the point at which the tunnel actually enters cover; it being from this point that the three thousand feet are to be counted upon which prospecting is prohibited as aforesaid.

To avail themselves of the benefits of this provision of the law, the proprietors of a mining tunnel will be required, at the time they enter cover as aforesaid, to give proper notice of their tunnel location by erecting a substantial post, board, or monument at the face or point of commencement thereof, upon which should be posted a good and sufficient notice, giving the names of the parties or company claiming the tunnel right; the actual or proposed course or direction of the tunnel; the height and width thereof, and the course and distance from such face or point of commencement to some permanent well-known objects in the vicinity by which to fix and determine the locus in manner heretofore set forth applicable to locations of veins or lodes, and at the time of posting such notice they shall, in order that miners or prospectors may be enabled to determine whether or not they are within the lines of the tunnel, establish the boundary lines thereof, by stakes or monuments placed along such lines at proper intervals, to the terminus of the three thousand feet from the face or point of commencement of the tunnel, and the lines so marked will define and govern as to the specific boundaries within which prospecting for lodes not previously known to exist is prohibited while work on the tunnel is being prosecuted with reasonable diligence.

At the time of posting notice and marking out the lines of the tunnel as aforesaid, a full and correct copy of such notice of location defining the tunnel claim must be filed for record with the mining recorder of the district, to which notice must be attached the sworn statement or declaration of the owners, claimants, or projectors of such tunnel, setting forth the facts in the case; stating the amount expended by themselves and their predecessors in interest in prosecuting work thereon; the extent of the work performed, and that it is *bona fide* their intention to prosecute work on the tunnel so located and described with reasonable diligence for the development of a vein or lode, or for the discovery of mines, or both, as the case may be. This notice of location must be duly recorded, and, with the said sworn statement attached, kept on the recorder's files for future reference.

By a compliance with the foregoing much needless difficulty will be avoided, and the way for the adjustment of legal rights acquired by virtue of said section 2323 will be made much more easy and certain.

The office proposes to take particular care that no improper advantage is taken of this provision of law by parties making or professing to make tunnel locations, ostensibly for the purposes named in the statute, but really for the purpose of monopolizing the lands lying in front of their tunnels to the detriment of the mining interests and to the exclusion of *bona fide* prospectors or miners, but will hold such tunnel claimants to a strict compliance with the terms of the statutes; and a reasonable diligence on their part in prosecuting the work is one of the essential conditions of their implied contract. Negligence or want of due diligence will be construed as working a forfeiture of their right to all undiscovered veins on the line of such tunnel.

"WHAT title have the drillers of the oil wells under the sea near Summerland, Cal.?" is the question repeatedly received since the publication of an illustrated article thereon in the issue of Oct. 15. As a strict legal proposition, they have no title except the fact of possession. The matter was discussed on page 455 of last week's issue. In addition it may be said that those oil men can hold their claims by possession against all comers except the State. The State can compel them to vacate at any time, but it is not likely to do so. The operators have a franchise from the county for the wharf alongside of which the well is sunk. Since the appearance of the article the wells have an average depth of 400 feet, and are now daily bringing up 150 barrels of oil from under the sea, more wells being in progress of sinking farther out to sea.

THE thirteenth annual report of the Department of Labor, issued at Washington, D. C., gives some noticeable statistics, showing the increased use of machinery in production, and the result. In '91 the cost of mining 100 tons of bituminous coal was \$77.60; time required, 342 hours. In '97 to produce the same work required 188 hours, at a cost of \$43.30. It is also to be noted that in '91 the number of men in the equation was 42; in '97, 32. In nearly every department of human labor similar results are shown in the Government publication.

Concentrates.

ROSSLAND, B. C., wants a school of mines.

THERE are 40,000 placer gold miners in Siberia.

THERE are no copper mines for sale in New Mexico.

THE United States flag now floats forever in the sunlight.

THE daily average ore shipment from Rossland, B. C., is 500 tons.

IN a 10-stamp battery, dropping 1, 5, 9, 7, 3, 2, 6, 10, 8, 4 gives good results.

THE Congress mine in Yavapai county, Arizona, has reached 1700 feet depth.

THE ordinary concentrator requires from 200 to 300 gallons of water per hour.

THE salary of Gold Commissioner Ogilvie at Dawson, N. W. T., is \$4000 a year.

IN electrical units the equivalent of a "horse power" is 746 volt-amperes or watts.

JANUARY 1, 1894, silver was quoted at 31½¢ per ounce in London; on December 31st, '94, 27¼¢.

WITHIN a radius of ten miles of Deadwood, S. D., several new ore reduction plants will soon be built.

THE altitude of Mt. Shasta is 14,440 ft.; of Mt. Whitney 14,522 ft.; distance between the two 466 miles.

THE gas consumed in one 16 C. P. gas jet, if consumed in a gas engine, will produce three 16 C. P. electric lights.

IN San Miguel county, Colo., mining gives employment to 1350 men and outputs 950 tons daily throughout the year.

THE highest temperature at a depth of 1800 feet that has been found in the Butte, Montana, copper mines is 73° F.

SOUTH AUSTRALIA wants to repudiate its agreement with the Gold Recovery Co. there and annul the agreed obligations.

THE government reports for '97 give a total production of iron of \$95,122,299. The production of gold and silver was \$127,000,172.

W. CAIN and P. Nolan, trying to escape from bad air in the Sunset mine No. 2 at Rossland, B. C., last week, fell from the ladder and were killed.

AN ounce of gold is worth three times what it was when the gold product of California was \$50,000,000 annually in point of purchasing power.

BUT one discovery of mineral is required to support a placer location, whether it be of twenty acres by an individual or of 160 acres by an association of persons.

WITH 150-foot head a 2-inch nozzle to operate a hydraulic elevator would need about 100 miners' inches, which equals a flow of about 2½ cubic feet per second.

THE United States Mint seigniorage on silver dollars is the difference between the current rate of silver per oz. and \$1.29, being now 68 cents, less the cost of coinage.

NEWSPAPER assertions regarding the Republic, Wash., ore are to the effect that the last two cars shipped to the smelter gave net returns of \$15,000—15½ ozs. gold per ton.

A GOOD compound for welding steel is made of one part of sal-ammoniac and ten parts borax crushed together, fused till clear, then poured out, and, after cooling, reduced to powder.

PLATINOID is an alloy of copper, nickel, zinc in the proportion of German silver with 1 or 2% tungsten, and is used for electric resistance, having a specific resistance of 33 microhms.

TUNGSTEN is defined as a heavy stone, whitish color, of 184.0 atomic weight and 19.26 specific gravity, its fusing or melting point being of very high degree. It occurs mainly in wolframite.

THE gallows-frame at the War Eagle mine at Rossland, B. C., made entirely of steel, is 120 feet high, and is claimed to be the largest "headgear" erected over a quartz mine anywhere.

A WELL AUTHENTICATED case of gold and tin being found together in place is reported from the Royal Tasman mine, near Gladstone, in northeastern Tasmania, where gold and cassiterite are reported to have been so found, the only case of the kind known.

TALC ORE has been successfully treated by washing and separating at the Lillian mine, Pewabic, Russell district, Gilpin Co., Colo., hand-jigging giving the result of a close saving of values.

SUPR. HARVEY of the Republic mine, Republic, Wash., says that in running a tunnel they made in October an average of 13 feet a day, which he maintains breaks "all mining records on the Pacific coast."

IN the Slocan, B. C., district, capital is being secured to begin the long-talked-of project of cutting a 10,000-foot tunnel below Sandon through Noble Five mountain, cutting five lodges at a depth of 4000 feet.

BRITISH COLUMBIA ASSAYERS want the Government assay office abolished, because of its competition with private business, they disliking to pay taxes for the support of an institution that competes with them for private business.

WHAT "economy" in mining can do and what can be attained in that direction is strikingly shown in the reports of the Broken Hill (Australia) Proprietary Co., where the average cost per ton of ore treated has been reduced from £6 15s 4d to £2 3s 7d.

"THE Vancouver Smelting Co." is an embryo London organization; capital £200,000. The proposition is to build a smelter with a daily capacity of 100 tons at Burrard Inlet, Vancouver, B. C., and secure a forty-acre site there, the outfit to cost the company £130,000.

THE Tasmania mine is a good example of the continuity and permanence of a gold mine. It has been a producer for twenty-one years, yielding \$7,891,500 in gold. The deepest level is 710 feet; there are 100 stamps; the average assay is \$20 per ton, worked by chlorination.

FOR use in high altitudes air compressors are made larger than for coast use. The Rand, South Africa, gold fields are about 5000 feet above sea level, and air compressors in use there are mostly 25 per cent larger than they would need to be on the ocean level.

THE Denver, Colo., Mining Record says that the determination of the Portland Co. at Victor, Colo., to case their main shaft with steel instead of timber, marks a new era in deep mining operations in Colorado. Structural steel sets are used and filled with 3-inch plank lagging.

THE gold production of the Rand, South Africa, district by months for the first nine months of '98 is as follows: January, 313,826 ounces; February, 297,975; March, 325,907; April, 335,-

125; May, 344,160; June, 344,670; July, 359,343; August, 376,911; September, 384,080; total, 3,081,997 ounces.

WHILE there is a "pocket region" in Tuolumne county, Cal., in the mineral slates that traverse and bisect the lime belt on the western slope of Bald mountain, yet it would be unjust to that county to ignore the fact that from the Stanislaus to the Tuolumne river are rich gold-producing mines of depth.

WHERE a customer requests a merchant to give credit to a friend, saying that if the friend does not pay he will, no legal liability is caused. Any verbal promise to pay the debt of another is within the statutes of frauds and covers no liability whatever. A suretyship to be binding must be in writing.

COMMON salt is a great preservative of wood. There is a stretch of railway track twelve miles long between Wadsworth, Nev., and Ogden, Utah, laid on bottom land on the edge of the great Salt Lake. The ground is soft, and there is a good deal of salt in it. The ties there are as bright and fresh as when they came out of the tree twenty-nine years ago.

By a new order, which goes into effect November 15, the Canadian Government has rescinded the order whereby free miners in Canada could obtain relief from forfeiture owing to the lapse of their certificates by making the proper affidavits and remitting \$5 to the Minister of Mines, always providing that the claims had not in the meantime been restaked.

ONE good way to find the required diameter of pump plungers to pump a given quantity of water at 100 feet piston speed per minute is to divide the number of gallons by 4; the square root of the quotient is the required diameter in inches. This applies only to single double-acting pumps; for duplex double-acting pumps, divide the number of gallons by 8 instead of 4.

THE bottom of the 4900-foot shaft of the Calumet & Hecla copper mine is one-half a mile below the deepest portion of the bed of Lake Superior, and nearly three-fourths of a mile below the level of the ocean. The lowest slopes and levels of several California gold mines are below ocean level; and in one case, on the southern California coast, there are five productive oil wells under the sea.

THE miners of Baranof Island, Alaska, have organized the Sitka mining district and adopted a long list of mining laws. Among the changes made by the new laws is the reduction of the recording fee to \$1.50 and the important provision that assessment work must include tunnel work, claiming that tunnel work is absolutely necessary before the claims so show up that capital will become interested.

ON the 29th ult. the large skip at the Red Jacket shaft of the Calumet & Hecla mine was hoisted to the top of the shaft, when the rope broke and the skip fell to the bottom, a distance of 4900 feet. The engineer had raised the skip too high and this pulled the rope out of the socket. The skip was empty. When a similar accident occurred at the same shaft four years ago, ten men were in the skip and were killed.

W. GULEWITSCH describes a method for the recovery of osmium from residues and gives details for the extraction of the metal by reduction with zinc and the conversion into osmium tetroxide by heating in oxygen. If there is much organic substance present the residuum is first distilled with aqua regia; the distillate is then reduced with zinc and the separated osmium converted into osmium tetroxide.

IT were better to have one developed mining claim than attempt to hold half a dozen, scratching "to keep up annual assessment work." Six hundred by fifteen hundred feet is about as much mining ground as can well be developed by any individual, and the probabilities of a sale are much better in the latter case than of a group of locations that have just enough done on them to keep them from being relocated.

THE "Sulman process" is based primarily on the MacArthur-Forrest cyanide process, its gist being in disbelief in the necessity of oxygenation. The Sulman process proposes to utilize bromide of cyanogen, and, by the addition of this to cyanide solution, secure rapidity of operation. Slimes are treated by adding soap solution, stirring and clotting the soap with lime, the effect being to reduce the mud to a flocculent, granular mass.

THE California Mineral Land bill will come up again next winter. With the exception of Stewart of Nevada, all the U. S. Senators who opposed it have been relegated to private life. In the House the Speaker says he favors the bill. The Commissioner of the General Land Office reports that the total of the lands within the granted and indemnity limits in California which would be affected by this bill (H. R. 3855) aggregates 13,679,602.29 acres.

AN arrastra will do good work on a small scale in a slow way and is better than nothing where the amount of ore or local circumstances will not admit of better machinery. It is no good for low grade ore. The iron work would cost about \$200, and could be put together and the whole thing built on the spot. A 5-stamp mill complete will weigh from six to nine tons, according to the weight of stamps. A 5-stamp mill, with 1000-pound stamps, would need 10 H. P.

AT the Golden Jubilee Mining Exposition in San Francisco last January many visitors would have been pleased to see the complete operation of mining and milling gold ore, and such a showing would be of great interest at any such gathering. At the Paris Exposition in 1900 the American State or Territory making such a display would attract considerable attention to its mines, and any manufacturer of mining machinery who would operate so comparatively inexpensive a plan would find it a big advertisement.

WHEN a painter runs across a color that he doesn't know the name of he calls it drab; so when a miner strikes a rock that is too much for him he usually calls it porphyry and lets it go at that. Such "porphyry" is, in most instances, simply country rock or dikes altered by hot water, which took out some elements and replaced them by others. It is considered a good sign of permanence, because it indicates that there was sufficient mineral action continued over a long enough period to produce a permanent ledge.

THE iodine which holds the gold of the ocean comes from the iodate of calcium. The amount of free iodine is not great in the ocean, but it is constantly being liberated by the iodate of calcium. As soon as this comes in contact with dead organic matter it becomes decomposed, and the iodine is formed. The amount of iodate of calcium in the ocean has been computed at 5,000,000 tons. This gives an enormous quantity of iodine in one form, and wherever free iodine is found there gold is held in solution in infinitesimal quantity.

THE following is a simple test for gold which may fill the requirements: For gold in oxidized ores, pulverize and place in a porcelain lined vessel or tea cup, cover with iodine and allow it to stand for two or three hours. Then dip into it a

piece of white filter paper, dry and burn it, and if it gives a purple color, gold is present, and the deeper the purple the richer the ore. For other ores with this test, such as pyrites, the ore must be roasted; where lime is present, the ore must be roasted twice, the second time adding carbonate of ammonia. After roasting, test as with oxidized ores.

"PROSPECTIVE purchasers of mining property have a right to rely on the statements made them by the owners as to the presence of extensive beds of ore at the bottom of certain pits and trenches, and are not called upon to go into them and determine the truth by dipping out the water or digging out the earth with which they are partially filled," says the United States Circuit Court of Appeals in the case of Green vs. Turner (86 Federal Reporter, 837); but any such "prospective purchaser" who would fail to verify any statement made by the vendor, so far as possible, would deserve disappointment and resultant loss.

TO FIND the necessary diameter of the bolts required to secure the cap at the crank pin end of a connecting rod suitable for an engine with a cylinder 4 in. diam., initial steam pressure 121 lbs. per sq. in. of piston: The area of the piston being 12.56 sq. in., its total load will be 1519.76 lbs.; two-thirds of this is 1013.17 lbs.; it is this amount of pull that each bolt has to resist. The normal working stress allowed to the sq. in. is 5000 lbs., so that the bottom of the thread must have an area of section of .2026 sq. in. This area indicates that two bolts, each ¾ in. diam., will be required to hold the cap to the crank pin end of the connecting rod.

TIME was in Colorado when if a mine owner recorded a lease in the office of the clerk and recorder of the county in which the mine was located, and posted notice of the same at the mine, he could safely calculate that no lien for debts of the lessor would be against his property; but that law was repealed. The mine owner's only protection is to be careful that he leases his mine to responsible men, with the provision that the lease is forfeited as soon as the lessee fails to meet his liabilities promptly. If the mine owner does not make this stipulation, he may be made pay for it. In California there is an express statute covering such cases.

THIS week the long case of M. W. Fox vs. the Hale & Norcross Co. received another advance in its final exit, the defendants announcing their readiness to pay the amount awarded, which, with interest, amounts to about \$300,000, the court ordering that the money be deposited by the receiver with the Union Trust Co., to be held subject to the order of the receiver and the court. The attorney who represented Fox will receive 25 per cent of the judgment at once, but there is a possibility of another legal battle over the remaining 75 per cent, the rival sets of directors having different views as to the disposition of the money.

IN Montana, Michigan and Arizona is the most present mining activity in copper. At Houghton, Mich., are reported 650 men at work around the Arcadian copper mine; 1500 feet of shafts and drifts are being monthly made; 200 men are at work on the stamp mill, eight miles distant, and 300 men making the eight-mile railroad; \$150,000 worth of new machinery has been ordered. The Calumet has over 4000 men on its payroll, the Tamarack nearly 2000 and the Osceola is expected to have 2000 a year hence. The total number of men employed on the 1st of last month was stated to be, in all the copper mines, 10,500, as against half that number five years ago.

LIEUT.-GOV.-ELECT NEFF, president California State Miners' Association, will call the 1898 convention to order on the 21st inst. It would be a good idea this time to elect the officers on the morning of the second day of the session. But one name is talked of for president—that of the honored present incumbent, "Jake" Neff, who if elected president of the United States would still be plain "Jake Neff" to the miners of California. Julian Sonntag declines to be considered for the office of secretary again. The names of J. J. Crawford of El Dorado and E. H. Benjamin of Alameda are mentioned in connection with that office. In many respects it is or could be made the most important position in the organization. The usual rates of 1½ fare for the round trip has been secured for attending delegates.

AT the recent International Miners' Congress held in Vienna there were represented 810,000 miners, the larger proportion being British. The congress adopted a resolution urging that endeavor should be made to secure a legal eight hours day, and that it should be extended to surface workers. All the countries represented voted for the resolution except Great Britain. A resolution demanding legislation rendering employers liable for all accidents to workmen, and declaring that no measures should be approved making it possible to evade responsibility by mutual agreement, was adopted unanimously. The congress adopted a resolution submitted by the Miners' Federation declaring the congress to be of opinion that the time had come for miners to fix a minimum wage, and, if necessary, to fight for it. The congress rejected, by votes representing 715,000 against 65,000, a motion favoring the regulation of the output of coal by international agreement. Most of the speakers declared the question to be beyond all discussion.

IN the Black Hills, South Dakota, district in the principal gold mills two kinds of single discharge mortars are used, each consisting of one solid casting, the bottom and sides so thick as not to need any lining, thickness decreasing as the feed is approached; outside walls vertical, with the exception of the discharge, which projects. The top is closed by two pieces of 2-inch plank, which rests on lugs ¾-inch wide, cast in the mortar, 2 inches below the top. These planks have each five semi-circular recesses which, when placed together, form holes for the passage of the stems. In addition to these five large holes, two smaller ones are bored for the 1-inch water-supply pipes, placed between stamps 1 and 2 and 4 and 5. Two mortars are placed close together, as the stamps of both are set in motion by one cam-shaft. To reach the mortars, etc., a passageway is left between every two pairs of batteries. The water supply is derived from a 3-inch main, running along the front of the batteries. From it passes upward a 2-inch pipe between each pair of batteries. With this is connected a 2-inch horizontal pipe, from which four 1-inch pipes branch off at right angles, two for each mortar. In addition to this water supply, there is a 1-inch pipe at each passageway, close to the mortar, coming from 3-inch main. A hose is attached to clean the apron-plates, and for other purposes. The points of difference between the two mortars lie in the inside dimensions of the lower part of the mortar and in the arrangement and number of the inside amalgamated copper plates.

Mining Conditions in Alaska.

Written for the MINING AND SCIENTIFIC PRESS by "ALEX QUARTZ."

To the people in the outside world the mining industry in Alaska and the Northwest Territory is seemingly on the decline. To those interested in the industry there, it is only now entering upon a successful and prosperous era. In the face of the fact that up to date this territory has produced for '98 over \$12,000,000, still hundreds of disappointed fortune hunters have returned denouncing the country and its leading people, who are interested in mining. Now, let us see who those disappointed men are and what they have done to prove to their own satisfaction and the satisfaction of the public in general that the country and its people who are interested in the mining industry merit such denunciation.

We find by a close canvass that the great majority of those people are men who have no practical knowledge of mining and consequently incompetent to pass judgment on the mineral resources of the country. We find also that the greater number of them are victims of either some grasping transportation company who misled them by mythical stories of rich strikes in new fields, or they have believed all of the exaggerated stories of successful "tenderfeet" who struck it rich in Klondike last year, which were circulated so freely over a year ago all over the continent. Those deluded people, not having the necessary knowledge of mining, actually believed that all they had to do was to go to Alaska or the Klondike and take up a claim and dig out a fortune in a short time with but little labor or expense. Numbers of them mortgaged their homes and spent the last dollar they possessed to reach the "Golden Klondike," only to find disappointment and ruins of their golden air castle staring them in the face. Discouraged and disgusted with themselves for having rushed blindly into the country to pursue a calling entirely new to them and when they found that their chances were few to win the golden reward they expected, they returned disgusted and empty-handed, denouncing the country and its people as boomers and liars.

But this is only the history of all other great mining excitements repeating itself, and the proportionate number of failures are no greater than they have been in other great excitements in the past, and, in fact, the number of failures in proportion to those who have succeeded are not so large as they were at the San Juan excitement a few years ago. There has been a popular idea among the "tenderfeet" that it did not require experience to mine successfully in Alaska, but they have found out to their sorrow the falsity of this belief. However, no matter how much the country may be "blackeyed" by the unsuccessful, the gold the country produces will speak for itself and the people will continue to come and development will progress rapidly, and in a few years Alaska will be one of the greatest gold producers, if not the greatest, in the world, for the gold is there and the people will find ways and means of getting it. Although it is true that a large amount of money has been taken into the country, still there was no gold dust imported, and when we count the gold in its native state that is shipped out of the country no one will deny the fact that Alaska and the Northwest Territory have produced it.

The Northwest Territory, it is true, is experiencing a "standstill" or decline period at the present, but it is not from the lack of gold in its mines, but from the excessive royalty exacted by the Government and the stringent laws by which the miners have to abide, and their inability under such conditions to make their claims yield a profit there, where the same claims would yield a fortune in a short time were they on American soil. All of the camps on the Yukon in Alaska were reported to have a promising outlook for the coming year when we left St. Michaels on Oct. 9th. The discoveries made in the coast country north and east of St. Michaels last winter, viz., Auvik and Golovin bay, are fast coming into prominence and will be in the next two years to come the chief attraction in Alaska. The Auvik country, which I gave a history in brief of in my letter of last July, is within the 100-mile limit of the military reservation of Fort St. Michaels and consequently could not be prospected or worked until the authorities at Washington had decided upon the matter and granted permits to pursue mining within the reserve. A short time previous to my leaving St. Michaels I received from Washington, through the commanding officer at St. Michaels, an order permitting myself and associates to mine on that portion of the reservation under the U. S. mining laws and the district was formally opened for the location of claims.

A few days' prospecting on "Macdonald creek" and the Auvik river in this district prior to my leaving Alaska proved to the satisfaction of many of us interested that the district is going to turn out even better than any of us had expected. The average of the colors found in the gravel laying on bedrock weighs over a pennyweight each and from the small patch of bedrock worked on "Macdonald creek" it was proven that the main part of pay will be in the form of nuggets. The assay value of the gold is the highest of any ever found in Alaska or the Northwest Territory, being worth \$19.50 per ounce. Consider-

able prospecting work will be done there this winter and a large number of claims will be opened there next spring. It is the ideal placer mining country of Alaska for many reasons. The river and all of its tributaries have a great deal of fall, affording a good dump for sluices. The mountains are high and steep, giving a good watershed into all creeks and ravines. Ample timber for fuel, lumber and all mining purposes is at hand. The distance from a landing on the coast being only thirty-five miles, makes it possible to get all kinds of supplies and machinery to the mines easily and cheaply, by pack train of horses in summer and by sleighs in winter. Like all of the coast streams south of Port Clarence, the waters in the channels of the creeks and rivers never freeze in winter, consequently there is no frozen ground to contend with, and as soon as the waters subside sufficiently after they break up the latter part of May, work can be carried on there without interruption until the last of September. During June, July and August two shifts of men can be worked night and day, as it is continual daylight, thus making a working season of six months instead of three.

Although there has been some warm and hot springs discovered in this coast country laying between the mouth of the Yukon and Port Clarence, no one yet has been able to advance a feasible theory why the waters in all of those coast streams never freeze underneath in winter, but it is nevertheless a fact that any creek flowing 50 miner's inches of water after the first frost in the fall, contains running water the whole winter through. I have myself cut and dug shafts in creeks through ice 6 and 8 feet thick in midwinter, to find running water and loose gravel underneath, still a close search failed to disclose any warm or hot springs in or flowing into the same creek.

The formation in the Golsan mining district on the Auvik is composed of black slate, porphyry, diorite and granite, all of which are densely mineralized except the granite. This is bordered on the north by a large dike several miles in width, of recent slate or what is commonly known as "coal slate." The distance from St. Michaels to the junction of Macdonald creek and the Auvik, the headquarters of the district, is about seventy-five or eighty miles, forty of which is by water or sea ice to Golsova, a native village on the coast, and thence thirty-five miles over three low ranges of mountains to the Auvik. This new country will in the future figure prominently in the gold production of Alaska.

What is known as the Golovin Bay country will take an important place next year in the leading gold producing sections of Alaska. It is situated on the Neukluk river, a tributary of Fish river, which empties its waters into Golovin bay. It is between sixty and seventy miles in a northerly direction from Cheenik, where Dexter's trading station and the Swedish Mission are located, and about 160 miles from St. Michaels. The route to the mines in summer is an all-water route: from St. Michaels to Cheenik by steamer or sailing vessel, and thence up the river to the mines by flat-bottomed wooden boats or native skin boats. But this season a small river steamer, 75 feet in length, succeeded in getting up the Neukluk river to within six or seven miles of the new town, Council City, which is situated near the center of the mining districts. The details of the discovery of this district last winter by Messrs. Blake, Libby, Melsing and Moredaunt was given in my letter of last July, and the reader is already familiar with them, so it is not necessary to repeat them; suffice to say that, although it had no "standstill" period like the Golsan district, it had its "backsets." It is situated some forty miles outside of the limits of the military reservation, but, unfortunately, the first rush of men who went there were novices, and, it being early in the season, the waters still high and the mosquitoes bad, they were easily discouraged when they could not get "gold by the shovelful," as one of them remarked. They returned to St. Michael and "blackeyed" the district. But, however, further developments proved its richness, and later on, when it was learned for a fact that the discoverers were panning out of Ophir creek as high as two ounces per day, the second pilgrimage was made, and since that time people have continued to come in, and when I left there on Sept. 10th there was a population of about 300 people, and substantial log buildings were fast taking the place of tents.

Council City is situated on the east bank of the Neukluk river, on the boundary line between Discovery and El Dorado districts, and between Melsing and Ophir creeks, the two first creeks discovered. No development has been done on Melsing creek so far to demonstrate how rich it is or what it will pay, all attention being paid to Ophir creek by the very few who thoroughly prospected their claims and did work enough to demonstrate what their claims will pay. Everybody coming into the new field was seemingly satisfied by seeing what those few were getting who were thoroughly prospecting their claims, and put in all of their time hunting up new creeks and staking claims, while the balance were building houses in Council City for winter quarters, as the season was nearing the close when most of them arrived.

To be brief, one claim proven, seven miles up Ophir creek, will pay at the least, in one place, \$300 per day

to the man shoveling into sluice boxes, and another claim down near the mouth pays two ounces per day to the man by the panning process, and it is taken for granted that all the claims lying in between are equally as good. In a small creek, a tributary of Ophir creek, an ounce per day to the man was taken out with a rocker from the gravel on the rimrock, without going to bedrock. On another claim, on another small tributary of Ophir, a daily average of over four ounces per day was taken out with a rocker for a couple of weeks prior to shutting down for the season. This I have seen done, but I do not know nor will I vouch for the richness of other claims on the same creeks, but it is natural to suppose that they are also good. The formation throughout the whole district is laminated black slate, intersected by frozen seams or veins of quartz, mica schist and talc. About 50 per cent of the gravel in the creeks is quartz from those seams and large ledges of quartz that run through the country.

The formation in this section, like the Auvik and all along the coast, lays very flat, averaging a dip of 15°. Large dikes of slate, carrying free gold, run through those districts, some of it (selected pieces) running as high as \$20 per ton, mortar tests. Those dikes and gigantic quartz ledges which I have seen of low grade ore convinces me that at no distant date this section will be one of the greatest milling districts on the continent. There is a vast scope of country lying between the Unalakleet river and Golovin bay, intersected by rivers and streams, in which gold has been found, which may on more thorough prospecting develop even better and richer districts than those already named. Ophir creek and the Upper Neukluk have one serious drawback, that is the lack of timber. The timber ends about a mile above Council City, and from there to the Port Clarence divide, at the head of the Neukluk, there is not a tree to be seen.

From the present outlook, this coast section is the coming country, for the reason that it is easy of access and has all the facilities for successful mining on a large scale. Still, I would not advise anyone to go there, good as the outlook is, for the reason that there are hardships to be endured and a great many slight drawbacks, that are too numerous to mention here, which would serve to discourage people unused to that climate. It is no place for a man who is not a practical miner, in good, sound health, and even they are liable to fail. The popular idea of luck, without practical knowledge of mining, which the majority of the "tenderfeet" preach, is all bosh. That is the very reason why the newly-discovered districts are so retarded in development, and the cause of so many hard-luck stories of those who came back cursing the country. It is all summed up in a few words: The lack of practical miners and prospectors and too many novices and speculators whose only capital is "wind." I would warn all who are not practical miners and who do not possess ample capital to work on to stay away from Alaska and stick to their old vocations as long as they insure them a comfortable living. In conclusion, I will say I have met a large number of Kotzebue Sound victims, and many of them were old California prospectors and miners, who, after prospecting on the Kowak, Noatak and Seeliwik, all agree on one point, and that is that gold does not exist in paying quantities in that section. Several of them have told me that there is not a color of gold to be found on the Noatak and Seeliwik rivers, and the "banner nugget" that was found on the Kowak this season was not as large as the head of a pin. About 700 people have already left there, and it is reported that the balance—some 700 more—will be out the first chance in the spring, if nothing is found there during the winter. Golovin bay has already got a good many of those victims, and likely will have many more before spring. There have been contracts let for a monthly mail this winter to St. Michaels, via Dawson, Circle and Rampart City, and the first official winter mail that ever left St. Michaels for the upper Yukon country left St. Michaels on Oct. 9th, carried by Edwin Engelstad, the veteran Alaskan traveler, who has the contract.

A GERMAN inventor is reported to have discovered a method of producing glass which will transmit light freely, but no heat. A plate of the material $\frac{1}{16}$ inch thick, containing 28 per cent of iron in the form described as ferrous chloride, allowed only 4.06 per cent of radiant heat to pass through it, while another plate of equal thickness, and containing quite as much iron in the shape of ferric chloride, permitted 11.2 per cent to pass. The chemical distinction is very small, but the effect is said to be marked. A thinner slab of this glass allowed less than 1 per cent of the heat of gas flames to pass, although transmitting 12 per cent of heat from sunlight. Ordinary window glass, on the other hand, lets 86 per cent of the heat through.

In New York the decision of the United States Court of Appeals in favor of the Mitis patent for use of aluminum in the manufacture of steel ingots and castings is considered the most important one affecting steel manufacturing rendered in many years. It means that every maker of steel, ingot or casting, must pay a royalty or cease to use this process. The use of aluminum in the manufacture of steel has made possible many later improvements.

The Present Conditions of Gold Mining in the Kochkara Region in the Oural.

NUMBER II.

Written for the MINING AND SCIENTIFIC PRESS by R. HELMHACKER, Prague, Bohemia.

The inclusions of pyrites, from which the arsenopyrite prevails mostly, also either pyrite or arsenopyrite alone, or both jointly, with rare chalcopryite and more sparingly galenite, form sometimes 5 to 10 per cent, and on some spots yet more of the vein matter. The arsenopyrite alone, or both the mixtures of pyrite with arsenopyrite, contain from 40 to more than 400 gr., chemically bound, therefore no free milling gold in one ton sulphureted ore, so that the veins in the depth have a higher grade than when the bulk of auriferous sulphurets in them increase. The auriferous sulphureted ore is also disseminated in slighter quantities in the outside of the vein walls in the lode rock, or penetrates fragmentary portions of silicified lodestone, or even granite, which, at such depth, is only partially decayed. The veins are developed with shafts to the depth of 140 m.; the free milling gold, or the metal in the condition suitable for washing and amalgamation, begins to decrease much below the depth of 20 to 50 m., where it is slowly replaced by auriferous chalcodony and auriferous sulphureted ores. The fineness of the gold ranges low, as the bullion contains about 30% Ag., but in the cellular, friable veins, more contiguous with the outcrop, the free Au has a lesser percentage of Ag.

The mining work is done simply: from the shafts are driven levels which tap commonly much water, as the ground is very permeable. As the country, already alluded to, has only few forests, and the firewood, transported from formidable distances, is becoming more costly, steam engines are run only for dressing and pumping purposes; hoisting is executed with horse-whims. The mining operations underground and stoping are done mostly by Russian miners, while the conveyors, and the unskilled labor above ground, are Bashkires. The wages vary per day from 30 to 42 cents. As it is hoped that a railway will connect the Kochkar mining region with the Oural trunk line, the firewood may be replaced by waste from naphtha refining, and by this means one could run more steam engines, being provided with a cheaper fuel. As yet, the firewood can be replaced only by some mines with peat, whose moderate deposits are distant about 10 km. from them.

Not far distant from the Kochkar mining region, at Cheliabinsk, were found lately quartz veins in the same great granite massive, occurring under similar conditions, but they differ from the veins described in that they are extremely fluctuating in their gold yield, which is, in the former region, more constant and less varying.

The secondary gold deposits are now less productive than when discovered half a century ago. The gold detritus formed by the disintegration and crumbling away of the rocks which contain the auriferous veins has not been deposited far from the place of its formation. Therefore they are alluvial and connected with the outcrops of the auriferous veins, immediately beneath them, as these species of secondary accumulations extend only to such distance as the veins pass below them, and thus are blended at their bottoms with the decayed heads of the gold vein-bearing rock. Placers extending over a larger ground area along the water courses, furrowing the country, and that have been partly removed, have their rich portions corresponding also with high-grade gold tenor, arranged transversely to their trend, resting over the outcrops of the veins. The alluvial placers show beneath a thin vegetable soil a barren alluvial bed of tenacious, variegated clay to a depth varying from 4 to 12½ m., and below them the auriferous layer ½ to 1½ m. thick. The alluvial gold-bearing layer is composed of coarse argillaceous sands, including edged fragments of vein quartz and rounded fragments of granite, containing in its lower division 1½ to 10 gr. Au. in one ton of gravel. But the lower division of the gold-bearing bed is blended on its bottom with the uppermost, entirely decomposed heads of granite forming their base, in which the same gold yield is detectable, and therefore they were dug, together with the alluvial bed, and washed. The quartz fragments from the disintegrated veins of adhering gold, arranged in rows on the underground outcrop of the lodes, naturally led to the discovery of the primary gold deposits. Evidently the alluvial bed of detrital gold was generated from the auriferous sulphurets, decomposed by exposure to air and weather agencies, which thus set free the fine or granular gold. The gold tenor of all the gold sands washed in the last year in this mining region afforded an average output of 1½ gr. Au. to the ton of gravel.

In spite of the atmospheric agencies decaying the granite, some minerals in it, like the liberated gold, remain unaffected, and are washed with the detrital gold in the placers situated on the brooks Kamenka, Tioplaia and Sanarka. These placers are renowned for the occurrence of precious stones, such as beryl, cyanite, pink topaz, corundum, ruby, sapphire, amethyst, transparent quartz, zircon, etc.

In regard to the age of the above-mentioned alluvial gold layer, the beds have been referred to as of recent origin, partly to the Postpliocene period,

as the remains of the elephant, rhinoceros and horse have been found in them.

The extraction expenses for one ton of savings are \$3.07; the ores must therefore contain 9.1 gr. of Au in one ton to justify mining exploration. Effectively the yield in gold is greater than this minimum limit, and the veins gave after they were discovered and worked good returns of free-milling gold. The turbid mud of the stamped ores is concentrated either on shaking tables (Rittinger's percussion plane) or led over amalgamated copper plates or over sluices covered with blankets; to take up and secure the fine gold, quicksilver was introduced in the stamp or panning mills, where the latter are used. About 1870 the mines were down to the depth of 28 to 40 m., and tests of the savings showed high grade ore. By the washing and amalgamation operation little of it was caught, and therefore in the waste heaped on dumps was gold chemically bound or in a condition not suitable to amalgamation, which time would make free milling, and the finely divided sulphureted ores and the chalcodony would be entirely decomposed by atmospheric agencies. For gold extraction there were erected since the year 1872 stamp mills which dressed the turbid water with free milling gold, as already alluded to, in shaking planes and by amalgamation; but as the quartz veins in partly decomposed condition and the gold-yielding country were friable, instead of the crushing operation in stamp mills, there were in the year 1894 erected Chilian arrastras, better adapted for this purpose of crushing and milling, so that the dressing and concentrating were done in forty-nine mills, viz: in five stamp mills with only nine batteries, and in forty-four other dressing mills with 110 pairs of Chilian mullers (arrastras), each pair of arrastras milling daily ten tons of savings. Since the year 1890 there were also placed in the mills percussion tables, Hungarian amalgamating pans and Frue vanners, but only six milling establishments dressed the sulphureted ores to concentrates in the vanners, while the others heaped the slimes or tailings resisting the mechanical mill-treating methods for gold catching on refuse dumps. To dress the vein stuff, on some greater mines were erected dressing mills. One of the largest presents a three-story building with three compartments: the crushing and concentrating, the ore roasting and the lixiviating.

(To be Continued.)

In the Days of '49.

TO THE EDITOR:—I notice your description of the Granite Hill mine, one-half mile east of Wolf creek, Grass Valley. In September, '49, I was one of a company of ten who camped on Wolf creek, and gave it that name. The circumstances in connection with the naming of this creek are as follows:

We ten arrived at the head of the little creek some time in September, '49, and camped, turning our cattle out to graze on that little valley. Having subsisted on three crackers each, a few dried apples and a little coffee for seven days previous, we became wolfish. Finding nothing for sale there to eat (and if we had found it we were about 40 cents short of any kind of change), we concluded to kill one of our faithful animals that had toiled so hard and patiently in the yoke to land us there. We had but one animal that looked as if he had fat enough on his bones to grease a gimlet. His name was "Dan Rice" because of his cuteness and funny tricks. We named him after that great Pennsylvania showman and joker. Perhaps not one animal in ten thousand that made that wonderful trip across the American desert arrived in as good condition to feed ten almost starved men as did Dan. We prepared to kill him. It was a solemn task and many tears were shed. We drew lots as to who should commit the terrible deed. It was done, and the hide, head and entrails were left on the bank of the creek below our camp. Nearly all through that night from the noise they made we thought there were about a thousand wolves fighting and howling over the remains of Dan.

So we named the creek Wolf creek, and so it remains. From there we went over and camped on Gold run; prospected there, but did not dive deep enough, consequently lost the chance of claims that yielded from \$100,000 to \$300,000 every 60 feet. So you see such was life in the most wonderful gold country the world ever knew. In the spring of '50 two men by the name of Walker built a sawmill and two houses on Wolf creek near the site of our old camp, each of them having a family. They finished up the mill and houses in the evening and intended to start in the morning down to the valley close to Sacramento after their families. The Indians came that night and killed both men and burned the mill and houses. In the morning some runners came over to Nevada City and told the news. A drummer and fifer were secured, who paraded the streets, and Capt. Tom Hocket (Oregon Tom) called for volunteers to hunt the Indians down. One hundred of us volunteered, and by noon we were on their trail. About fifty miles southeast of Grass Valley we began to see them skulking through the timber, from tree to tree. I don't know how many were killed, but all seemed satisfied that the murder of the Walkers was amply avenged.

J. M. IRWIN.

The Refining of Base Lead Bullion Containing Silver, and High in Gold.*

NUMBER II.

By G. H. BLAKEMORE.

The Desilverization of Softened Lead.—When the lead in the softening furnace has cooled sufficiently the tap hole is opened and the lead run into a so-called ten-ton (it really holds fourteen tons) desilverizing kettle. The stream of black-red lead falling into the kettle forms a considerable amount of dross or litharge. This cannot well be prevented. It is skimmed off and returned to the softening furnace. Sometimes as much as 700 pounds of it will form. To get all the copper out that is possible, the contents of the kettle are allowed to cool down, until the charge begins to "ring" at the edges, that is, to solidify. Most of the remaining copper will then rise to the top. This is skimmed off and returned to the next charge of the softening furnace.

Assays of this copper dross per ton are as follows:

| Silver, Ozs. | Gold, Ozs. | Copper, % |
|--------------|------------|-----------|
| 143.38 | 87.36 | 2.20 |
| 280.33 | 88.49 | 3.10 |
| 161.64 | 77.06 | 2.30 |
| 231.37 | 76.94 | 3.60 |
| 131.67 | 52.63 | 2.30 |
| 182.39 | 62.65 | 10.20 |
| 145.51 | 49.04 | 3.80 |
| 247.82 | 105.08 | 9.40 |

Assuming that the kettle full of softened bullion has had to be cooled back to allow the second copper dross to rise and be skimmed off, and that it has been heated up to the melting point of zinc, the kettle is now ready for the zinc charge, determined according to the assay of the bullion dip, which should have been taken from the softening furnace to save time.

The following instances will show exactly what zinc was required for the following charges:

| Net tons in kettle. | Assay per ton. | | First zinc, lbs. | Assay after. | | 2nd zinc, lbs. | Assay after. | | Third zinc, lbs. | Assay after Ag. |
|---------------------|----------------|-------|------------------|--------------|------|----------------|--------------|-----|------------------|-----------------|
| | Ag. | Au. | | Ag. | Au. | | Ag. | Au. | | |
| 11.01 | 195.48 | 16.52 | 630 | 1.81 | nil | 86 | nil | nil | | |
| 11.15 | 151.71 | 15.98 | 542 | 6.52 | nil | 106 | nil | nil | | |
| 10.49 | 118.88 | 13.12 | 495 | 19.80 | .008 | 161 | tr. | tr. | | |
| 9.78 | 159.90 | 14.00 | 416 | 13.53 | tr. | 123 | .10 | tr. | | |
| 11.22 | 111.30 | 15.00 | 517 | 7.92 | tr. | 112 | nil | nil | | |
| 11.05 | 246.38 | 24.04 | 651 | 9.26 | tr. | 116 | nil | nil | | |
| 10.04 | 311.10 | 49.42 | 863 | 10.04 | nil | 115 | nil | nil | | |
| 10.98 | 219.94 | 31.32 | 727 | 8.24 | nil | 112 | .11 | tr. | | |
| 9.80 | 186.22 | 34.70 | 638 | 5.14 | nil | 98 | nil | nil | | |
| 9.76 | 177.90 | 23.72 | 601 | 14.71 | tr. | 125 | 2.01 | tr. | 65 | nil |
| 10.47 | 340.04 | 37.38 | 887 | 14.26 | tr. | 127 | nil | nil | | |
| 11.38 | 111.34 | 15.00 | 517 | 0.94 | tr. | 112 | nil | nil | | |
| 11.38 | 31.33 | 0.31 | 55 | 13.23 | nil | 117 | nil | nil | 50 | nil |
| 10.87 | 81.22 | 6.51 | 129 | 69.27 | .008 | 205 | 6.48 | nil | 259 | 0.21 |

As soon as the assay of the bullion is known the zinc table is consulted and the proper charge of zinc weighed up and melted into the lead in the kettle. This is then either hand stirred or steam stirred. If the former, a perforated circular skimmer, with a handle of three-quarter round iron ending in an "eye" or loop, is used for this operation. The workman holds the "eye" of the handle in both hands and squarely faces the kettle. He then slides the skimmer, edgewise, into the lead, turns it face up and, using the edge of the kettle as a fulcrum, he presses down on the handle, steadily at the commencement of the stroke, and ending with a jerk, so bringing the face of the skimmer to the surface with a splash. He draws the skimmer towards him on the surface of the lead, turns it edgewise to push it to the bottom of the kettle, and so renews his stroke. Two men work opposite each other and they first make the lead revolve one way and then, by changing the direction of the stroke, make the current change the other way once every five minutes. This stirring is kept up for from thirty to forty-five minutes. Easy as it may seem, there is considerable knack in stirring a kettle of lead. The paddle, or stirrer, keeps traveling away, and a "new chum" at stirring may be easily recognized, as he cannot stir and stand in the one spot. The work is laborious while it lasts, and although steam is effective in stirring if looked after, and labor saving in a large plant, nothing is saved by it in a small plant, because the men are required later on in the work for the moulding of the soft lead. With steam stirring care must be taken that the lead is not too cold, for if it is the zinc crust is much lower in silver and gold than it should be; if too hot, i. e., visibly red, a certain amount of the zinc added is rendered useless by oxidation. With ordinary care steam stirring is good under the precautions stated. After the zinc is well stirred in the kettle is allowed to cool down for some three hours. The skimming which in that time has risen to the top contains usually all the gold and a considerable part of the silver (see the table of results given above). After the first lot of skimming, or "crust," as it is called, is taken off, the fire is started to warm up the lead. A chisel-pointed scraper, some 4 inches wide at the edge, is then pushed down the side of the kettle to detach particles of alloy which have deposited there. This rises to the top and the second skimming is taken

* Australasian Institute Mining Engineers.

off. A third skimming is also obtained by letting the kettle cool back until it "rings," i. e., solidifies along the edges. As soon as this ring gets about 3 inches wide the fire is started again under the kettle, and the heat raised so as to just melt the ring; a little more alloy is thus obtained. These skimmings or crusts are taken off by two men, one man using the skimmer and the other a wooden rabble, with which he pushes the floating crust to his mate. Some seven hours are taken to complete the first zincing, counting from the time the zinc is melted in until the last skimming is off.

As soon as the lead is skimmed clean a sample is taken large enough for ten French assay tons. This is assayed immediately by the assayer for gold and for silver. The weight figure of zinc necessary to add to extract the balance of the silver left in the lead is sent down by the assayer, who keeps the zinc table in his charge. By the time the assay is ready the kettle of lead has been warmed up to the melting point of zinc once more, and when the second zinc is added the same process of stirring is followed and three skimmings of zinc dross taken off. The crust obtained from the second zincing is not placed with the crust obtained from the first zincing. A glance at the zinc results given above will explain why. It is apparently free from gold and very low in silver, and therefore it is put aside and added to the next charge in the kettle and called "returns." I usually count 3 pounds of the zinc used in the second zinc as equal to 1 pound of fresh zinc, and always make that allowance in the zinc required by the next charge. For instance, say a new charge in the kettle requires 600 pounds of fresh zinc and I have 99 pounds of zinc in the shape of a second zinc crust. I count this as equal to 33 pounds of zinc and put it into the kettle with 600—33 pounds = 567 pounds of new zinc to be added.

Sometimes a third zinc is necessary in case the silver in the kettle is not low enough, and, if so, the crust or skimming so obtained is placed with the second crust and both returned to the next charge. If the silver is not higher than 0.20 ounce per ton it is usually allowed to pass as clean.

Although I here speak of gold crusts and silver crusts separately, it is not the best practice to attempt to extract the gold with as little silver as possible and to produce a silver crust afterwards containing only silver. My experience is that it cannot be done when gold is present in the bullion in the amounts given in a previous table. The reason is that the gold does not all come out with the zinc; some is always left behind.

It is admittedly expensive to have to extract all the silver with the gold and so only produce dore bullion, but it is better to do that than lose a considerable amount of gold by attempting to produce a silver crust in the hope of getting a portion of the silver ready for the market without having to go to the expense of the parting operation. The examples given are instances of special attempts to extract all the gold and make a silver crust. Assays are given of the silver crusts, which in every case contained gold, although a careful assay of the bullion from which it was produced failed to show that any gold was left.

The following are instances of special attempts made to clean the lead of gold:

1. The assay of the lead before zincing was 14.78 ounces gold and 121.16 ounces silver per ton. First, gold zinc 200 pounds reduced lead to .004 Au. 108.80 Ag. per ton; second, 30 pounds reduced lead to tr. Au. 76.90 Ag. per ton; third, 10 pounds reduced lead to nil Au. 67.23 Ag. per ton.

The first silver crust from this apparently clean charge assayed 927.48 ounces silver and 0.26 ounces gold per ton.

2. Assay of lead in kettle 12.22 ounces gold and 124.22 ounces silver per ton. First, gold zinc 211 pounds reduced lead to .05 ounce Au. 119.59 ounces Ag. per ton; second, 35 pounds reduced lead to .008 ounce Au. 53.44 ounces Ag. per ton; third, 20 pounds reduced lead to nil Au. 45.28 ounces Ag. per ton.

The first assay crust assayed 421.84 ounces silver and .40 ounce gold per ton.

3. Assay of lead in kettle 15.14 ounces gold and 149.26 ounces silver per ton. First, gold zinc 193 pounds reduced lead to .03 ounce Au. 136.11 ounces Ag. per ton; second, 70 pounds reduced lead to nil Au. 44.02 ounces Ag. per ton.

The first silver crust assayed 653.80 ounces silver and 0.50 ounce gold per ton.

In addition to the above instances, the following figures are assays made of first silver crusts:

| Oz. silver per ton. | Oz. gold per ton. | Oz. silver per ton. | Oz. gold per ton. |
|---------------------|-------------------|---------------------|-------------------|
| 915.13 | 0.29 | 891.35 | 0.05 |
| 519.49 | 0.32 | 583.94 | 0.06 |
| 644.76 | 0.14 | 145.80 | nil |
| 785.38 | tr. | 534.61 | 0.21 |
| 715.77 | 0.13 | 792.29 | 0.02 |
| 102.28 | 0.06 | 510.86 | 0.04 |
| 891.35 | 0.05 | 133.18 | tr. |
| 785.38 | tr. | 573.42 | tr. |
| 715.77 | 0.13 | 156.59 | nil |
| 317.48 | tr. | | |

The amount of gold is certainly small in most instances, but as soon as the concentration processes commence the percentage of gold in the concentrated products rapidly rises.

(To be continued.)

A Spokeless Tailings Wheel.*

The comparatively level country traversed by the Main Reef series, and the enormous economic importance attaching to the secondary treatment of our ore (which takes the form of cyanidation of the sands and slime products of the gravitation stamp mill), very soon brought the question of the cheap lifting of the mill pulp preparatory to its distribution at the cyanide plant into notable prominence.

To those who have grown with the Rand industry from its humble beginnings it has been most instructive to watch the evolution of the tailings wheel as we know it to-day, and to note the steadiness with which it has distanced the plunger pump and the centrifugal pump in the favor of our mechanicians. The main lines upon which that evolution has advanced receive their best and latest exponents in the type of elevator erected at the Glen Deep and French Rand mines; a wheel of wooden and iron construction, 60 feet in diameter, with at most a double row of buckets for the elevation of the mill pulp, belt-driven by a pulley on the arms of the wheel, and the axle resting on substantial bearings supported by built-up steel A frames, and these frames designed so tall as to be braced together above the top of the wheel, and resting on masonry foundations.

The bicycle wheel suggested the design of one meritorious pattern of tailings wheel, of which that at the Consolidated Main Reef is an example. In this the spokes are constructed of rod steel on the tension principle; the original application of motive power was by toothed wheel at the periphery, but this has been replaced by a driving rope. A second tailings wheel of this type is almost finished at the Durban-Roodepoort, but it differs from that at the Consolidated Main Reef in that the usual flat bucket is replaced by a V-shaped bucket. The original design for the tension spoke wheel was made by the inventor of the new appliance, who has now, in the opinion of most of our leading mechanical engineers, struck upon an idea that is of really wide application.

The invention consists of a spokeless or armless wheel or hollow cylinder provided with the buckets which are typical of the tailings wheel in ordinary use. The wheel may be constructed of any material found most suitable, and can be of any breadth and height. Round the outer periphery of this wheel or elevator are riveted two complete parallel rings of steel rail. The wheel rests on two pairs of flanged rollers at its base, which rollers receive their motion from the motive power and rotate the elevator. Three other pairs of rollers are used—two at about the middle at opposite sides and a third pair at the top. These are intended to keep the wheel in its true path and also from collapsing. Should it be necessary to make a wheel of greater breadth, it is the intention to use a third, and even a fourth, rail with its complement of rollers.

It is proposed to mount the lower sets of rollers on shafts or axles, resting on substantial bearings, long enough to receive the motive power driving the wheel. At about three-quarters of the distance from the bottom of the wheel, or at any convenient height, a platform is supported on the framework already mentioned. This platform is provided with vertical or angular sides to form the receiving-box into which the wheel discharges the material elevated. This last is conveyed by launders or chutes to any desired point. One of the points in favor of the new appliance is that the small diameter of the driven wheels or rollers allows of full efficiency being derived from the driving ropes or belts. Under the system in vogue this is not the case, owing to the slow travel of the driving belt.

The special advantages claimed by the inventor are simplicity, cheapness, effectiveness, and capacity practically unlimited. The last advantage alone renders comparison between the two systems almost impossible; in the case of the present type of wheel, when a large quantity of material has to be raised, two or more wheels are required; while in the case of the new wheel, the material from several mills could be raised at a proportionately much smaller cost than could that from one mill—the wheel being merely so much the wider. The only necessity is dividing off the breadth of the wheel into the needful number of compartments for the separation of the products of the various mills. The normal type of wheel requires massive structures to support it, while the arms interfere with the free discharge of material both into and out of the buckets; the new wheel rests practically solely upon the two lower sets of rollers, and both the foundations and framing which carry the additional rollers bear none of the weight of either the wheel or the material to be raised. With the new wheel any sort of driving power can be employed; tooth-gearing can be applied to the periphery of the wheel, or to the friction rollers; a direct-acting engine can drive the shafts of the friction rollers, or a slow-speed motor can do so; the motive power can be supplied by rope drive—either at the wheel's periphery or to the shafts of the friction rollers.

In the design for a wheel of the new type, to handle

*Condensed from South African Mining Journal.

the products of a 200-stamp mill, the gross width of wheel (which itself weighs fifteen tons without load), standards and framing, is 5½ feet. The elevator needs only certain structural modifications to fit it as an elevator "for raising liquids or solids, or combinations of solids, and solids generally, but is specially adapted, as far as mining purposes are concerned, for raising tailings, slimes, concentrates, rock or other like matter from a given point to any desired level." The inventor is L. H. Lavenstein.

New Propositions for Good Roads.

The California good roads movement is assuming new forms. At the coming session of the Legislature a new good roads bill will be presented. It is now proposed to attack the problem of getting good roads from the side opposite to that by which it was approached before. That is to say, instead of taking the business of building the roads out of the hands of the county supervisors—a proposition which arrayed powerful opposition to the Legislature two years ago—it is now the intention to have the highways constructed by the county authorities on plans and specifications prepared by the Department of Highways. To induce the counties to build main roads in this manner a substantial inducement is to be offered—the highways so built are to be accepted and maintained by the State, the necessary sprinkling required to keep down the dust being included as a part of such maintenance.

State Maintenance.—The bill as drawn provides that no road shall be accepted by the State unless it is at least five miles in length and leads, on the best grade and alignment, from one county seat to another or between other important places. In order to maintain the accepted roads, the Department of Highways is empowered to let contracts to sprinkle, roll and otherwise care for such highways. For the first year \$100,000 of State funds is to be appropriated, and thereafter as much as may be necessary.

Half of the Money for Permanent Work.—These are the principal provisions of the State highway bill as drawn, and there are also proposed certain amendments to the county road law, the most important of which is a provision that 50 per cent of the road taxes shall be put into a "good road fund" which shall be used only for certain specified purposes, viz: the laying out, grading, draining, sprinkling, graveling or macadamizing of the principal highways of the county and the purchase of road machinery. Another amendment gives the county surveyor increased powers and constitutes him practically county engineer for road-making and maintenance purposes.

What the Highway Commission Expects.—The Highway Commissioners propose that half of all the money raised in the State annually for road purposes—an amount equaling nearly \$1,000,000—shall be expended in permanent road work according to the most modern and intelligent methods. They propose that this sum shall be used in building roads of the best material along proper grades. They propose that all superstructures, wherever possible, shall be of rock; so that once built they will last for centuries and never henceforth be of any expense to the taxpayers of the State. A high average for the best road, stone bridges, culverts and all, is \$5000 a mile. At this rate 200 miles of modern road could be built in California annually. In five years we could have 1000 miles of as good roads as there is in the world, and in twenty years we could have a network of magnificent highways connecting all of the great districts of the State with each other, and all at no increased cost to the taxpayers.

JOHN MUIR says, in this happy land no famine comes nigh the Sierra bear. All the year round his bread is sure, for some of the thousand kinds that he likes are always in season and accessible, ranged on the shelves of the mountains like stores in a pantry. From one to the other, from climate to climate, up and down he climbs, feasting on each in turn, enjoying as great variety as if he traveled to far-off countries north and south. To him, almost everything is food except granite. Every tree helps to feed him, and every bush and herb, with fruits and flowers, leaves and bark, and almost everything living or dead within reach, animals and insects—badgers, gophers, ground squirrels, lizards, snakes, etc., and ants, bees, wasps, old and young, together with their eggs and larvae, and their moss, grass, and paper nests. Craunched and hashed, down all go to this marvelous stomach, and vanish as if cast into a fire. What digestion! A sheep or wounded deer or a pig he eats warm about as quickly as a boy eats a buttered muffin; or, should the meat be a month old, it still is welcomed with tremendous relish. After so gross a meal as this, perhaps the next will be strawberries and clover, or raspberries with mushrooms and nuts, or pockery acorns and choke cherries. And, as if fearing that anything eatable in all his dominions should escape being eaten, he breaks into cabins to look after sugar, dried apples, bacon, etc.; and if still hungry, he eats the mountaineer's bed,

but when he has had a full meal of more temptingainties he usually leaves it undisturbed, though he has been known to drag it up through a hole in the roof, carry it to the foot of a tree, and lie down on it to enjoy a siesta. Eating everything, never is he himself eaten except by man, and man alone is an enemy to be feared. "Bar meat," said a hunter from whom I was seeking information, "bar meat is the best meat in the mountains; their skins make the best beds and their grease the best butter. Biscuit shortened with bar grease goes as far as beans; a man will walk all day on a couple of them biscuit."

Dissenting Opinions.

The United States Supreme Court stood five to three in their decision against the Joint Traffic Association. Justices Gray, Shiras and White voted against. Justice McKenna took no part in the decision.—Washington dispatch.

There never should be a dissenting opinion in a case before the Supreme Court of the United States, or any other high appellate court. The decision should be that of the court, and not of the judges as individuals. The judges should get together and render a decision settling the points in controversy, and the decision rendered should not reflect the opinion of this judge or that judge, but the opinion of the court. If one were a candidate for the position of teacher in the public schools, what possible good could it do to tell him, "You are elected, but three members of the board voted against you," or if he applied to a bank for a loan, to tell him that he could have it, but three of the directors voted against the loan because they doubted his solvency? In effect the court says to a suitor, "We decide for you, but two or three judges still think you are wrong." Dissenting opinions of judges can have but one purpose, and that is to give a judge an opportunity of exhibiting his individual views and opinions. The public cares little about his individual views. The only concern of the public is with the decision of the court as a court, so that they may know what it is, and know how to govern themselves. The curtain should not be raised to present the disagreeable picture of family discord and want of harmony. The people cannot change the result, but must accept it as the majority decides. It is a maxim of the law that it is to the interest of the public that there should be an end to litigation. It certainly is to the interest of the public that when a question is settled by the highest tribunal it should remain settled for all time. The result of a dissenting opinion is simply to open up for future discussion, litigation and bickering the question which should then be finally settled by that tribunal. Somebody must settle this question; it must be settled somewhere; this tribunal is selected as the final arbiter, and when it once settles it, it should be settled forever.

Another very important thing about a dissenting opinion, especially if it is well written, is that it impresses not only the particular litigant, but the public who read it, with the idea that injustice has been done by the courts; a feeling of dissatisfaction arises, a feeling of great wrong is cast broadcast. The court has been weakened in popular esteem, for in the opinion of the reader it has lent itself to injustice and inflicted wrong.

At least one good result would follow the abolition of dissenting opinions—the main opinion would be shorter and more concise, stating in plain English the points decided, and succinctly the reasons therefor; for all the judges, being to some extent responsible for it, would see that it was not filled with obscure illustrations and beclouded with alleged reasons of doubtful logical force. If we had shorter opinions the judges would have time to write better ones.

Nothing of any benefit to the public can be gained by a dissenting opinion.

Mercury on Aluminum.

M. C. Margat is reported to have made a curious discovery regarding the action of mercury on aluminum. He says that if the surface of a plate of aluminum, which has been well sand-papered, is rubbed lightly with amalgam of mercury, there will be produced upon it within a very short time an extraordinary efflorescence. The surface of the metal will soon be covered with a growth of alumina, which will shoot up literally within plain vision. No more remarkable sight is to be observed than the formation of this miniature forest, which attains, in the course of half an hour, a height of nearly half an inch.

If the metal is brushed over it will be found pitted, as if with acid, at all the parts in which this rapid oxidation has taken place. But a little heat applied to the plate suffices, by reason of the volatilization of the mercury, to arrest the phenomenon entirely. It will, however, be reproduced every time the surface is rubbed anew with a little amalgam of mercury. The experiment succeeds more easily with the amalgam, as it is difficult to sufficiently pulverize a drop of mercury with the finger, the metal not soaking into the aluminum. It is probable that the mercury produces catalytic action, and that it then allows the aluminum disintegrated by its pres-

ence, or perhaps reduced to a porous condition, to be more readily attacked when cold by the oxygen of the air. Nevertheless the plate is heated to a degree appreciable to the touch and actual combustion is evidently established.

South Africa and British Columbia Compared.

It costs money to open mines on the Rand, South Africa. This is shown in a report by C. Wilson Moore to an extraordinary general meeting of the shareholders of the Sheba Queen Gold & Exploration Co., which was held in London recently, in which he stated that the deep level mines, as a rule, require from £400,000 to £500,000 to make them productive.

From this it will be readily seen that the Rand is not a poor man's country like this is. Take the leading mines of the camp, for instance, and what was spent to make them producers? The Le Roi paid from the grass roots, and was owned by comparatively poor men, until its dividends made them wealthy. The War Eagle had a pay chute that extended from the surface, and before this chimney was worked out by the original owners dividends to the amount of \$187,000 had been paid. When the pay chute had been worked out it was sold to the Gooderham-Blackstock syndicate for \$700,000. The latter company was ambitious, desired to mine on a large scale and spent a large sum in placing the property in condition, so that nearly \$3,000,000 worth of ore was in sight before it began to take it out and pay dividends. In order to accomplish this magnificent result a little over \$200,000 was expended. In the Center Star, it is claimed, when it was sold to the Gooderham-Blackstock syndicate there was something like \$3,000,000 worth of ore in sight, and those who pretend to know allege that not over \$200,000 was spent to attain this splendid result. The management claimed to have spent more than this sum. Take the Iron Mask mine, which was a poor man's proposition from the start. It has paid its way and has now large reserves of ore, and as soon as its enlarged plant is installed it is certain to become a dividend payer. The property does not owe any money and all that has been expended upon it was taken out of the mine, and whatever money was used in the preliminary development of the property, and it was not a large sum, was borrowed from the old War Eagle Company, and was repaid out of the proceeds of the mine. The Columbia & Kootenay was developed into a producing property for a merely nominal sum. Then there are many other properties in this camp that can easily be made to yield a profit when from \$50,000 to \$200,000 has been expended upon them. This is in marked contrast to the £400,000 or the £500,000 required in the Rand to bring deep level mines up to the productive stage—and by productive is meant that they will simply produce ore in fair quantities. It does not mean, even after they have expended the large sums spoken of, that they have uncovered millions of dollars' worth of ore as was the case with the War Eagle and the Center Star.—Rossland, B. C., Miner.

Thought He Saw the Cage.

The death of Stephen Jeffrey, who stepped into the shaft at the Silver King mine, recalls to mind many similar fatalities from the same cause—that of a miner stepping into the shaft under the impression that he was stepping into the cage, says the Bradbury, Montana, *Times*. Old miners who have had narrow escapes from death from this optical delusion always feel the cage before stepping in, as they will not trust to the eyesight again after being once deceived. In the case of Jeffrey there was an electric light shining right on the spot where the poor fellow thought he was stepping into the cage, when the cage was not there at all. Had it been where he had always been accustomed to see it at that particular time, all would have been well. The shaft was clear, but to Jeffrey's eye the cage was the black, yawning shaft of death. It is quite likely that his partner saw the cage, as well as Jeffrey, because he was following close behind, and appeared very surprised to see Jeffrey disappear. Had he seen differently he would have called to Jeffrey ere it was too late. It is a common thing for miners to see the cage or skip in the shaft at the level or drift they are working in, when in reality it is not there at all.

The truth of the above will be felt by thousands of men who have had the same singular impression. Another curious fact is that when one is running a car he goes with it. The writer has personal knowledge of two instances, one where he was running a car in a drift, and it unexpectedly went into a sump, he going along with it, and also following it when he ran it off the end of a track over the edge of the dump. In each case he could and should have let go when he felt and saw the car upending, but for some unexplained reason he clung to it and went, too, and has been told by many miners that they have done just the same thing.

A Mine Shaft Cased With Steel.

At Cripple Creek, Colorado, the Portland M. Co. proposes to fit out its main shaft with steel, the supports and sets to be of that material, with timber for lagging.

The three-compartment shaft of that company is timbered, and the expense item is becoming burdensome, not only on the ground of safety, but on account of the heavy expense of securing and transporting the heavy timbers necessary. This big shaft has always been a problem with the company, and as depth is gained its importance steadily increases. A few weeks ago, says the *Denver Republican*, it was suggested to the manager that a shaft composed practically of steel was practicable at a cost only a trifle in excess of wood, while the durability would be much greater. The suggestion was immediately taken up by the management, which, upon investigation, determined that a shaft constructed of steel would be stronger, more durable and cheaper than the ordinary timber shafts, with a saving in the time of construction.

The corner posts are to be composed of structural steel 1 inch thick, cast at right angles, with the angles inside, the several lengths solidly bolted together. The square sets are of the same style of iron, to be firmly bolted to the uprights at intervals of 6 feet. The lagging is to be composed of 4-inch plank, set in endwise, with broken joints, so that the pressure will in no place come against more than 6 feet of plank.

The cost of the steel structure with the heavy lagging is just the same as if the shaft timbering was composed entirely of wood, but the saving is in the rapidity of construction, the greater durability of the steel and the saving in excavation. A timber shaft requires timbers of from 10 to 12 inches square, while the steel is but 3 inches thick, and, on account of its shape, presenting a sharp edge to the rock, can be readily fitted with a few blows of a pick. The saving in excavation in a three-compartment shaft, such as that in use at the Portland, amounts to nearly a yard and a half of rock work for every foot of depth gained—an important matter in such a shaft as the Portland, with its 1000 feet of depth.

The Manufacture of White Lead by Means of Electricity.

In a paper read before the Hygienic Council of the Department of the Seine, says *L'Electricien*, M. Ribau claims to be able to manufacture white lead by means of the electrolytic decomposition produced by currents. Tubs of sandstone are provided, in which is a mixture of carbonate of soda and chlorate of soda in solution. In this liquid thin sheets of lead are immersed, the sheets being placed in a vertical position parallel with each other and separated by a small interval of space. Sheets in pairs, for example, are united to the positive pole of an electric source, while single sheets are united to the positive pole. When the current is turned on, chlorate of lead is produced, and this chlorate of lead forms, on contact with the carbonate of soda, hydro-carbonate of lead. Wooden rods, placed between the sheets of lead and made to oscillate by means of a common axle, are used to maintain by agitation the homogeneity of the bath and to scrape, as fast as it is produced, the white lead adhering to the sheets of lead. The white lead falls to the bottom of the tubs, from which it is taken, and through a filtering press. The liquid that remains in the tubs is poured into a special kind of reservoir, when a current of carbonic acid regenerates the carbonate of soda at the expense of the soda which had been liberated by the current. This returns the mixture to its primitive condition of carbonate and chlorate of soda. It remains to be seen whether or not this process is applicable to industrial pursuits and if the white lead thus obtained possesses the qualities of that article as manufactured by the older methods. If the experiments above alluded to are satisfactory, the process of thus producing white lead should be encouraged, since by this process the risks of saturnine intoxication are reduced to a minimum.

A METHOD of producing iodoform by the aid of electricity has just been invented, and is said to yield satisfactory results. The apparatus consists of an ordinary battery jar, closed with a plate of India rubber, and containing three platinum plates of electrodes. The middle one, which is about eighty-five square meters in surface (centimeters), serves as the anode, and the cathodes are wrapped in parchment paper. Between the electrodes were placed two entrance tubes for gases and an exit tube. The charge consisted of a solution of potassium iodide, sodium carbonate and alcohol, the whole being kept at a temperature of 65° by a water bath. The iodoform was removed every eight ampere hours, and the corresponding amount of iodide of potassium and twenty cubic centimeters of alcohol added. A slow current of carbon dioxide is passed through the cell to take up the caustic potash formed at the cathode.

The lightest metal tubing is made of nickel and aluminum.

California Iron—a Neglected Industry.

TO THE EDITOR:—In the MINING AND SCIENTIFIC PRESS of Dec. 11th, '97, appeared an article bearing the very pertinent inquiry "Why should we not make our own iron?" by R. B. Symington, M. E., of San Francisco. For nearly a year I have scanned the columns of this most excellent journal for something more upon the subject, but in vain.

It has occurred to me as being quite paradoxical that in a State like California, whose people have a wide reputation for enterprise and liberality, and within whose borders is contained vast quantities of the raw material of highest grade and greatest purity, that an industry of such commanding importance as that of iron and steel production should, year after year, be permitted to remain dormant.

I apprehend no one will question the value of such an industry if successfully operated, nor that we have the raw material in quantity and quality I have indicated. Should the latter proposition be questioned, let the doubter visit the iron mines or more properly "prospects," in San Bernardino county, near Newberry, on the line of the Santa Fe Pacific Railroad, and as he stands upon the immense outcroppings, rising many feet above the surface, of a vein 400 feet wide of solid Bessemer ore, of a purity unsurpassed, and looks down, and up upon other black and brown and red veins of like high grade, both narrower and wider, none of which being of less than 100 feet in width of solid ore, he will be a doubter no longer. Such a body of ore if situated in Pennsylvania or the central west would be looked upon as of inestimable value and its development would be a question of but hours, not years. California's reputation in the mining field has been made in the recovery of the yellow metal from her rich gravel beds and the development and operating of her numerous quartz veins bearing the same valuable metal, and it seems hard for her people to look with favor upon the development of the baser or more common metals, yet the day will come when the mining of, reducing and converting this now despised iron will rank as a wealth-producer and man-employer, a close competitor with any other industry within our borders.

To-day the foundries, machine shops and great manufacturing establishments of this State are handicapped by the excessive cost of cast iron, steel billets, etc. The East is supplying our people with a majority of the manufactured articles of steel and iron in use. These imported manufactured articles, of which iron or steel form all, or the principal portion, amount to tens of thousands of tons, and many millions of dollars in value annually. These articles are shaped by many thousands of hands of men and women, whose eyes have never been gladdened by a sight of the "Golden West" or whose bodies have never been invigorated by contact with our unsurpassed climate.

There are doubters who, pointing to the idle blast furnace on the Columbia in Oregon, and another one in Washington, say pig iron cannot be successfully produced in California. There have been other doubters in other ages. The telegraph, the telephone, electric light and the steam engine were all subjects of greater doubt, but the prophets who doubted were glad to retire to a blessed oblivion. So will those who assume to forecast the doom of the iron industry in this State. During the past six or seven years I have given the subject some thought and study, and I undertake to say iron can here be produced at a profit and at the same time dropping the price at least \$2 per ton below that which pig iron now commands at the chief points of consumption on this coast. The lowering of the price of pig metal \$2 per ton to our home manufacturers would give such an impetus to the manufacturing industry as to soon well nigh double the production of the present, with a corresponding increase in the employed.

The two lone furnaces of Oregon and

Washington—the sole monuments of a neglected industry between Cape Horn and the mouth of the Yukon—are too small for profitable practice under modern conditions. The Washington furnace went out of blast because its home or domestic ores were so "lean" as to require mixing with ores imported under tariff charges from British Columbia. The Oregon furnace—a very good small plant in its day—began operations on its 34 per cent ores, which gradually dwindled down to 22 per cent when it went out of blast several years ago. Its ores were too lean for reduction anywhere, requiring the melting of from four to six and one-half tons of ore flux, etc., to produce one ton of metal. It could not be a success even with \$12 to \$15 per ton in its favor in the matter of transcontinental freight charges. With the high-grade "San Bernardino" ores of southern California, which yield 68 to 70 per cent metallic iron, but a trifle above two short tons of ore and flux would require to be reduced in order to produce one long ton of pig metal—quite a difference in favor of this State as compared with the northern furnaces.

It is objected that the high fuel cost places California outside the range of successful iron production. I agree that fuel on this coast is very high, but that is not the only element or condition governing the profitable production here. It would not be an objection were its cost five times what it is if the commodity produced were correspondingly high. The writer remembers that the price of coke on this coast has, during the past six years, receded nearly as many dollars per ton, and it is not believed that it has yet reached the limit of reduction. So far as to the comparative cost of producing a ton of pig iron, as between Pennsylvania and the central West, or in southern California, we here stand on an equality in the matter of ore cost, freight on the same and in labor, both skilled and unskilled. In the matter of ore grade and in climatic conditions, the advantage is with us. In the one matter of fuel, we are at a marked disadvantage. The fuel cost to produce one ton of metal here would at present be from \$4.50 to \$6.50 greater than in the East; but we must not overlook the fact that, while the price in the South is about \$7 per ton and in the North and East about \$10, the former commands \$18 and the latter about \$20 per ton here, thus leaving room for a healthy reduction in the price and a handsome profit.

By the uninformed the question is asked, "Where do you expect to find a market for your iron after you have produced it?" The reply may be given, "We have found it. San Francisco consumes at present not less than an average of 1000 gross tons per month, supplemented by a large consumption at Oakland, Alameda, San Jose, Sacramento, Stockton, Fresno, Bakersfield, Los Angeles and San Diego in California and Portland, Or., Seattle and Tacoma in Washington. Japan imports many thousands of tons from the United States. We might get part or all of that. And then there is Hawaii and the South American ports which would likely be customers. It is no longer a question of either a market or of a profit on the output, but one of finances for erecting and operating a modern, up-to-date blast furnace.

So long as we permit our best resources to lie dormant we are hardly doing justice to our reputation for reputed capital or progressive enterprise. How long shall we continue to import a commodity, either in the "pig" or manufactured state, while our mountains are groaning under their weight of massive ore, with which nature has so bountifully supplied them, and many of our deserving citizens stand waiting with enforced idle hands for the hour when capital, brains and determination shall join to give them relief, richly remunerate the investment and greatly add to the strength of the commonwealth?

C. L. HUBBS.

San Diego, Cal., Oct. 23rd, '98.

Form of Contract for Driving a Level.

The following is a good form of contract and may serve as a basis for drafting such a document:

..... MINE CONTRACT.

Sealed bids will be received until 10 o'clock, A. M., 1898, for linear feet on in Good Intent crosscut, La Paz Mining District, at office of Company at Silver City, Colorado, subject to following terms and conditions:

Size.—..... shall be high in the clear above the track inside of timbers, width feet inside of timbers at bottom and feet inside of timbers at top.

Drainage.—A drainage ditch shall be made the entire distance at such place as may be directed by our then acting foreman, not less than eight (8) inches deep and twelve (12) inches wide, and shall be of that depth and width under the mudsills, where mudsills are used.

Grade.—The shall be on a grade of to each one hundred (100) feet.

Timbering.—All timbers shall be furnished in the works by the Company, framed and shall be put in the places designated by the Company in such manner as the Company may direct.

Track.—The rails, spikes and ties will be furnished by the Company, and laid down by contractor according to the instructions of the company's foreman.

Ore.—All ore should be carefully removed by the contractor and saved for the Company. Provided, if Company desire, it may remove the ore itself, and if taken down by the contractor, it shall be done under instructions and in such manner as the Company's foreman shall direct.

Tramming.—All tramming shall be done by the in such a manner as not to interfere with or impede other work in the Good Intent crosscut.

Work.—Work shall begin within days after acceptance of bid, and shall be continuously prosecuted with not less than shifts and men per each twenty-four (24) hours until completion. All work shall be done in first-class workmanlike manner according to direction of Company's foreman, and in case of dispute, the decision of our then foreman shall be final and binding.

Payment.—Payment shall be made within five (5) days after completion of the contract and acceptance thereof by our then acting foreman, and if contractor fails for any reason to complete contract according to specifications, no payment whatever shall be made said contractor for any work done under the contract. No payment shall be made under the contract until contractor furnishes receipts in full for all work and labor done or material furnished under the contract.

Blacksmithing.—Company shall do all blacksmithing necessary for the contractor, and the decision of the acting foreman of the Company shall be final as to such necessity.

Powder, Fuse, Caps and Tools.—Powder, fuse, caps, tools, candles, etc., shall be furnished by the contractor.

Stopes.—Provided, that the Company shall be permitted to stope within twenty (20) feet of the breast of the drift or crosscut mentioned in this contract.

Forfeiture.—Company shall have the right to declare an absolute forfeiture of this contract for failure to perform the number of shifts herein provided for, as provided for, or for any other violation of these specifications.

The company reserves the right to reject any or all bids.

A CABLEGRAM asserts that a record of 40.8 miles an hour was made at the second trial of the torpedo boat destroyer Hal Lung, built at Elbing, Germany, for the Chinese government. The runs were made in the open sea between the lighthouses at Pilau and

Brusterort, which are 19 knots apart. The wind was fresh and there was considerable sea on.

Progress in Gold Dredging.

Dredging for gold in California streams, like all forms of mining, is a progressive science. Considerable has been done in the last five years. In New Zealand, also, gold dredging occupies considerable present prominence. In the province of Otago, N. Z., in four weeks eighteen dredgers secured 1600 ounces of fine gold. Two dredgers on the Kawarau river, near Cromwell—the Ranfurly and the Magnetic—show what progress is there being made in dredge construction. The Ranfurly dredge is 109 feet long, and, including the stagings fore and aft, 120 feet; width, 25 feet 6 inches; depth 7 feet. The ladder is 75 feet between centers, and will dredge to about 50 feet; the screen is 4 feet in diameter and 25 feet long. The buckets have each a capacity of 5½ cubic feet. The main engine is of 16 H. P., and will be steamed by a multi-tubular externally fired boiler, working up to a pressure of 140 pounds. The winches are driven by a pair of horizontal engines, built into the frame of the winch, and fitted with reversing gear. The dredge is also supplied with an auxiliary steam winch, driven by a worm and reversing gear. A lathe is fitted up on board, driven by the engine of the auxiliary winch. A novel feature of the dredge is an overhead crane for lifting large stones off the buckets, or for lifting the buckets themselves, weighing about 700 pounds each. The screen is driven by friction rolls, and both the rolls and the path in the screen are turned. The elevator is 35 feet between centers, and is driven by a belt up one side, which is housed in under the platform. The main drive is by ropes, the screen, centrifugal pump and elevator being driven by belts, each separately driven. The tables are 20 feet by 17 feet, in six divisions, and a special device enables water to be turned on to any particular table independent of the others. The dredge will be lighted by electricity.

In the issue of Oct. 15 was noticed editorially the new use of gas from a furnace blast in the cylinder of a gas engine. It is learned that M. E. Heirman has formulated a new cycle of operations with the view of using such gas. In this method mixed gas and air is introduced under pressure behind the piston at the beginning of the stroke, is cut off by a valve at any desired point and simultaneously ignited. Since there is no clearance space or compression chamber in the cylinder, the products of combustion are entirely expelled during the return stroke. This method accomplishes two important objects, i. e., an explosion for every revolution and an automatic cut-off like that of a steam engine.

THE lake steamer Troy has gained the reputation of having developed the lowest figure for coal consumption per H. P. that has ever been accomplished on the lakes and probably in the world. The vessel is 402½ feet in length, 42½ feet beam and 28 feet in depth. The quadruple expansion engines with cylinders 19, 27½, 40 and 58 inches in diameter and 42-inch stroke, are supplied with steam at 210 pounds pressure. She recently made the remarkable performance of developing 1690 I. H. P., which showed that the coal consumption per H. P. per hour was 1.5 pounds.—Engineer.

C. A. SCOTT of the computation division of the Coast and Geodetic Survey, has been awarded the Wilde prize by the Academy of France. The Wilde prize is a coveted honor, open to the world, to be conferred on one judged the most worthy from among those who make discovery or write works on astronomy, chemistry, geology, physics or mechanics. The award to Mr. Scott is based on a work on terrestrial magnetism. The committee which made the award consisted of some of the best known scientists in France.

Mining Summary.

ALASKA.

The steamer City of Topeka, from Alaska, reports that heavy snowstorms have visited various sections of Alaska and nearly all mining operations have been suspended, except quartz mills located near tidewater. On Nov. 2nd 4 feet of snow fell on Chitoot and White passes, which completely put a stop to travel. Telephone messages from Lake Linderman to Skagway announce that about 400 persons are snow-bound there. It is stated that 500 claims have been filed and recorded in the Atlin mining district and that 1000 men will winter there.

The new stamp mills on Douglas Island are about ready. These give Douglas Island a total of 80 stamps, with a capacity for crushing 2500 tons of ore daily. The stamps will be operated as follows: Treadwell, 540; Mexican, 120; Union, 100; Ready Bullion, 120.

The Treadwell is reported to have 8,000,000 tons of ore in sight. The ledge on the Ready Bullion has been traced for 900 feet along the beach and hill, its width being from 30 to 100 feet on the surface. A shaft has been sunk 650 feet, at the bottom of which the ledge has widened to 300 feet, carrying \$12 to \$14 in gold per ton. New stamp mills are being erected on the mainland, making a thousand stamps on and adjacent to Douglas Island.

The regular monthly report of the Alaska-Mexican mine showed 13,405 tons ore crushed and 281 tons sulphurets treated, the latter yielding \$5823. Bullion product for the month, \$25,929; expenses, \$20,501; average yield of ore, \$1.93 per ton.

The report by Major Walsh to the Minister of the Interior, respecting the Yukon district, has been issued. He says, to permit of this district being thoroughly prospected and developed, the population must be assured of its food supply beyond a peradventure and at reasonable prices, and the only way in which a supply can thus be secured is by providing transportation facilities. The collection of royalty will amount to about \$500,000. He says the Postoffice Department should take over the mail of the district, and certainly the Dawson part of it. The service is growing larger and requires the full attention of a postmaster, with a few clerks thoroughly educated in the service, as it is impossible for the police to handle it satisfactorily. He recommends the establishment of a branch postoffice at the forks of El Dorado and Bonanza creeks; recommends that an assistant judge for Dawson district be appointed and that one of his duties be the deciding of mining disputes, and says the output this year from the Yukon district will be in the neighborhood of \$10,000,000.

ARIZONA.

The Oro M. Co.'s mill, in the Oro Blanco country, will likely start up soon.—The Merriweather Bros. are again operating mines at Richenbar.

Near Tucson, Sullivan & Co. are chloriding their ores, which are principally lead. They are taking out two carloads a week, shipping to El Paso. They get \$25.50 per ton net. They have a 4-foot vein of ore which runs well in lead and \$5 in silver.—In the Hardy copper group, near Fairbank station, a depth of 180 feet has been reached and a drift run 20 feet on a 4-foot ledge. The ore goes from 45 to 60 per cent in copper, besides some gold and silver.

Prescott Courier: The new management of the Little Jessie mine is putting in new machinery and a large force has been put to work.—In the White Elephant group of mines near Prescott, being developed by Johns & Engle, a body of ore was recently struck which assays \$6 in gold, eight ounces in silver, and 12 per cent copper.—The Tintic mine has been drained and development resumed.—The Black Rock mining camp, Geronimo, received two carloads of machinery.

Tombstone Prospector: Copper ore is found in the Copper King Co.'s mines at Solomon Springs.

Yuma Sentinel: The American Girl mine, in the Picacho district, near Yuma, the property of ex-Gov. Markham and others of California, is giving good results.

CALIFORNIA.

Amador.

At the Potazuba mine, Sutter Creek, they are raising from the 200 level to connect with the winze above. They have 150 tons of ore on the dump and will soon have a crushing.—The Bay State, Centennial and Wheeler mines near Plymouth are in operation.

Butte.

Russell & Malone, near Big Bend, are working in an old river channel and carting the dirt for washing to the Feather river. It yields good returns. They are also digging a ditch to bring water when the winter rains come.

The first general meeting of the shareholders in the Con. Gold Mines of California, Ltd., was held in London, Oct. 20th, to pass resolutions for accepting the properties of the old company of the same name. The company was registered after the reconstruction had been agreed upon, but according to the law of California it was necessary that the resolution should be passed by a majority of two-thirds of the shareholders. The resolutions were carried. The chairman stated that the whole of the 250,000 £1 shares, with 17s 6d paid up, had been allotted, and the calls paid, with the exception of some £30. On June 9th G. H. Evans, the Gen. Mgr. at Orville, wired that a pay chute had been struck, and since then a telegram announced a second similar discovery. They would have commenced crushing before now but for the exceptional drought.

Calaveras.

The Diamond Jack mine, near San Andreas,

has been bonded to San Francisco people, who have begun work sinking a shaft and putting up machinery.

Mokelumne Hill Chronicle: The Gwin mine at Mokelumne Hill continues crushing. The ore has improved in value and an additional forty stamps is contemplated.

Del Norte.

Crescent City Record: The Jones Creek M. & C. Co. have bonded their property to R. C. Hall of San Francisco for \$25,000, of which \$5000 is to be paid Jan. 15, 1899, and the balance in installments of \$5000.

El Dorado.

(Special Correspondence).—The Jumper M. Co. will soon give results of its two years of development on the old Griffith mine near Diamond Springs. This property yielded good ore to water depth, but after that it passed through years of struggle and finally abandonment. The Jumper Co. has extensively opened the mine in its old workings and in new ground. The Griffith is a mother lode property, and the method pursued by the present company is bringing out the merits of the old mine.

Sinking and drifting have been in progress night and day since the Jumper began its operations. Among the results justified by their thorough test of the Griffith mine the company has about completed a 20-stamp mill and an electric power plant from the Crawford power house, all of which is expected to be put in operation the 15th inst. This will be the first electric plant in this portion of the county and it is quite probable that other mines in this section will soon be operated by the same power.

The old Dalmatia and present Gopher Boulder mines at Kelsey are equipped with electricity, though at present they are simply using their pumps. The owner, W. H. Bail, a resident of London, England, will be here within a short time, and it is said here by his representative that he will either operate the mine or lease it, so that a renewal of work is almost a certainty. There are a 20-stamp and two Huntington mills and eight concentrators on the property.

The Gold Bug mine in Placerville continues its development work. The property is bonded to a Fresno company; they made their first payment on the mine last week.

The Selby mine near Diamond has twenty-five men employed. This property was worked to some extent by San Francisco and Montana people, but abandoned about a year ago. The present company it is stated will sink to considerable depth.

Placerville, Nov. 7th, '98.

Humboldt.

C. Foote has bought the Moston property, comprising 3000 acres of placer ground along Trinity river in Trinity and Humboldt counties for \$145,000, to be paid by 50 per cent of the gross proceeds out of each cleanup being applied on the purchase price. Work has begun on shafts, tunnels and ditches, thirty-five men being employed. It is expected that hydraulic mining will begin about Feb. 1st, '99.

Kern.

Randsburg Miner: Work is progressing on the Yellow Aster mines. The new pump at the wells was started last week. The six miles of 5-inch pipeline is complete to the mill site. The lumber is on the ground for the foundation of the 100,000-gallon water tank. Instead of one large wooden tank, as at the wells, several smaller iron tanks will be used. The Yellow Aster people have milled 1500 tons per month for eighteen months and not a pound has been milled that did not go \$30 average per ton.—The Tribby tunnel has developed some remarkable ore. A seam was found in the 40-foot ledge last week from which 100 pounds of ore was worth \$1000, or \$10 per pound. The whole mountain seems to be a body of ore that will pay from \$7 to \$8 per ton. This is outside of the high-grade ledges.

Los Angeles Mining Review: The last cyanide run at the Eureka mill at Randsburg netted \$1100. The plant is extracting from 90 to 95 per cent of the gold in the tailings. The stamps at the mill are dropping on Stringer rock.—In the 350-foot level of the Wedge 1 foot of good ore has been opened up. Some of it exceeds in value anything yet taken out of the mine.—Word has been received at Randsburg that the Supreme Court will reopen the case brought by Stanton against the Yellow Aster Co. and referred back to the lower court.—Griffith & Co. of the Johannesburg mill have bought the G. B. mine in the Stringer district. It is opened by shafts and drifts and shows a body of medium grade ore. They will at once take out enough ore to keep their mill busy at times when it is not occupied with custom ore.—The richest ore found in the Kinyon mine was extracted last week from the 150-foot level.—The Yellow Aster Co. have closed their contract with the Union Iron Works of San Francisco for a new mill to be ready for work Jan. 15th. The mill will have a capacity of 150 tons per day. The company's mines are looking good. Work at the wells continues.

Napa.

The quicksilver mines near Calistoga shipped in October 1107 flasks—an increase of 304 flasks over September.

Nevada.

(Special Correspondence).—The water famine through which Nevada county thought it had safely passed, so far as related to the operation of many of its stamp mills, has not permitted the season to close without shutting down some of the largest plants in the county.

The companies whose mills operate by electric power continue their operations uninterrupted. But the largest probably of the county's gold producers, that have heretofore relied upon water for motive power, are furnished water enough for pumping only. The effect of this enforced idleness is keenly

felt by the large number of men who are temporarily idle, and it brings to mind quite vividly what a profitable industry mining is to a community like Grass Valley and Nevada City when it thrives, but is to be looked upon when everybody is busy in a cursory way as an every day affair. The enforced closing of the big mills will aid toward the prospecting and opening of new properties to which capital will come as a profitable venture.

It is noted that some Colorado papers remark with some facetiousness that California is offering drouth as an excuse for the diminished gold output of the current year, but that this should be attributable rather to the fact that California mines are nearly worked out. When it is borne in mind that nearly 200 stamps within a small radius in this section alone are hung up for want of water, the gold output of the State will of course be greatly lessened, but the properties, far from being worked out are most of them only beginning in their history.

The payment of a dividend by the North Star Co. near Grass Valley amounting to \$50,000, after costly improvements in machinery and the purchase of the Grass Valley Water Co.'s plant for \$50,000, shows that the several properties being developed under this company's systematic methods are a profitable property. The ground had long been idle until taken up by the people now operating it. The 40-stamp mill is at work day and night. Much of the ore is drawn more than a mile by steam wagons from the Central and Massachusetts Hill shafts. The former is over 1200 feet deep vertical, and its hoisting machinery and power plant are a model of their kind. Compressed air, heated, is used. A. D. Foote is Gen. Mgr.

Placer.

The Gold Blossom and the Three Stars mines, near Auburn, are closed down for want of water.

Nevada City, Nov. 7th, '98.

The old Red Hill mine, near Nevada City, has been leased to Grass Valley miners for two years, and they have begun to sink a new shaft.

The Harrison gravel mine, near Nevada City, is taking out pay dirt and finds coarse gold.

W. H. Henry has six men sinking a shaft on Albion Hill, near Grass Valley. The assays show a satisfactory average. East Oakland people are interested.

Grass Valley Union: The W. Y. O. D. G. & S. M. Co. has conveyed to the Grass Valley Exploration Co. the W. Y. O. D. General Grant, Dewey-Hobson, Telegraph, Parr, Sims and Nuttall mines. This new corporation will operate these properties under the same management that has heretofore worked the W. Y. O. D. mine.—The Malakoff Co. at North Bloomfield has struck gravel in their tunnel and it seems to be the rim of the channel.

Plumas.

The Quincy Independent says that P. Turner is developing a property near Quincy that yields good grade ore and upon which a mill is contemplated.

Quincy Bulletin: Four Hills mine, near Johnsville, has now completed a dam 120 feet long, 37 feet high and 12 feet wide, of rock walls. There are fifteen men employed in the mine, and work will be continued during the winter. Next summer a mill will be built on the property, which is owned by the Four Hills M. Co.

San Bernardino.

T. P. Crowder has discovered a vein of coal near Cajon which is traced nearly a mile and gives indication of yielding a good quality of coal.—The Pacific Coast M. Co. is preparing to mill the ore from the Fleming mine on Baldy. A roller mill, tramway and other machinery is being put into place.

San Diego.

Ramona Sentinel: It is locally said that a good strike was recently made in the Ranchita mine at Julian.—The Helvetia mine has a large force of men at work and will soon put on more. The pumps are working day and night.

Shasta.

(Special Correspondence).—At the National mine near Buckeye development continues and ore is being blocked out preparatory to starting the mill so soon as water can be had for the electric plant. The mine has been put in good order to become a productive property, but at present shares the fate of other properties affected by water famine. Ore production for the smelter continues in the Whitehouse section from the Evening Star and Garfield properties. Their ore is carried by a wire tramway nearly a mile, across the Sacramento river, to the railway. At the Uncle Sam mine near Kennet a large force is at work. This property belongs to the Sierra Buttes Co. The Mt. Shasta mine near Shasta is outputting a good grade of ore, all of which is hauled to the smelter. This property, among others, gives evidence that quartz mining in this county is but making a beginning, and that the possibility of disposing of ores at the smelter is also an inducement toward furthering the industry. The Mountain Copper Co. have changed their schedule for working custom ores. Instead of charging \$3.50 per ton, and returning 95 per cent of the ore value, they now return 75 per cent of the assay value of the ore. Because ores were not a free milling quantity they were by many people condemned as worthless, and the county in general was of necessity compelled to pass through a series of quiet years, so far as mining was concerned. The impetus it has received within two years and the present success of properties that receive systematic and thorough development are proof of the merit that Shasta county possesses, and in which capitalists are gradually becoming interested.

Redding, Nov. 8th, '98.

Redding Free Press: J. Brown recently took

out a \$3000 pocket near Whiskeytown.—The Washington M. Co., near French Gulch, is putting up a new 5-stamp quartz mill. It will be run by water power.—Near Copper City Sales & McDonnell are getting out ore for shipment.—The Princess Hydraulic M. Co. contemplates making extensive additions to its water rights and ditches on Broad creek near Whiskeytown. The extension is one mile long, including a tunnel of 700 feet.—J. H. Morton, representing capitalists, put six men at work on the Hiatt & Dale mine in the Old Diggings district.

Redding Searchlight: A strike has been made in the Philadelphia mine near French Gulch.

Sierra.

(Special Correspondence).—The company that has been operating the South Fork and Lucky Dog drift mines has ceased work, which, it is locally reported, amounts to abandonment of the properties. Work on the North Fork continues and is giving very good returns, much of the gravel yielding \$4 a carload. The company has expended a large sum of money in opening this mine.

Forest, Nov. 7th, '98.

Siskiyou.

Fry & Macaulay will soon have their mill completed on Cherry creek and begin crushing from the Ironsides mine, which they recently bought.

Yreka Journal: A mill has been completed at the Schroeder mine at Deadwood and will soon begin crushing. The creek bed has been prospected from near Shasta river to the northern boundary of Yreka and for some distance in town, and the company will determine shortly upon future proceedings.—The Greenhorn blue gravel mine is paying well, and has a supply of water by pumping from bedrock into a reservoir.—Hunter & Co. of the Cherry Hill mine, on Cherry creek, are putting up a mill, which will soon be ready for crushing.—A strike is locally reported in the Eagle quartz mine at Indian creek, in Scott valley, of good yield.—D. W. Jones' quartz mine in Quartz valley employs twenty-seven men and is taking out good quartz.—Morrison is crushing good rock at the Allen mill in Quartz valley.—Kingsley & Hay have resumed work on their mine near Scott river.

Trinity.

The Brown Bear M. Co. at Deadwood is enlarging its milling capacity, putting in boiler, air compressor and additional machinery.

Tulame.

Jamestown Magnet: In the Arizona mine, Tutletown, the shaft is 300 feet deep, and discloses 3 feet of quartz and several feet of vein matter.—At the Trilium mine, Jamestown, No. 2 shaft is down 640 feet. Drifting is going on at No. 5 level north and south with good results.—H. Bogan and partner found a pocket from which they got \$2500 in gold.—No. 1 shaft at Santa Ysabel mine has reached 520 feet. The drift at No. 4 level cut through the central ore chute, showing 6 feet of ore. The mill is waiting for water.

Sonora Banner: The Turner Flat Drift Gravel M. Co. on Table mountain sunk a shaft to bedrock, 92 feet, from which tunnels were run 500 feet. A pump with a capacity of 300 gallons per minute is in action. The water that is pumped from the mine is used for sluicing purposes and 400 buckets are washed every twenty-four hours.—Foster & Hamilton have reopened the Good Hope claim, which has been idle for a long time.—Sinking at the Never Sweat is in progress by Jardine & Copp.

Sonora Democrat: The Lillian mine near Sonora has been bonded by G. W. Fisher & Co. The property has much development. The company also secured bonds on the North Star and Golden Eagle claims, twin locations in the vicinity of the Lillian.—The new 300 H. P. steam plant at the Black Oak is in operation. Steam is conveyed from the big twin boilers to the mill, 700 feet. The Black Oak mine shows a large slope of high-grade ore.

Sonora Independent: In the Tarantula shaft near Sonora crosscutting at the 700-foot level is in progress.—Work has begun on the Anaconda near Columbia.—The Rappahannock is drifting on the 1100-foot level.—The Harrison mine at Jacksonville is putting in a new pump.—The Dunsmore mine near Columbia has forty men employed building a mill, etc.—The O. K. near Sonora are running a crosscut tunnel and a shaft and upraise will be started soon.

COLORADO.

BOULDER COUNTY.

J. Smith has shipped 700 tons of ore from the Boulder mine at Caribou the past six weeks and netted good returns. The tonnage of this property and others in that district promises to be so large as to induce the North-western to extend its line to Eldora, or at least to a point between Nederland and Caribou.—Twenty-two veins are said to have been cut in the Mogul tunnel at Eldora within a distance of 700 feet.—The E. & M. mine at Ward has shipped 302 tons of milling ore and 41 tons of smelting ore the past thirty days.

CHAFFEE COUNTY.

A steam plant is to be installed on the Golden Wonder mine, Turret City. One of the veins has from 6 to 7 feet of ore that is said to run from \$100 to \$200 in gold.

EAGLE COUNTY.

The ore shipments from Battle Mountain district since Jan. 1st are 344 carloads.

CLEAR CREEK COUNTY.

Leasers working the Demby mine, near Idaho City, are drifting on their lode through the Knickerbocker tunnel, which is 600 feet below the shaft of the Demby and over 1000 feet distant. They have good ore in the lower shaft workings.—The Mammoth tunnel is working three shifts on the air drills. Some veins have been cut, but the big one will not be reached for another thirty days.

It is said that in a distance of 1000 feet from the heading of this tunnel 100 veins will be cut.

EL PASO COUNTY.

The Gold Coin people at Victor, it is locally reported, owing to the reserves of medium and low grade ores, have decided to build a large mill at the mine.—The Hull City placer, Cripple Creek, produced during October \$133,000 worth of ore.—Sixty-five tons of three-ounce ore was marketed from the Cleveland lease of the New Zealand Co.'s Deadwood mine on Bull hill.

Work has begun at Victor on an ore reduction plant, to cost \$75,000, by the Onelda Reduction & M. Co. of Colorado, A. Seiboth Mgr.

From the mines at Goldfield about 100 tons of ore are shipped daily. Of this, the Legal Tender produced last month 2700 tons, of which a large proportion was of smelting grade.

A. Madden is said to have discovered a 3-foot vein of tungsten near Wilbur.

The Victor Record says that at a depth of 300 feet in the Thompson mine, on Gibbons hill, a vein has been opened that is from 50 to 60 feet wide. The ore is of a milling grade and the mine is producing from thirty-five to forty tons daily.—The yield from the Cripple Creek district for October amounts to \$1,478,700—an increase of a few hundred dollars over September, but an increase in tonnage of 1000. This increased tonnage is due to the Metallic Reduction Works at Florence, which put through their plant 11,500 tons, as against 8400 tons in September. A new feature in this report is the high-grade ore treated in the district by the small plants in Cripple Creek and the different towns of the camp and placer gold bought by these plants, converted into bullion bars and sent to the U. S. mint. Conservatively, the bullion value of this class of ore is placed at \$15,500. Adding October's output to that of former months, the total of nearly \$13,000,000 has been reached for '98.

GILPIN COUNTY.

Central City Observer: During October were shipped from Black Hawk 300 cars of ore—an increase of twenty tons over October, '97.—The Rocky Mountain concentrator, in October, produced 600 tons of concentrates.—The Kansas-Burroughs Con. for October shipped 3500 tons.—The Cook G. M. Co. reports an output of 2800 tons for October, 80 tons of which was smelting ore.—The Concrete G. M. Co. reports an output last month of 1472 tons.—During October 5550 stamps were dropping in Gilpin county.

GUNNISON COUNTY.

A strike has been made in the Moss Rose property, near Gothic. This mine had been idle a long time.

LAKE COUNTY.

Leadville Miner: The output from the Mab mines for October was 4000 tons. At times the average was 200 tons daily.—The Rialto M. & L. Co., operating a group of claims through the deep Pyrenes shaft, is running drifts with eight-hour shifts at 1230 feet depth.—The last of the four special sinkers was started to work in the Bon Air shaft on October 28th, and the water is being lowered at the rate of 8 to 10 feet every twenty-four hours. Everything indicates that the mines will be ready for the resumption of work within ninety days. Three 80 H. P. boilers at the Penrose and the same number at the Bon Air furnish steam. The coal required is thirty tons per day and the cost of operating the two plants does not exceed \$8000 a month.—Shipments from the Mahala mine, Leadville, have been increased from 50 to 100 tons daily. Exploration by the diamond drill shows the ore body to be extensive.

IDAHO.

The Rapid River Copper M. Co. of Colfax, Wash., owns seven claims in the Seven Devils country, on which there is a ledge that runs from 70 to 90 per cent in copper. The company has a force getting out ore, and will start a pack train to the nearest transportation point next spring.

The Camas mill at Hailey, the first cyanide plant in the locality, is closed for the winter; it was operated with satisfactory results.

Near Lewiston S. I. Silverman has secured the Badger mine and will resume development at once. Over \$50,000 was spent on this mine by the old Badger Co. After it was fitted with expensive machinery the ore body pinched and it was abandoned and has been idle for eight months.

McDowell & Patterson, leasing on the Niagara mine near Hailey, have struck a foot ledge of high grade ore.

In the Friday mine, near Boise, a ledge has been uncovered 80 feet and a chimney 20 feet long, from which 300 sacks of ore have been stored, the lowest assay of which is \$60 a ton.—A consignment of auro-cyanides from the Camas No 2 at Hailey was shipped last week to Salt Lake City.

In the Pierce district near Kendrick more systematic mining has been done this season than at any time in its history. There are over 100 men working for wages in this neighborhood. The Mascot M. & M. Co., working the old Blanket ledge on Gold creek, is taking in a new stamp mill. The last mill run yielded \$15 per ton.—In the Democrat mine a tunnel has been driven 900 feet; the ore averages \$6 per ton. Pockets have been found where the ore has assayed high. Eight men are employed. A 10-stamp mill will be put on the property soon. J. Dunn is the Supt.

Florence Miner: A What Cheer ore test has been made to demonstrate the advisability of placing a mill on the property. The ore was an average taken from the mouth to the face of the tunnel. The returns from the plates were \$11.85 in gold, and concentrates per ton value of \$220.33. Owing to the failures in this camp this summer, the directors and stockholders of this company had become doubtful of the advisability of putting a mill on the property at the present time, but this

test demonstrates that it has sufficient ore of a value that would make it one of the best paying propositions in camp, with the proper reduction works. There has been a tunnel run in on the ledge 527 feet at a depth of 310 feet. The average width of pay ore is about 30 inches. E. Lortscher is Gen. Mgr.

Wallace Press: The Mammoth M. Co. has begun work on a tunnel which will be the second one in length in the Cœur d'Alenes, and will be one of the largest mining development works undertaken here for many years. The tunnel will cut the ledge in 3500 feet and will cut the vein 1800 feet below the surface, and will be 1100 feet below any work that has yet been done. Supt. Wilson calculates that it take two years to complete the work.

Cœur d'Alene Press: Every mining man who has visited the gold belt of the Cœur d'Alenes since quartz mining became an established industry, has commented on the lack of improved concentrating machinery, although all our ores are base enough after a few feet depth is attained that a large part of the values cannot be saved on the plates. This backwardness is all the more noticeable because on the South Fork the silver-lead miners have the most perfect machinery to be found anywhere in the world. Until less than a year ago the mills had nothing more effective than bumper concentrators, except in the Jenkins and Daddy mills, where canvas plants had been put in with very indifferent success.

MONTANA.

The silver smelter at Great Falls, which has not been in operation for several months, started up recently to an extent greater than for several years and employing 175 men. The supply of ore on hand is large. The East Helena works of the company have been run almost to their full capacity recently.

Last month seven carloads of concentrates were shipped from the mines of the Vermilion M. Co. at Missoula from which good returns reported. This month double that number will be shipped.—The Hidden Treasure mine at Clinton has begun to ship ore.

Clancy Miner: Work on the Liverpool mine near Clancy will resume soon. The shaft will be sunk to the 600-foot level.

NEVADA.

The Glasgow & Western Co. in Cherry Creek shipped a boulder of ore containing over \$500 in silver, lead, gold and copper. The boulder weighs 500 pounds, and is from the Star workings at Cherry Creek. A carload of this ore is on the road to Salt Lake City, the last one yielding the company about \$20,000. The foundation has been laid for the new Star mill, and the machinery is being delivered. The grading for the railroad between the company's plant at Golconda and the Adelaide mine in Humboldt county has been completed and laying of rail will begin shortly.

The Dexter Co. have started their new shaft at Tuscarora. It will be sunk 400 feet.—The Magnolia M. Co. of De Lamar will build a mill next year.

The Austin Reville learns that a ledge 68 feet wide and averaging \$14 per ton has been cut in the Drinkwater tunnel at Silver Peak. The property belongs to Mr. Blair of New York and being worked for him by S. Wasson. The Douglass mill at Dayton started up on a two-months' run on rock from Washburn's mine and the Justice.

From the Eureka and Hamilton districts for the week ending Nov. 4 were shipped 307,910 pounds of ore.—At the Chairman mines at Ely, White Pine county, T. T. Lane has given up the bond on the property. It is said that the Lanes spent \$150,000 on the mine and plants, and though they introduced improved appliances they failed to extract as high percentage of value from the ore as their predecessors had done with an old mill.—The Magnolia M. Co. of De Lamar, Lincoln county, will build a mill next year.

NEW MEXICO.

A shipment of silver-lead ore was made from the Rex and Percha mines, Hillsboro district, to Silver City.—The Bennett Stevenson mine, in the Organs, is being worked with a full force and silver-lead concentrates are being shipped.—The Cochiti G. M. Co. has 120 men on its payroll, besides seventy-five men cutting wood under contract.—O. P. Posey has taken the Victor group of mines in Colla canyon, where extensive work will be done.

Near Hanover Brockman & Hughes are taking out ore that runs 17 per cent copper, three ounces silver and carries a percentage of iron.—F. Bell, at the Philadelphia mine, is making shipments of a good grade of copper ore.

A. E. Dawson, Mgr. Santa Rita Copper & Iron Co. is shipping five cars, over 100 tons, of iron daily.—The Hearst Co., in the valuable properties which they have leased from the Santa Rita Copper & Iron Co., has 100 men employed, mostly on the royalty or tribute system. They are said to be making good pay and shipping a large amount of ore.

Hillsboro Advocate: The Trippie mine at Hillsboro shipped fifty-five tons of 100 ore to the smelter last week.—The Snake mine made an eighty-ton shipment.—The October output of gold from the dry washers at Hillsboro amounted to \$1400.45.—The Richmond mine made a shipment recently of \$175 per ton ore.—The Moreno Valley M. Co. have closed down their placer works for the winter. Their last weekly clean-up was \$960.

OREGON.

The Bellvue properties in Granite county, though the season was short for lack of water, paid the owners well; and though the mill has closed, the blocking out of ore continues.—The Red Boy has 30 feet of \$30 ore exposed, and in addition to this there are 3 feet of ore that yields higher values.—The Victorator mine in Grave Creek district is being fitted up by a company of Colorado people who have bought a big area of ground.

The Baker City Democrat enumerates

twenty-five shipping mines in the neighborhood of Baker City. The amount of concentrates shipped in October was 619,834 pounds.—The Robbins mine, near Baker City, recently passed to Pennsylvania capitalists, who intend to operate it on an extensive scale. The plans are arranged for deep sinking and the necessary machinery will be placed and work will begin immediately.—At the Denny group a 7800-foot tunnel has been started.—In the Sumpter district the mines are employing large forces and there are hundreds of men at work where a few years ago there was no employment of miners at all.—At Granite, J. W. Larkin is doing extensive development on the Cougar mine.

On the Magnolia mine, J. W. Vinson has a force at work and the showing is good.—The Red Boy mill is dropping twenty stamps.—The Red Boy Co. is building a mill on the May Queen mine.—McElroy & Sheridan have leased their Little Giant mine to Seattle people who are doing development work.—At the Golconda, E. & E., North Pole and Columbia mines, in Cracker district, there is much activity. At the Golconda 100 men are employed. The new mill will start about Dec. 1st.—The North Pole M. Co. are satisfied with the result of their operations.

Ashland Tidings: The Gold Bug M. Co.'s property on Mt. Reuben, Josephine county, is being opened up in a thorough manner. Senator Jones and others of Nevada are interested. A wagon road fourteen miles to Glendale has been built at a cost of \$13,000, and a sawmill with a capacity of 5000 feet per day erected. R. W. Jones is Supt. The machinery for the stamp mill is arriving.

Baker City Democrat: The Ohio mine in Cracker Creek district has a 10-stamp mill operating by water power. The shaft is 500 feet deep.—On the old Connor creek mine near Baker City development work will continue during the winter.—Grants Pass Courier: The Placer mines near Grants Pass are prepared for the winter work.—The survey on the mining ditch from Cow creek in Douglas county to Grave creek in Josephine county, about fifty miles, will be begun in a few days. The Victorator Co. are the projectors. This ditch will cover a many thousand acres of placer mining ground and will be one of the largest hydraulic mining enterprises undertaken in the State.

SOUTH DAKOTA.

Black Hills Mining Review: Near Portland, the lessees of the Ben Hur claim are taking out from ten to fifteen tons of ore per day. The shoot averages 10 feet in width and runs from \$30 to \$70 a ton gold.

UTAH.

The Watson ore chute in Winnamuck ground at Bingham has been found and yields a good quality of silver and lead ore.—The output of the Ophir mill was 1420 tons during October, with a total of 2943 tons for the last sixty days. Work for the winter is likely to cease at any time.

One worth \$12 per ton in gold is coming out of the two upper shafts on the Omaha of West Dip.—From Tintic last week's shipments were seventy-five cars of ore, ten of concentrates, and two bars of bullion.

Mercur Mercury: At the Daisy mine, Mercur, the output is of a high standard. A drift is being run to tap the vein at a depth of several hundred feet.—Eight carloads of ore are being shipped from Stockton every day.—The Geyser-Marion made a shipment of cyanides last week.—The roaster at La Cigale mine is nearing completion.

Tintic Miner: The Gemini, Eureka Hill, Godiva, the Uncle Sam and Humburg, at Eureka, ship about 800 tons of ore a month, with a valuation of probably \$75,000.—The Bertha mine shipped a test lot of ore, the results of which warrant a continuation of work on the property.—Two shifts are at work on the Tetra tunnel. A power drill will be used.

Bingham Bulletin: The Old Jordan mill at Bingham is turning out concentrates rapidly, but Supt. Holden says if lead goes below \$3.50 he will shut down.—Cutler & Cowan shipped three carloads of ore from their Ashland lease.—Gravel was struck in the West Mountain placer, and good pinnings made.—Progress is being made on the Highland Boy tramway.—The Erie finished a fifty-ton shipment last week.—A strike has been made in the King Solomon mine, near Ogden. In the 600-foot tunnel a ledge was disclosed, 8 or 10 feet in width; the values average 2 per cent lead, an ounce in silver and \$6 in gold to the ton.—At Larling Bros.' mill, Park City, an average of six tons of high-grade ore concentrates is worked every twenty-four hours.

The Salt Lake Tribune says the local samplers during October handled over 15,000 tons of ore.—Samples from the ore body into which the Mercur Co. is driving on Lulu ground showed an average of \$62 gold per ton.—At the Swan-Bemis mill, Bingham, an average of sixty tons of ore a day are treated.—The Ontario at Park City, during October, marketed 200 tons of ore at a profit.

Salt Lake Tribune: Samples of ore from the Midas mine in the Deep Creek country shows encouraging results. The owners were a short time ago joined by John Dern of the Mercur mine and they will erect a mill this season. The milling ores average about \$10 in gold per ton.

WASHINGTON.

At Republic the Gold Leaf tunnel was driven 75 feet in October. It has reached 225 feet.—The Little Cove north drift is in 360 feet and is again being crosscut. It was run 100 feet in October.—The cross tunnel on the Knob Hill was advanced 100 feet during the month.—The Princess Maud tunnel was driven 125 feet in October and is being pushed at the rate of 5 feet a day.—The Mountain Lion mine has a road completed so that machinery and wood can be delivered at the tunnel. The foundation for the compressor is completed.

At Republic the Ben Hur mine encountered 5 feet of ore and the ledge shows between 2

and 3 feet of mixed vein matter in addition.—Nineteen feet of high-grade ore is the latest news from the Republic mine, and the crosscut is still in ore. The first level in this mine is 135 feet deep. The second is 235, and the present strike is almost 200 feet lower still, about 425 feet vertical depth. The next tunnel will give a depth of about 625 feet.

Two-thirds of the Merrimac claim, at Republic, was sold to a company represented by W. S. Norman of Spokane for \$10,000.

WYOMING.

The Rambler mine, in the Grand Encampment district, has done much development work. The ore body at 210 feet depth is said to be 4 feet wide, carrying from 60 to 75 per cent copper and about \$4 gold. The ore is hauled to the railroad with ten-horse teams and trail wagons, carrying from 14,000 to 16,000 pounds to the team.

FOREIGN.

BRITISH COLUMBIA.

The Swansea mine at Windermere has been developed to a considerable extent by shafts and tunnels. All three shafts are in pay ore and the tunnels are being driven for crosscuts. One of them has passed through the vein, showing it 30 feet wide. A shaft has been sunk in the tunnel, which shows 4 feet of green carbonate of copper. This ore yields a good profit. The assays of this ore run from 20 to 35 per cent copper. It is the intention of the owners of the Swansea to work the mine during the winter and make large shipments in the spring.

The Pacific Northwest M. Co. of London, England, has bought a hydraulic mine, near Yale, of large extent and begun preliminary work. This is said to be the same company that operates the Snowshoe mine near Libby, Montana.—Recently the Le Roi mine at Rossland in twenty-four hours hoisted and placed in ore bins 725 tons of ore, not counting the waste extracted the same time.—The shipments for the same day amounted to 440 tons and the output for October was over 12,750 tons. The mine employs 300 men. The shaft is 810 feet, and the station at the 800-foot level has been commenced.

On the Bosun property, Slocan, twenty-five men are employed and 120 tons of ore shipped per month.—The Second Relief mine near Erie, belonging to A. A. M. Campbell and J. A. Finch, is being developed by three tunnels, connected by winzes, and over 1200 feet of tunneling has been done. The ore is a copper sulphide running well in gold. The gold values of the lead, which is of an average of 34 inches for 1200 feet, are \$50 per ton. About half of the gold can be recovered by milling, and it is intended to erect a stamp mill on the property and ship the tailings to the smelter. There are about 1500 tons of this ore on the dump ready for shipment which will be hauled to the railroad as soon as snow falls. A wagon road thirteen miles in length has been built from Erie to the mine at a cost of \$16,000.—The Mascot mine at Kamloops, owned by J. H. Russell, has been bonded to an English company for \$5000.—Thirty-five men are employed on the North Star, East Kootenay, and contracts were made for the hauling of 1000 tons of ore to the railroad.—Klimpton & Co. near Windermere shipped twenty tons of ore to the Kaslo smelting works. It cost \$30 per ton to have the ore packed.—The shipments of ore from the Slocan from July 1st to October 20th, '98, were 11,043 tons.—The War Eagle mine at Rossland is daily shipping 150 tons of first-class ore. The major portion of this is taken from the stopes between the 500 and 375-foot levels. The motive power to be used in the operation of the mammoth compressor and hoist will be electricity. The management hopes to have the new plant ready for operation before the first of January.—The water is low in the Quesnelle and the Olson dredge has shut down for the season.—It is locally reported that a six days' run at the Athabasca mine near Nelson produced \$4000. This does not include the concentrates, which carry a value of 40 per cent.—At the Silver Cup group in the Lardeau there are 350 tons of high-grade ore ready for shipment. The average value of the ore is said to be \$165 per ton. These properties are owned by the Sunshine, a subsidiary company of Lillooet, Fraser River and Cariboo Gold Fields, Ltd., of London, England, with a British Columbia office at Revelstoke.

Enough snow has fallen to enable the Comstock, Slocan, to rawhide ore to the wagon road. Several carloads will be shipped.—The second cleanup of the Cariboo Hydraulic M. Co.'s properties on the south fork of the Quesnelle, made a week ago, is valued at \$36,000, making the total for the season \$100,000.—The Pilot Bay smelter will resume operations when the coke supply is available from the Crow's Nest.

At Alberni, in the Thistle Group, bonded by Capt. De Lamar, work has been suspended, the miners discharged and the work thrown up, the tunnels driven having failed to penetrate the ore deposits indicated by surface outcroppings, to the satisfaction of M. K. Kinslingbury, the engineer in charge of the mine.

The output of the Le Roi mine at Rossland for October was 12,750 tons. Rumor is again in circulation that the Le Roi mine will pass into the possession of the British-American Corporation soon.

Rossland Miner: The Hall mines at Rossland will install a six-drill compressor and is making arrangements for electricity sufficient to run both the Hall mine and the Hall smelter.—The new crosscut tunnel in the Velvet has been begun. It is expected that the vein will be met at the 400 foot station in the tunnel. In the Commander the developments show an increase in quartz and white iron, while there is not so much copper as was in the ore chute at the 250-foot level.—The total output of the Le Roi for October was 12,960 tons, or more than 400 tons daily.

JAPAN.

A sulphur mine in the Brat Tilboeff Island

of the Chishima archipelago, which was discovered by Koho Kasai of Hakodate, was being worked during the last few years, the products being disposed of at Yokohama or Hakodate. For the present year the output is estimated to exceed 2000 tons, which will be refined at the Hakodate smelting furnace. According to a reliable survey the vein is said to contain a rich deposit of sulphur, although the quality is not quite up to the standard expected. After next year the work will be conducted on a more extensive scale to meet the growing demand for the mineral, and the smelting will be carried on in the island, for the transportation of the sulphur to Hakodate to be refined involves a heavy outlay owing to the rise in the rate of freight charges between the island and Hakodate, and of insurance premium.

LOWER CALIFORNIA.

The iron mine near San Isidro, owned by A. Godbe, has been favorably reported on for prospective investors. The mine is a large deposit of iron ore.

MEXICO.

Le Monde Economique says: Discoveries of several deposits of tin have been made in Mexico, principally in the States of Guanajuato, San Luis Potosi and Sonora. The heights of the Sierra de la Estanera, in the mining district of Comanja, State of San Luis Potosi, contains tin ore which assays from 70 to 75 per cent of metal. In the State of Durango also tin is met with in considerable quantities, which, if properly treated, would yield from 35 to 75 per cent of metals, often under the form of oxides.

NEWFOUNDLAND.

At the new mine at Belle Isle, Conception Bay, 200 men work on the surface of the ground, scattered over a considerable area. It is an open quarry of red hematite iron. The ore lies in a horizontal stratum, three miles in length, a quarter of a mile in breadth and about 5 feet in thickness.

SOUTH AMERICA.

Franklin Ransom of Cleveland, O., has returned from Tierra del Fuego with nearly \$18,000 in gold. He says he has endured hardships, but will return to South America in the spring. All gold there is obtained from placer mines or is washed from black sand thrown within reach by storms, as on the Humboldt Co., Cal., coast.

Personal.

LOUIS JANIN is at Roseland, B. C.
D. W. NELSON becomes Supt. Robbins mine, Baker City, Or.
W. H. ALDRIDGE, Mgr. Trall smelter, Trail, B. C., is in Montreal.
J. E. HARVEY, Supt. Republic mine, Republic, Wash., is in Spokane.
H. B. ADAMS has been appointed Gen. Mgr. Bassick mine, Rosita, Colo.
CHAS. BUTTERS was last week examining a mine at Silver Star, Montana.
RICHARD A. PARKER is examining copper properties in southern Oregon.
D. SEARLES succeeds E. T. Hale as Supt. E. & E. mine, Bourne, Oregon.
CHIEF SIGNAL OFFICER GREELEY expects to be in San Francisco next week.
M. WATBRIGHT succeeds F. P. Ling as Supt. Greenhorn gravel mine, Yreka, Cal.
H. BRATNOBER passed through San Francisco last week on his way to London.
G. M. LAKENAN, managing owner Wisconsin mine, Grass Valley, Cal., is in San Francisco.
G. H. EVANS, Gen. Mgr. Banner mine, Oroville, Cal., has returned from San Francisco.
J. J. CRAWFORD, part owner Gwin mine, has returned from Calaveras and El Dorado counties to San Francisco.
C. A. HAMILTON, who is developing mining properties in Trinity county, returned to San Francisco from New River, Cal.
E. J. POINGDESTRE, San Jose, Cal., was investigating his mining properties at Brownsville, Cal., last week, with a view to resuming work.

Recently Declared Mining Dividends.

Empire State-Idaho M. & D. Co., Idaho, 1 1/2%, \$9375; payable Nov. 15.
Bunker Hill & Sullivan, Idaho, \$21,000; Nov. 4.
Pioneer G. M. Co., California, 12 1/2 cents per share, \$18,000; payable Dec. 15.
Grand Central, Utah, \$31,250; Nov. 10.
Silver King, Utah, \$37,500; Nov. 10.
Pennsylvania M. Co., California, 5 cents per share, \$2575; Oct. 12.
Yukon T. M. & E. Co., 2 cents per share; payable Nov. 16.
North Star M. Co., California, 25 cents per share, \$50,000; payable immediately.

Recent Mining Incorporations.

Aztec Turquois M. Co., San Francisco; capital stock \$50,000; subscribed; G. G. Carr, H. E. Wise, C. A. Maydwell, R. G. Hart, Jr., C. H. Holbrook, Jr., D. H. Whittemore, G. M. Leavitt.

Commercial Paragraphs.

THE Butte & Ruby Valley Smelting Co. has planned to erect a silver-lead plant of 100 tons per day capacity at Twin Bridges, Montana, which is about twenty miles south of Whitehall. The machinery will be supplied by the Colorado Iron Works, A. M. Grant, agent for the latter, having consummated the contract.

Coast Industrial Notes.

—The Southern Pacific Co. is looking for sources of coal.
—The sales of American type writing machines in Mexico amount to \$50,000 a year.
—Every sawmill on Puget Sound and Gray's Harbor, Wash., is running night and day.
—The Skagway, Alaska, railroad is now in operation thirteen miles to White Pass City.
—Grass Valley, Cal., on the 8th inst., voted in favor of the issuance of \$40,000 worth of sewerage bonds.
—From Everett, Wash., last week were shipped to Shanghai, China, 700 M feet of railway timbers.
—At Corvallis, Or., 60,000 pounds of hops were sold recently at an average price of 14 cents a pound.
—The Santa Fe Railway Co.'s oil property at Richfield Station, Cal., is producing an average of 300 barrels a day.
—The Stockton & Tuolumne railroad, building from Jamestown to Sonora, Cal., is within one mile of the latter place.
—The Santa Fe has ordered thirty locomotives, to be delivered at the rate of two a month, commencing with December.
—About \$2,000,000 is recommended for Government appropriation for next year's river and harbor work on the Pacific coast.
—A discovery of coal is reported in Whatcom county, Wash., near Deming. The ledge is said to be 10 feet thick and of a good degree of hardness.

—From Pullman and Garfield, Wash., have been shipped to Omaha and St. Louis 117 carloads of apples, for which the growers received \$1 per 100 pounds.
—The Crow's Nest Pass Coal Co., near Ferlie, B. C., has started burning in fifty coking ovens, and is distributing sample loads throughout the Kootenays.

—A fire at Sacramento, Cal., on the 7th partially destroyed the S. P. car shops, involving a loss of \$250,000, and temporarily depriving 500 men of employment.

—The Fresno, Cal., *Republican* says that in the last thirty days the California Raisin Growers' Association has paid the growers nearly \$1,000,000 and is still paying daily from \$40,000 to \$60,000.

—In Denver, Colo., the U. S. Circuit Court has granted to the Colorado Fuel & Iron Co. a temporary injunction restraining the various railroads from advancing rates from Pueblo to Pacific coast points.

—The *Victoria Times* says that the cannery and fishermen have experienced the worst summer on record in lower British Columbia waters, and that the combined Coho salmon pack does not total 40,000 cases.

—The import of salmon to San Francisco the last week of October was 5643 cases. The export was 104,160 cases. The amount of dried fruit exported was 216.38 cases. The amount of sugar imported for nine months was 246,762,000 pounds.

—A little more than thirty miles from the coast of Japan the Pacific ocean has been found to be more than 4643 fathoms deep. Some officers who were surveying for a telegraph cable found their wire broken at this depth without reaching bottom.

—A Chicago Electric Co. is considering a proposition from the Japanese Government to form in Chicago a syndicate with a capitalization of \$100,000,000, to install and build electric street car lines and incandescent lighting and power plants in the domain of the Mikado.

—At Peoria, Ill., the Japanese Government is reported to be buying enormous quantities of spirits to be used in the manufacture of smokeless powder. A solid train of twenty-three cars, which carries nearly 1,000,000 gallons, was recently shipped to Japan, and two more large shipments will go this month.

—W. B. Story has completed his reconnaissance between Bakersfield and Antelope valley, on the edge of the Mojave desert, for the proposed line of the Bakersfield & Los Angeles, Cal., Railroad Co. He recommends that several preliminary surveys be made by the way of Tejon and O'd Fort Tejon passes before a definite line is selected.

—Speyer & Co. of New York have bought \$10,000,000 Southern Pacific of California 5% first consolidated mortgage gold bonds, amounting to \$10,000,000, and due in 1937. The principal and interest are unconditionally guaranteed by the Southern Pacific Co. These bonds are part of about \$20,000,000 worth, in exchange for underlying bonds and for new construction.

—The Postoffice Department of Japan for the indirect exchange of money orders between this country and Corea, and on and after January 1, 1899, money orders may be drawn in the United States for payment at the Japanese postoffices at Chemulpo, Fusan, Seoula, Yuensan and Mukho in Corea, and in like manner at those offices for payment in the United States.

—General Passenger Agent Charles S. Fee of the Northern Pacific, who has returned to St. Paul from a long absence on the Pacific coast, speaks as follows in the *Pioneer Press* of this region: "I never saw such good times as now prevail in the far Northwest. I visited every city of consequence in that section and found not only prosperity, but hopefulness on the part of the people. There is greater confidence in the future than I ever observed there before. All crops have been abundant and good prices have been realized. Hops that sold for 10 cents a pound five years ago are now selling for 17 cents, and that is only one illustration of the general improvement. Farmers and business men are paying off mortgages and have something saved, and are happy."

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 1, 1898.

613,352.—BALL CASTER—G. L. Boveroux, Oakland, Cal.
613,404.—GOLD WASHER—G. H. Chick, Oakland, Cal.
613,398.—WATER BATTERY—H. H. Corter, S. F.
613,512.—WINDOW—B. Hausmann, S. F.
613,433.—NCT LOCK—J. W. Hines, Elma, Wash.
613,569.—TACK DRIVER—G. W. Hobbs, Los Angeles, Cal.
613,575.—MATCH BOX—E. D. Kellerman, Montezano, Wash.
613,454.—GANG PLOW—P. Maddocks, Tracy, Cal.
613,402.—FIRE PROOF WALL—J. I. McCormick, S. F.
613,522.—DOOR GUARD—J. J. Nagley, Marysville, Wash.
613,487.—NECKTIE LOCK—E. A. Normand, S. F.
613,227.—RUNNER FOR VEHICLES—M. Palmtag, New Whitcomb, Wash.
613,292.—RUNNER FOR VEHICLES—M. Palmtag, New Whitcomb, Wash.
613,305.—ORCHARD PLOW—J. Porteous, Fresno, Cal.
613,470.—CULTIVATOR—F. A. Rice, Edna, Cal.
613,325.—CAR FENDER—J. Sexton, Los Angeles, Cal.
613,344.—CHILD'S HARNESS—M. R. Thompson, Olympia, Wash.
613,545.—SLEEPING BAG—Sarah Winters, Seattle, Wash.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SIDE HILL GANG PLOW.—Peter Maddocks, Tracy, Cal. No. 613,454. Dated Nov. 1, 1898. This invention is designed to plow especially upon side hills. It comprises a triangular frame mounted upon bearing wheels, with means by which the wheels can be adjusted. A double series of plows are connected with opposite sides of the frame, the standards being so hinged that those upon one side may be turned up free of the ground, while those upon the other side are turning the furrow. Thus when the plow is going in one direction upon the hill side one set will be at work and the other out of action; then when the plow is reversed to move in the opposite direction on the same side the other set of plows will be turning the furrow, and the first set will be out of action. The hinged plow standards are connected in series with rods, and these rods are connected by links with lever arms, by which the plow may be thrown out of or into action.

GOLD WASHING APPARATUS.—George H. Chick, Oakland, Cal., assignor of one-half to C. Zander, of Alameda, Cal. No. 613,494. Dated Nov. 1, 1898. This invention is designed to provide a continuously working apparatus for washing out gold and separating it from sand and other debris without stopping the work for cleaning up. It comprises a supporting frame with a chute mounted at an incline thereon, a main bottom having a stop or abutment at its lower end, a supplemental bottom formed of independent removable sections resting thereon and abutting endwise, each of said sections having a transverse rifle bar at its lower end, a superposed amalgamated plate and a plate fixed to the upper portion of the transverse rifle and projecting upwardly to form a chamber or pocket between itself and the amalgamated plate. A receiving box is fixed above the upper end of the apparatus having a screen bottom by which the coarser material is first separated and thrown out, and other screens situated above the inclined amalgamated plates so that a portion of the material passing through the first screens will be deposited on the first or upper set of plates, while a second coarser portion will be deposited on a second set of plates, thus separating and distributing the material and reducing the work to be done by either set of plates.

FIRE-PROOF WALL OR PARTITION FOR BUILDINGS.—J. T. McCormick, San Francisco, Cal. No. 613,462. Dated Nov. 1, 1898. This invention relates to improvements in the construction of fire-proof walls and partitions for buildings so that an economical construction is provided for building intermediate walls and partitions either with or without an air space. The wall or partition consists of vertical and horizontal bars interlocked at their points of intersection and with their edges approximately in the same plane so as to form a surface upon both sides for the application of the wire or metallic lathing. If it be desired to have an air space in the partition, the vertical bars are made of greater depth, and the horizontal bars are arranged flush with the opposite edges of the vertical bars, but not extending entirely across so that they leave an intermediate space after the lathing and plaster have been applied to the opposite faces.

COMBINED SLIDABLE AND SWINGING WINDOW SASH.—B. Hausmann, San Francisco, Cal. No. 613,512. Dated Nov. 1, 1898. The object of this invention is to provide a means for conveniently obtaining access to the exterior surface of windows by the employment of sashes in which the glass is set, which sashes are hinged to vertically slidable strips so that when the sash is closed into position it may be moved up and down like an ordinary window sash. The invention comprises in conjunction with these strips and sashes hook bolts, which

are adapted to engage with corresponding loops in the strips, counterweight chains connecting with the exterior faces of the strips so that the windows are counterbalanced and slidable, a stop bar fixed upon one chain and a plate fixed upon the channel on which the strip slides, so as to be engaged by the stop bar to arrest the strip so that the sash can be lifted and the hook bolts disengaged to allow the sash to be opened.

CULTIVATOR.—F. A. Rice, Edna, Cal. No. 613,470. Dated Nov. 1, 1898. This invention relates to improvements in cultivators which are especially designed as weed cutters, and it consists in such a construction as will sever all weeds at points below the surface of the ground, and also pulverize the surface without leaving furrows or trenches. At the same time the framework forms a clod crusher for breaking and pulverizing any clods which may be passed over by the machine, the ground being generally leveled and put into fine shape after the apparatus has passed. It comprises parallel beams, two of which are inclined upwardly, one being hinged to its companion and provided with means by which it can be raised or lowered with relation to the ground. Straps or connecting plates are secured at opposite ends to the outside beam only, and blades or cutters are fixed with the upper and lower horizontal portions and connecting portions set on edge and extending in opposite directions from the central line of the machine.

COLLAR AND NECKTIE LOCK.—E. A. Normand, San Francisco, Cal. No. 613,467. Dated Nov. 1, 1898. The object of this invention is to provide a device which is especially serviceable as a lock to prevent the collar button from being disengaged from the collar or from the shirt-band when the buttonholes in either have become worn or enlarged. It also forms a lock or holder to prevent the necktie from slipping out of place with relation to the collar. It may be employed to retain cuffs upon sleeve-buttons and for various other similar uses. It consists of a single piece of wire bent at the center to form an upwardly curved arch adapted to fit the shank of the collar-button, the ends bent in the opposite direction from the lower limits of the arch to form spring members normally inclined upward and formed with inwardly projecting hooks to fit beneath the edge of the collar, while the outer portion forms outwardly projecting hooks to engage the edge of the necktie, while the central loop is retained over the collar-button.

Catalogues, Etc.

THE "star" catalogue of all received this week is from the Gates Iron Works. It is a "general catalogue," not technical, nor special, nor in detail, but intended to show some of the machinery furnished by the Gates Iron Works. It is worthy of special note even in these fine de siècle days of fine catalogues, having all the first-class finish of a fine literary magazine. A postal request to the Gates Iron Works, 650 Elston Ave., Chicago, Ill., will bring any one a copy.

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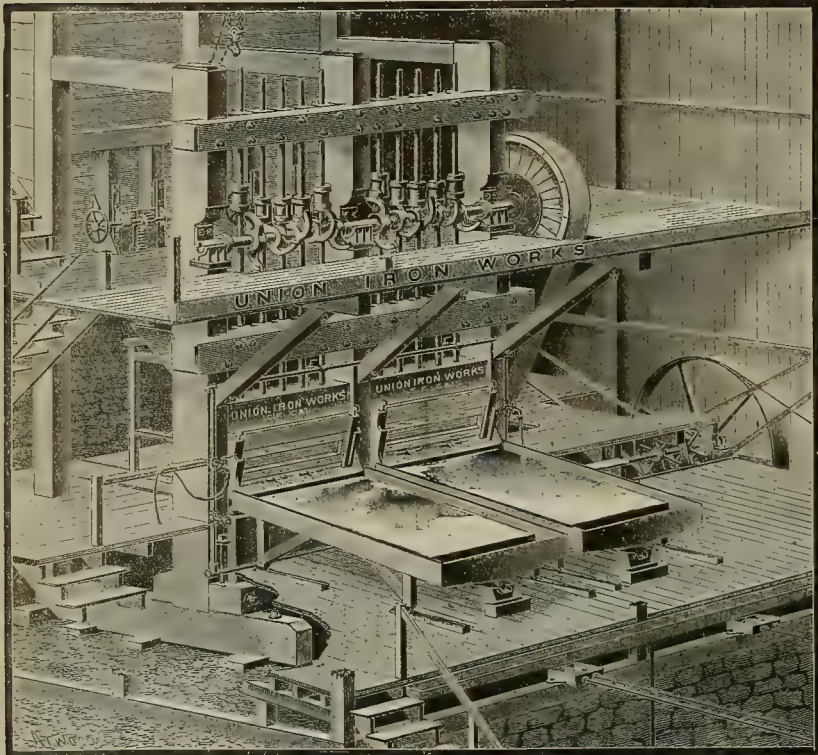


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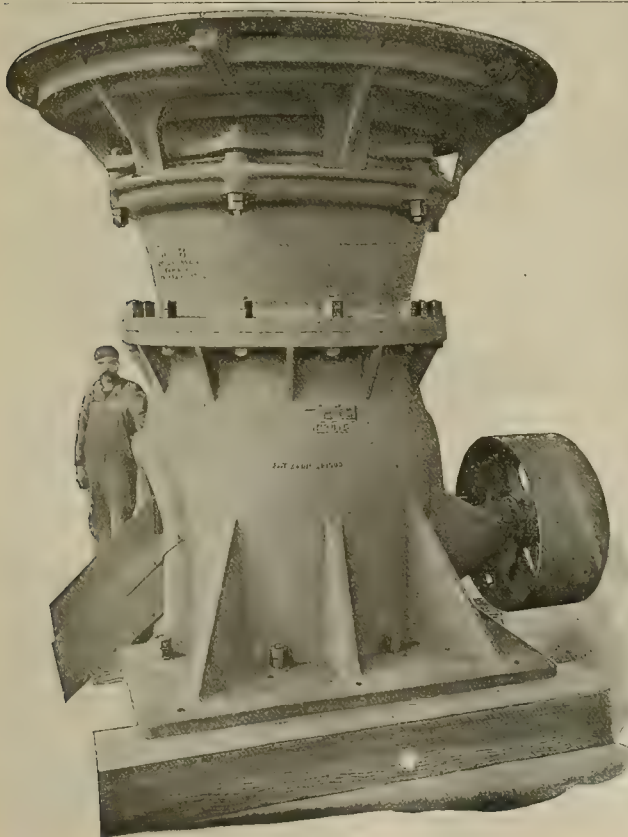
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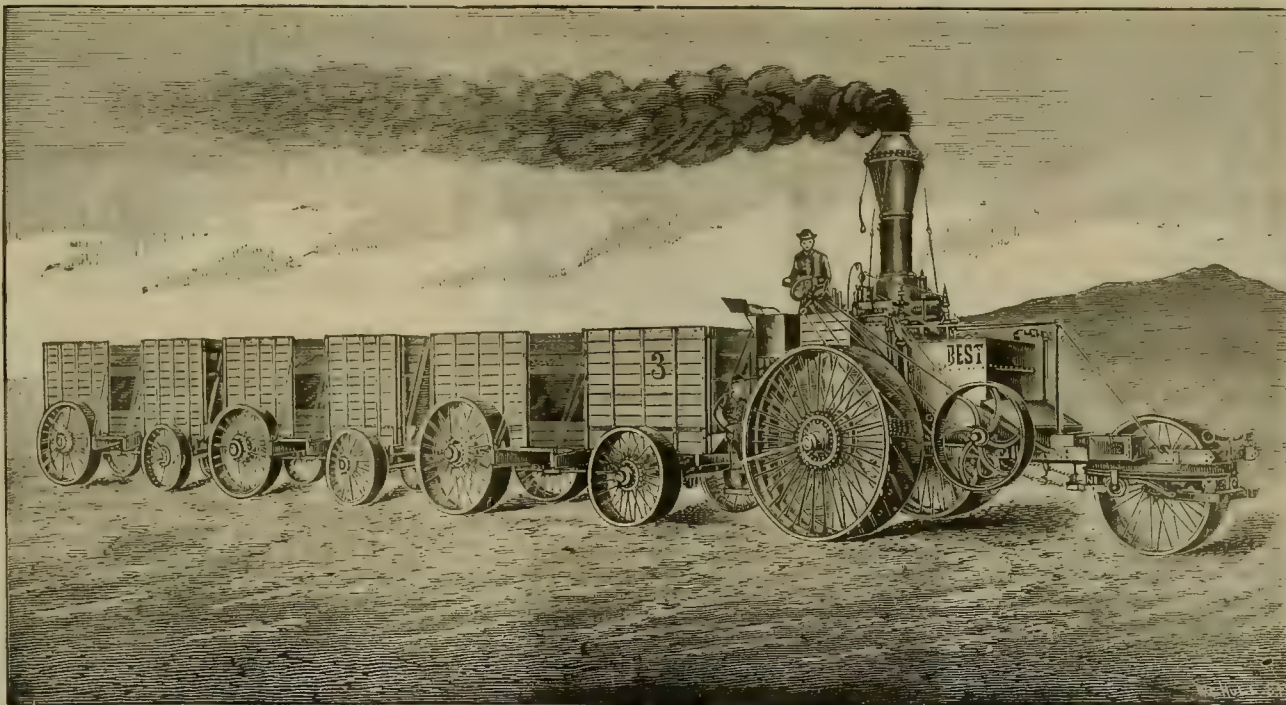
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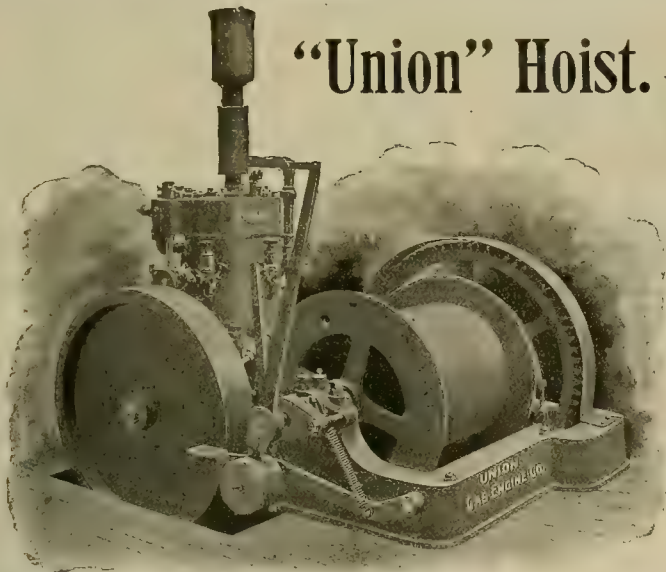
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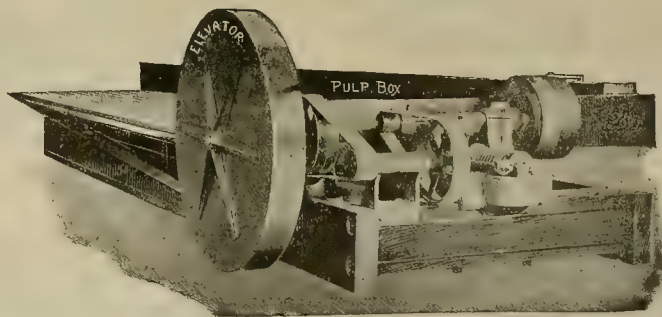
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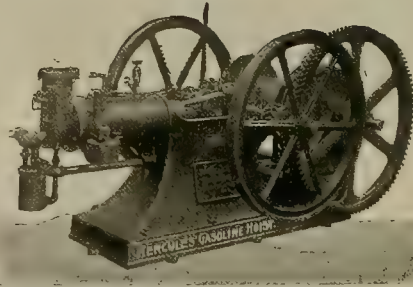
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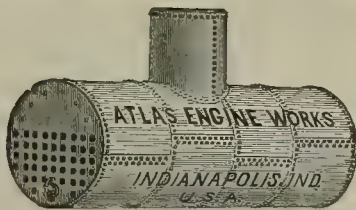
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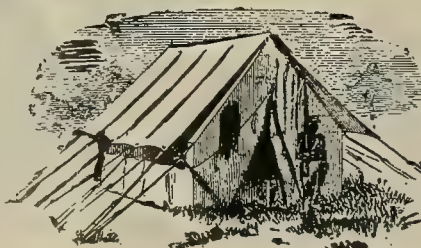
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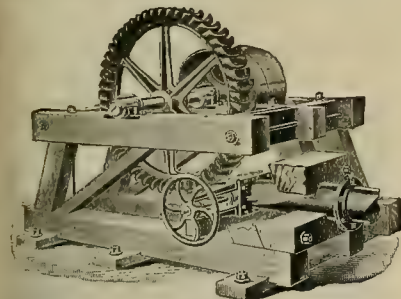
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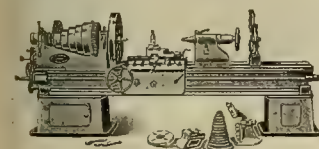
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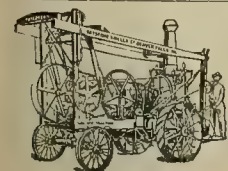
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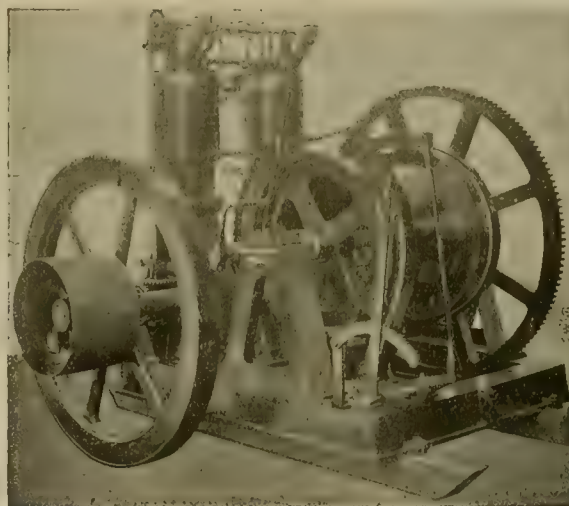
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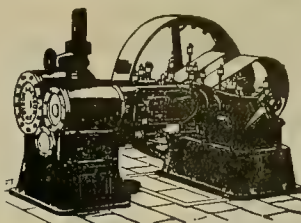
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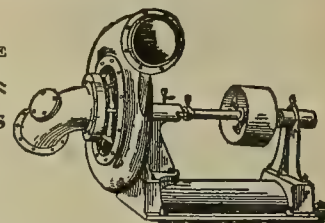
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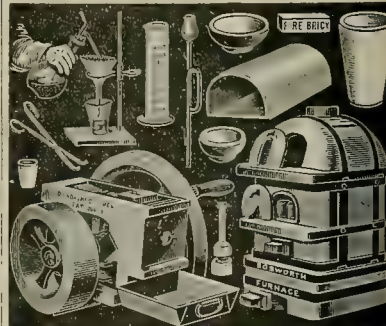
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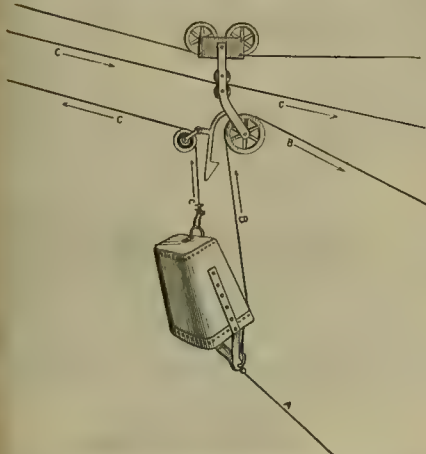
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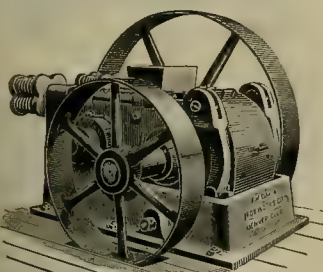
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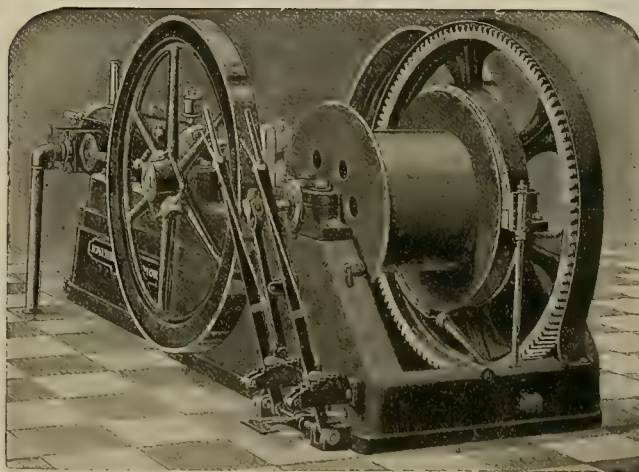


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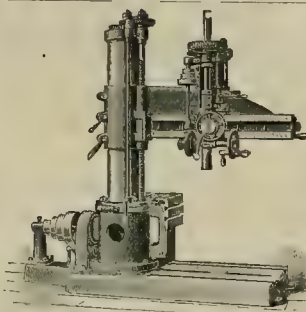
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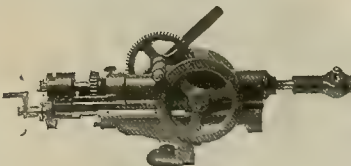
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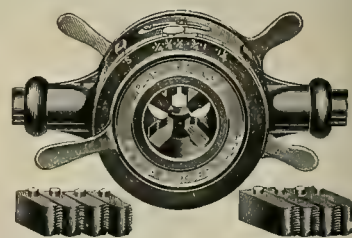
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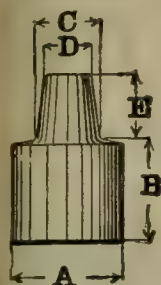
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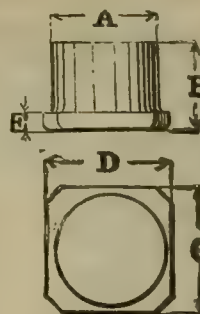
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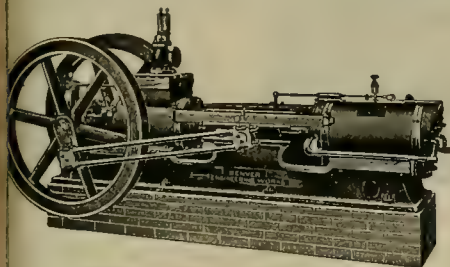
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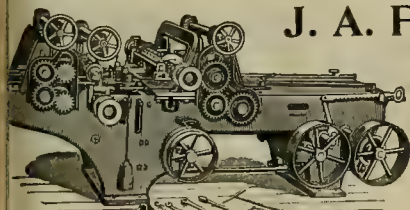
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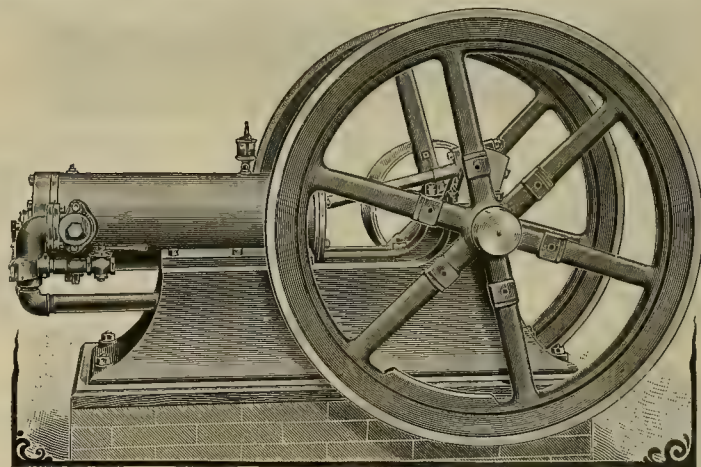
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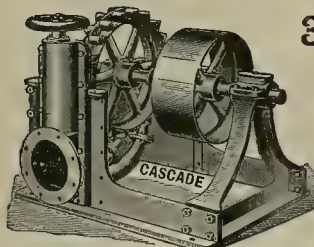
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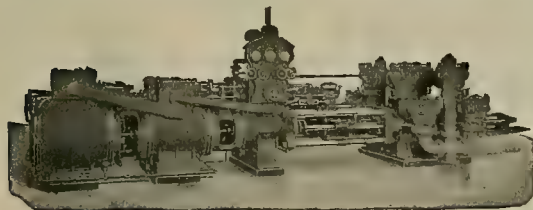
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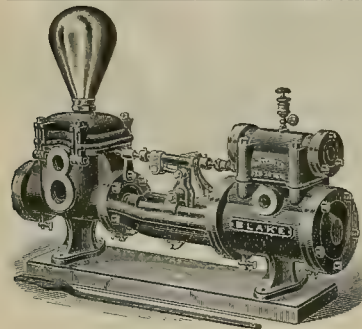
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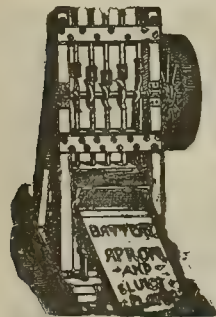
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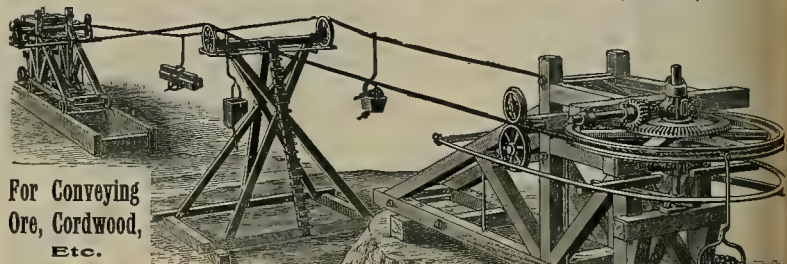
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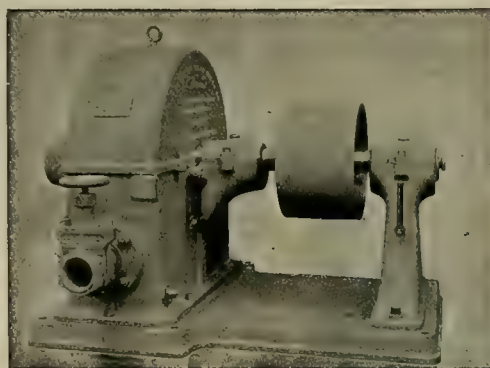


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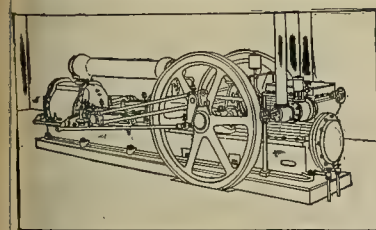
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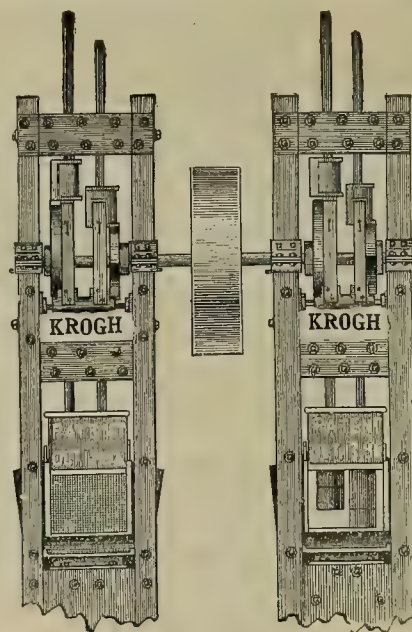
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Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced first-class agency. We have able and trustworthy associates and agents in Washington and the capital cities of the principal nations of the world. In connection with our scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us to give advice which will save inventors the expense of applying for patents upon inventions which are not new. Circulars and advice sent free on receipt of postage. Address DEWEY, STRONG & CO., Patent Agents, 330 Market St., San Francisco, Cal.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 10, 1898.

SILVER.—London, 27½d; New York, 60½¢; San Francisco, 60½¢; Mexican Dollars, 47½¢@47½¢. New York exchange, sight, 15; telegraphic, 17½ cents premium.

Shipments of specie from San Francisco during the first ten months of '98 were \$47,405,200, against \$37,259,650 for the same time last year, and consisted principally of \$3,350,600 in silver bullion, \$3,768,290 in Mexican dollars, \$463,486 in silver coin, \$39,446,535 in gold coin, and \$337,494 in currency. Of this year's shipments \$5,779,113 went to China, \$300,000 to Japan, \$415,900 to India, \$501,000 to Honolulu, \$139,282 to Central America, and \$40,564,000 to New York.

LEAD.—Following election, says a New York dispatch, the market was purposeless for the most part to-day. While the list was steady in tone, business dragged in an unusual manner. At the close the Metal Exchange called Pig Iron Warrants very quiet, with \$7 bid and \$7.25 asked; Lake Copper firm, with \$12.62½ bid and \$12.75 asked; Tin quiet, with \$18.30 bid and \$18.50 asked. Lead quiet and steady, brokers' \$3.50, Exchange \$3.72½@3.77½. The firm naming the settling price for leading miners and smelters at the West quoted Lead to-day at \$3.50.

Local, pipe, 6@6½¢; sheet, 6½@7¢; pig, 5½¢; bar, 6¢.

COPPER.—New York reports Lake \$12.75@12.87½.

The following table shows the number of pounds and value of wire nails exported from the United States during the past decade:

Exports of wire nails from the United States:

| Year. | Pounds. | Value. | Price per Pound (Cents). |
|-------|------------|-----------|--------------------------|
| 1888 | 1,547,078 | \$155,403 | 10.0 |
| 1889 | 1,612,576 | 157,389 | 9.7 |
| 1890 | 1,955,359 | 160,510 | 8.2 |
| 1891 | 1,768,433 | 138,859 | 7.8 |
| 1892 | 2,056,267 | 160,239 | 7.8 |
| 1893 | 2,300,501 | 158,093 | 6.9 |
| 1894 | 2,233,776 | 180,607 | 5.6 |
| 1895 | 4,367,267 | 210,192 | 4.8 |
| 1896 | 8,031,927 | 321,055 | 4.0 |
| 1897 | 9,941,714 | 357,641 | 3.6 |
| 1898 | 22,894,099 | 458,787 | 2.0 |

IRON.—American, soft, \$21.75 and \$23.75 per ton; Scotch, \$24.25.

SPELTER.—5½¢@5½¢.

TIN.—Menlo Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18¢; Bar, 19¢.

ANTIMONY.—9½¢, 10¢.

BABBITT METAL.—10-12-14—best 16¢.

QUICKSILVER.—Domestic, unchanged, \$41; export, \$37.00@37.50; carload lots, special rates.

POWDER.—F. o. b., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½¢; less than one ton, 17½¢. No. 1* 60%, carload lots, 13½¢; less than one ton, 15½¢. No. 1** 50%, carload lots, 11½¢; less than one ton, 13½¢. No. 2, 40%, carload lots, 10¢; less than one ton, 12¢. No. 2* 35%, carload lots, 9½¢; less than one ton, 11½¢. No. 2** 30%, carload lots, 9¢; less than one ton, 11¢. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices:

| | | | |
|------------|-------------|------------|-------------|
| Wellington |\$8 00 | Cocos Bay |\$5 00 |
| Seattle |6 00 | Southfield |7 50 |

Cargo lots, Eastern and foreign:

| | | | |
|-------------------|-------------|------------------|-------------|
| Wallsend |\$7 50 | Cumberland |\$9 00 |
| Brynmor |7 50 | Cannel |9 50 |
| Pennsylvania, hd. |14 50 | Welsh Anthracite |12 50 |
| Sooth |8 00 | Rock Springs |9 50 |

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.08 per gal.; bbl., \$1.03; pure No. 2, cs., 53¢; bbl., 50¢; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.06; less than 200 gals., \$1.10; in bbls., 4¢ per gal. less than case; Baker's Crystal, \$1.26; China Nut, 53¢; Linseed, strictly pure, boiled, bbl., 44¢; cs., 49¢; raw, bbl., 42¢; cs., 47¢; lots of 5 bbls., 1¢ less; Lucoi, boiled, bbl., 39¢; cs., 43¢; raw, bbl., 36¢; cs., 41¢; lots of 5 bbls., 1¢ less. Kerosene—Pearl, cs., per gal., 17½¢; Astral, 17½¢; Star, 17½¢; Eocene, 19½¢; Extra Star, 21½¢; Elaine, 22½¢; Water White, bulk, in tanks, 11½¢; Mineral Seal, iron bbls., 21¢; wooden bbls., 23½¢; cs., 28¢; Mineral Sperm, 27¢; Deodorized Stove Gasoline, bulk, 13¢; do., cs., 18¢; 86 deg. Gasoline, bulk, 20¢; do., cs., 25¢; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½¢; do., in cs., 16½¢; Lard Oil, Extra Winter Strained, bbl., 56¢; cs., 61¢; No. 1 bbl., 46¢; cs., 51¢; Neatsfoot Oil, bbl., 65¢; cs., 70¢; No. 1 bbl., 55¢; cs., 60¢; Sperm, crude, 60¢; Natural White, 65¢; Bleached do., 70¢; Whale Oil, Natural White, 40¢; Bleached do., 45¢; Cocoa, cs., 55¢; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31¢ per lb.; carloads, 29¢; in 10-

lb. tins 37¢; sulphuric acid, 2½¢ per lb. 66% B.; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½¢ per lb.; blue vitriol, 4½¢ per lb.; borax, refined, 5@6¢ per lb.; chlorate of potash, 9½¢@10¢; roll sulphur, 2½¢; alum, \$1.90@2.00; flour sulphur, French, 2½¢@3½¢; California refined, 1½¢@1½¢; nitric acid, in carboys 8¢ per lb.; caustic soda, in 10-lb. tins 15¢ per lb.; Cal. s. soda, bbls., 65¢; sds., 60¢ @ 100 lbs; chloride of lime, spot, 2.10 @2.25¢; salt peter, 15¢; chloride of potash, 25¢; caustic potash, 12¢.

CANDLES.—Electric Light Candles—6s, 16 oz., 7½¢; 6s, 14 oz., 6½¢; 6s, 12 oz., 5½¢; 6s, 10 oz., 4½¢; Granite (Mining) Candles—6s, 16 oz., 8½¢; 6s, 14 oz., 7½¢; 6s, 12 oz., 7½¢; 6s, 10 oz., 6½¢. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8¢; colored, 9¢.

NAILES.—List per keg: No. 20 to 60d, wire, \$2.35; cut, \$2.25; 10 to 20d, wire, \$2.40; cut, \$2.30; 8d, wire, \$2.45; cut, \$2.35; 6 and 7d, wire, \$2.55; cut, \$2.45; 4 and 5d, wire, \$2.65; cut, \$2.55; 3d, wire, \$2.80; cut, \$2.70; 2d, wire, \$3.05; cut, \$2.95. In carload lots, 10¢ per keg less.

CORDAGE.—

| | Sisal. | Manila. |
|------------------------------------|--------|---------|
| 1¼-in. cir. (7-16 dia. and upward) | 9¼ | 10¼ |
| 12-thread (¾ dia.) | 9¼ | 11¼ |
| 6 and 9 thread (¾ and 5-16 dia.) | 10¼ | 11¼ |
| Bale Rope (3 and 4 strand) | 9¼ | 10¼ |
| Bale Rope (2, 6 and 8 strand) | 9¼ | 11¼ |

San Francisco Stock Board Sales.

SAN FRANCISCO, Nov. 10, 1898.
9:30 A. M. SESSION.

| | | | |
|--------------------|----------|-------------------|----------|
| 500 Belcher |25c | 700 Ophir |75c |
| 500 Best & Belcher |32c | 300 Potosi |30c |
| 500 Chollar |32c | 200 Savage |25c |
| 1000 C. Cal. & Va. | \$1 40 | 100 Sierra Nevada |92c |
| 500 Crown Point |15c | 300 Union Con. |31c |
| 100 Occidental |48c | 500 Yellow Jacket |21c |

| | | | |
|---------------------|----------|-------------------|----------|
| 1050 Ophir |71c | 200 Confidence |55c |
| 500 Mexican |22c | 350 Sierra Nevada |85c |
| 1300 Gould & Curry |30c | 600 Belcher |28c |
| 500 Best & Belcher |30c | 300 Belcher |08c |
| 500 C. Cal. & Va. | \$1 30 | 100 Overman |06c |
| 1100 Savage |21c | 600 Justice |08c |
| 500 Chollar |18c | 300 Union Con. |27c |
| 800 Potosi |17c | 100 Alta |07c |
| 100 Hale & Norcross |91c | 600 Scorpion |04c |
| 300 Crown Point |12c | 300 Con. New York |04c |
| 1000 Yellow Jacket |21c | | |

Acetylene Gas.
A handsome new illustrated catalogue will tell you where and by whom the new light is being used, and what the verdict is. Mailed upon application. PACIFIC ACETYLENE GAS CO., 115 New Montgomery St., San Francisco.

WANTED.

A First-Class Assayer and Experienced Ore Sampler

To take charge of a branch office through which we purchase ores and bullion, and sell general mining supplies. Address, with references, THE LEWIS COMPANY, City of Mexico.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Geo. W. Allen and E. P. Thomas, in the Hangman's Gulch Mine, near Placerville, El Dorado Co., to deposit tailings in Hangman's Ravine; from Sam B. Lusk and J. J. Miller, in the Sampson Mining Claim, in Gold Lake Mining District, Sierra Co., to deposit tailings in a ravine below the mine; from E. Reynolds and F. Carter, in the Morristown Mine, near Port Wine, Sierra Co., to deposit tailings in west branch of Little Canyon Creek; from Geo. D. H. Meyers, in the Myers Placer Mine, near Placerville, El Dorado Co., to deposit tailings in Johnson's North Canyon; and from Frank and Antoine Leveroni, in the Corsica Mine, near Sierra City, Sierra Co., to deposit tailings in old pits, gives notice that a meeting will be held at room 59, Flood building, San Francisco, Cal., on November 28, 1898, at 1:30 P. M.

ANTIMONY.

We buy Antimony Ore in any quantity and pay prompt CASH for same. Write us and let us know what you have.

Chapman Smelting Works Co.,
(INCORPORATED.)
422 Battery Street, San Francisco, Cal.

UTAH
Mines—Dividend Paying
and Investment Stock.
W. E. HUBBARD & CO., 15 W. 2d So. Street,
SALT LAKE CITY.



A Valve that Shuts Steam Off
TIGHT.

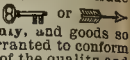
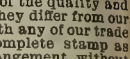
Full particulars by addressing the manufacturers,
The Wm. Powell Co.,
CINCINNATI, O.
Puget Sound Machinery Depot, Seattle, Wash.
carry a stock.

UNFAIR COMPETITION.

Our recent announcement that inferior goods had been sold and billed on the coast as our goods, and that our trade-mark numbers had been counterfeited, has disclosed an even greater extent of these practices than we had supposed to exist. To make the resulting damage to the reputation of our goods as small as possible and to protect our would-be patrons we repeat:

All our catalogue goods, except those listed by us as manufactured by others, are stamped with our name "Keuffel & Esser Co." or our initials "K. & E. Co." and where there is room for it, with our trade-

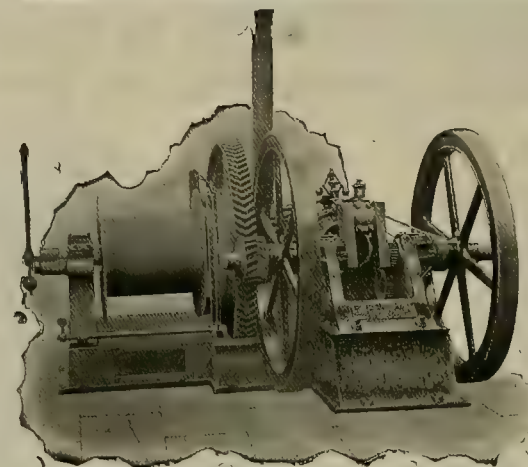


Our German drawing instruments bear only the trade marks  or  We never stamp our goods with catalogue numbers only, and goods so stamped are therefore not ours. All our goods are fully warranted to conform to the description we give of them in our catalogue and to be of the quality and grade specified. We make some lines of cheaper goods for the jobbing trade, but they differ from our catalogue goods in quality and appearance. These inferior goods are not stamped with any of our trade marks. Our catalogue goods are not furnished to any dealer or agent without our complete stamp as described above, and any claim that we furnish our catalogue goods by special arrangement without our stamp is therefore an attempt to deceive. Our special papers in rolls or sheets

Duplex Universal Anvil Baragow Normal

are watermarked or stamped along the edge with their name. Any claims that our papers are furnished by us in bulk without these names or that these papers have been obtained otherwise than through us, are absolutely false. We will thankfully accept any information bearing on the counterfeiting of our trade-mark numbers or the palming off of other goods as ours.

Very respectfully, KEUFFEL & ESSER CO.



FRESNO, June 25, 1898.

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gaso-
line engine and hoist purchased
from you is doing fine work
and is perfectly satisfactory in
every respect.

Yours truly,

TUOLUMNE MOTHER LODGE
M. & D. CO.,

Per N. W. Moodey, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET, SAN FRANCISCO, CAL.

WEST COAST OF MEXICO.

WÖHLER, BARTNING Suc's, Mazatlan (Sinaloa), Mex.
Bankers, Importers, Exporters and Commission Merchants.

Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco.

ORE BUYERS AND EXPORTERS. MINING SUPPLIES.

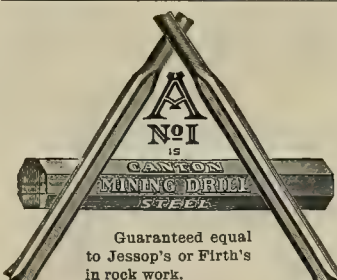
The National Feed Water Heater.

800,000 HORSE POWER SOLD.

Delivering Water to the Boiler at 210 degrees F. Thirty Sizes from 5 to 4000 Horse Power. Made of the Best Seamless Drawn Brass or Copper Tube, with Hard Brazed Joints. Unsurpassed for SIMPLICITY, EFFECTIVENESS and RELIABILITY.

HENSHAW, BULKLEY & CO., Agents, - San Francisco, Cal.

— Send for Catalogue. —



Coast Representatives: C. B. Boothe & Co., Los Angeles, Cal.
Schaw, Ingram, Batcher & Co., Sacramento.

CANTON STEEL COMPANY,

Works: CANTON, OHIO.

General Western Office, - - - DENVER, COLO.

Manufacturers of
HIGH GRADE MINING STEELS.

Canton Steel is Hammered,
not Rolled.

FOR SALE BY ALL DEALERS.

J. D. BETHUNE,
(Late Associate Justice Supreme Court.)
Attorney at Law,
Mining Law,
PRESCOTT, ARIZONA.
A Valuable Gold Property for Sale.

Quicksilver
FOR SALE IN LOTS TO SUIT.
Agents for Redington Quicksilver Mine.
REDINGTON & COMPANY, Wholesale Drug-
gists, 23-25-27 Second Street, San Francisco.

Mines or prospects operated on contract to purchase, MONEY loaned, under lease on fixed royalty or percentage. MINING companies organized, their property experted, financed and managed. MINES, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated. EXAMINE mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.
EDW. N. BREITUNG, Marquette, Mich.
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McNiel's A.B.C. Universal Commercial. U.S.A.

PACIFIC EXPLORATION COMPANY
Finds buyers or working capital for meritorious mines or good prospects. Correspondence invited.
W. E. Holbrook, Pres., L. F. Haskell, Sec'y.
29-30 Chronicle Building, S. F.

Assessment Notices.

EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Forest Hill, Placer County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 26th day of October, 1898, an assessment (No. 14) of one-half of one cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, No. 1209 Claus Spreckels building, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 25th day of November, 1898, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 14th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors.
J. J. CRAWFORD, Secretary.
Office—No. 1209 Claus Spreckels Bldg., San Francisco, California.

CONSOLIDATED ST. GOTHARD GOLD MINING COMPANY.—Location of principal place of business, 113 Crocker building, San Francisco, California; location of works, Nevada County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of November, 1898, an assessment (No. 16) of Ten Cents (10c.) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 113 Crocker building, sixth floor, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 14th day of December, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on FRIDAY, the 30th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors.
F. HOLLING, Secretary.
Office—113 Crocker building, sixth floor, San Francisco, California.

DELINQUENT SALE NOTICE.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the 22nd day of August, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|-----------------------|-----------|-------------|----------|
| C. Rehn..... | 75 | 2,000 | \$200 00 |
| C. Rehn..... | 77 | 1,000 | 100 00 |
| C. Rehn..... | 79 | 500 | 50 00 |
| C. Rehn..... | 81 | 499 | 49 90 |
| C. Rehn..... | 82 | 1 | 10 |
| C. Rehn..... | 161 | 150 | 15 00 |
| A. Rehn..... | 176 | 250 | 25 00 |
| M. Schiffmann..... | 8 | 100 | 10 00 |
| G. F. Ochs..... | 9 | 250 | 25 00 |
| G. F. Ochs..... | 105 | 200 | 20 00 |
| G. F. Ochs..... | 170 | 100 | 10 00 |
| E. S. Heller..... | 10 | 100 | 10 00 |
| A. Schiffmann..... | 12 | 50 | 5 00 |
| C. Warnke..... | 138 | 250 | 25 00 |
| I. Echemann..... | 15 | 200 | 20 00 |
| E. Fey..... | 17 | 100 | 10 00 |
| E. Fey..... | 74 | 200 | 20 00 |
| E. Fey..... | 108 | 200 | 20 00 |
| T. J. Sullivan..... | 20 | 500 | 50 00 |
| F. Knottner..... | 110 | 500 | 50 00 |
| F. Knottner..... | 111 | 500 | 50 00 |
| E. Schulz..... | 41 | 200 | 20 00 |
| J. Forbes..... | 43 | 500 | 50 00 |
| C. Ebbecke..... | 45 | 100 | 10 00 |
| M. Martin..... | 98 | 50 | 5 00 |
| N. Stands..... | 99 | 50 | 5 00 |
| J. Green..... | 104 | 200 | 20 00 |
| W. J. Rustemeyer..... | 109 | 500 | 50 00 |
| W. J. Rustemeyer..... | 116 | 500 | 50 00 |
| W. J. Rustemeyer..... | 117 | 500 | 50 00 |
| L. Knottner..... | 112 | 150 | 15 00 |
| E. Knottner..... | 113 | 150 | 15 00 |
| G. Knottner..... | 114 | 100 | 10 00 |
| G. Knottner..... | 115 | 100 | 10 00 |
| G. Schmitt..... | 47 | 5,000 | 500 00 |
| G. Schmitt..... | 48 | 2,000 | 200 00 |
| G. Schmitt..... | 49 | 2,000 | 200 00 |
| G. Schmitt..... | 51 | 1,000 | 100 00 |
| G. Schmitt..... | 53 | 1,000 | 100 00 |
| G. Schmitt..... | 54 | 1,000 | 100 00 |
| G. Schmitt..... | 61 | 500 | 50 00 |
| J. G. De..... | 142 | 415 | 41 50 |
| S. M. Fernandez..... | 146 | 100 | 10 00 |
| F. Woenne..... | 154 | 1,000 | 100 00 |
| J. H. Slevens..... | 156 | 500 | 50 00 |
| I. Joltke..... | 159 | 200 | 20 00 |
| L. Page..... | 182 | 100 | 10 00 |
| H. Page..... | 205 | 1,000 | 100 00 |
| H. Page..... | 206 | 1,000 | 100 00 |
| W. J. Pattosien..... | 207 | 200 | 20 00 |
| W. J. Smith..... | 218 | 700 | 70 00 |

And in accordance with law, and an order from the Board of Directors, made on the 22nd day of August, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, room 57, 916 Market street, San Francisco, California, on FRIDAY, the 25th day of November, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

GEO. W. FLEISSNER, Secretary.
Office—916 Market street, room 57, San Francisco, California.

GOLD IN COLORADO!

Colorado has within its limits some of the greatest gold mines that has ever been discovered. In Cripple Creek in 1892 there were a few prospectors looking over the hills; in 1895 the camp turned out over \$8,000,000 in gold. Leadville, the old bonanza camp and the mineral product of which made Denver what it is today, is becoming a big producer of gold. New inventions for working low-grade gold ores, together with the discoveries made to work rebellious ores, have opened up a field for the miners such as they have never enjoyed before, and Colorado has inducements to offer such as no other district in the world possesses; the record of the State in gold production for the last three years speaks for itself. Among the other prominent camps in the State are Telluride, Ophir, Rico, Silverton, Mineral Point, Durango, La Plata, Ouray, Saw Pit, Ironton, the Gunnison district and many others. New finds are being made and new camps are springing into existence every day. The Denver & Rio Grande Railroad, which is the pioneer road of Colorado and which has always been the miner's friend, reaches all the mining camps in Colorado. For elegantly illustrated descriptive books, free, of mines in Colorado send to

W. J. SHOTWELL, - - - General Agent,
314 California St., San Francisco, Cal.
S. K. HOOPER,
General Passenger Agent, - - DENVER, COLO.

DELINQUENT SALE NOTICE.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Riverside County, California.
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 16th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------------|-----------|-------------|----------|
| W. H. Bailey, Trustee..... | 240 | 2,000 | \$200 00 |
| W. H. Bailey, Trustee..... | 261 | 2,000 | 200 00 |
| W. H. Bailey, Trustee..... | 262 | 10,000 | 100 00 |
| C. A. Bailey..... | 133 | 1,000 | 15 00 |
| C. A. Bailey..... | 135 | 1,000 | 15 00 |
| C. A. Bailey..... | 136 | 1,000 | 15 00 |
| C. A. Bailey..... | 138 | 500 | 7 50 |
| C. A. Bailey..... | 139 | 2,000 | 30 00 |
| C. A. Bailey..... | 210 | 4,532 | 67 98 |
| R. L. Cheney, Trustee..... | 245 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 246 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 247 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 248 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 249 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 250 | 250 | 3 75 |
| R. L. Cheney, Trustee..... | 251 | 2,500 | 37 50 |
| R. L. Cheney, Trustee..... | 252 | 1,000 | 15 00 |
| W. H. Bailey, Trustee..... | 256 | 3,300 | 49 50 |
| W. H. Bailey, Trustee..... | 259 | 7,300 | 109 50 |
| W. H. Bailey, Jr..... | 147 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 148 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 149 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 150 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 151 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 188 | 2,500 | 37 50 |
| W. H. Bailey, Jr..... | 208 | 4,000 | 60 00 |
| W. H. Bailey, Jr..... | 209 | 532 | 7 98 |

And in accordance with law, and an order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 508 Safe Deposit building, San Francisco, California, on TUESDAY, the 1st day of November, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
R. L. CHENEY, Secretary.
Office—Room 508 Safe Deposit building, San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed to THURSDAY, December 1st, 1898, at the same hour and place. By order of the Board of Directors.
J. W. FEW, Secretary.
Office—310 Pine St., Room 16, San Francisco, Cal.

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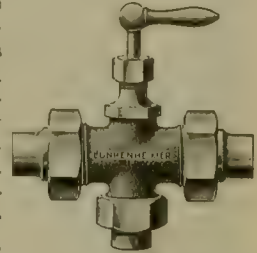
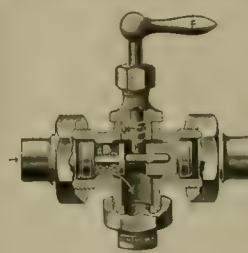
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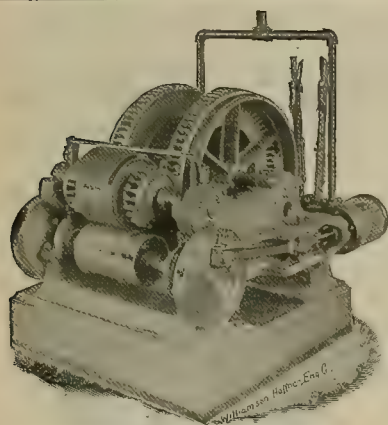
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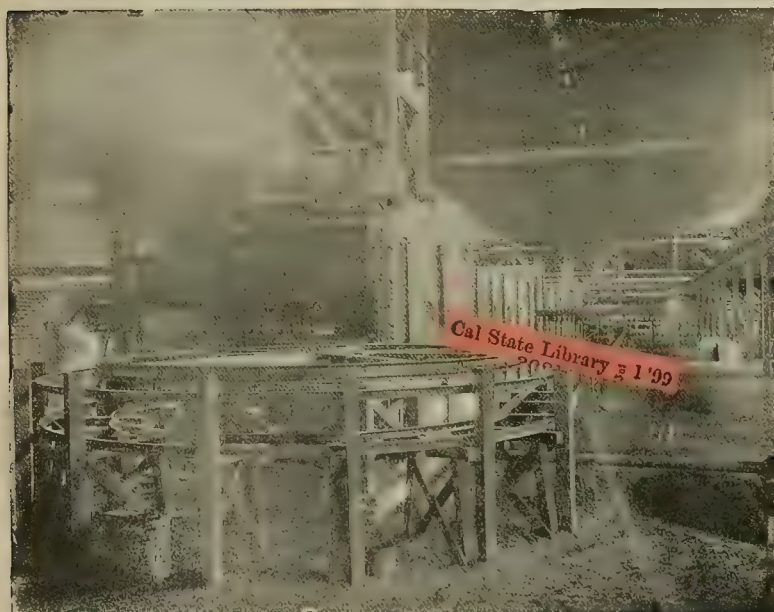
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January 2, 1897.
"The roasting is invariably good. We can do 80 tons per day to 0.13% sulphur, when everything runs smooth. Our month record which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.18%."

February 19, 1897.
"Our furnace is now running very nicely indeed, averaging 80 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it."
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For the convenience of our readers in the mining counties we print in legal size, 12x36 inches, the Mine Bell Signals and Rules provided for

in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness. 50 Cents a Copy.

MINING AND SCIENTIFIC PRESS, 330 Market St., San Francisco, Cal.

MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 2002.—VOLUME LXXVII.
Number 21.

SAN FRANCISCO, SATURDAY, NOVEMBER 19, 1898.

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Single Copies, Ten Cents.

California State Miners' Association.

The seventh annual convention of the California State Miners' Association will be held in Native Sons' Hall in San Francisco, beginning on the 21st inst. Herewith appear portraits of some of its most prominent officers. Hon. Jacob Hart Neff has been president of the Association since it was first organized. To him, as much as to any one man, the Association owes its existence and whatever success has been secured. Mr. T. J. Parsons, president of the Del Monte Milling Co., has ably filled the office of vice-president, and on several occasions, when financial aid was needed, has been of valuable assistance in securing it. The same meed of honorable recognition is due Julian Sonntag, president Manufacturers' and Producers' Association, who, for three years as treasurer and two years as secretary, has labored for the advancement of the Association's interests. Mr. Samuel J. Hendy, president of the Joshua Hendy Machine Works, the Association's genial treasurer, has husbanded the Association's funds, and at the last meeting of the Executive Committee reported sufficient money in the treasury to meet the expenses of next week's convention.

It is believed to be the general wish of the miners of California that President Neff continue to fill that chair. He has just been elected Lieut. Governor of the State of California, and pleads that his time and approaching official duties preclude the possibility of further service. The MINING AND SCIENTIFIC PRESS is frank to say that it believes the Association can

not release Lieut. Governor Neff. His personal probity, great influence and powerful aid were never more needed than at present, and this paper but voices the sentiment of everyone, everywhere throughout the commonwealth in saying that he should continue in the position that he has so long adorned, and in which he can be of such benefit to the State. The recent

tremendous vote he received, leading his ticket many thousands, shows the esteem and confidence of the people, regardless of party or section.

If, however, it shall appear that President Neff continues positive in his refusal to serve longer than seven years, the Association will have to cast around for a chief executive officer, and in such an event it is believed that Mr. Wm. C. Ralston would be available timber. He is young, strong, physically and mentally equipped, enthusiastic for the Association and the principles it represents, has always been prominent in the councils of the Association, was long its efficient secretary, is a practical miner, and stands high in the estimation of his fellow working miners throughout the State.

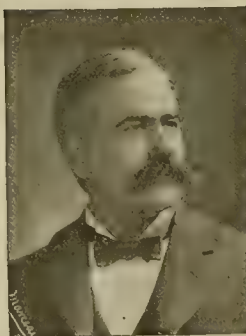
It is very seldom that this paper gives place to portraits of individuals or has anything to say about any one, but on the eve of the seventh annual convention of the Association that represents 14,000 working miners and their allied interests it is in

order to say a little, solely for "the good of the order."

This paper considers that the secretaryship can be made the most important office in the gift of the Association. Like all the other positions, it has been ably filled by men who were proud to give their services without salary or hope of



J. H. NEFF, President.



T. J. PARSONS, Vice-President.



S. J. HENDY, Treasurer.

OFFICERS CALIFORNIA STATE MINERS' ASSOCIATION.

gain, but it is manifest that no capable man can be expected to give valuable time taken from the daily demands of private business. This journal believes that the horizon broadens; that the possibilities of the future of the Association grow wider, and that the California organization should reach out, enlarge its scope, secure new membership, increase public interest, call out its own latent resources, have county miners' associations in every county in the State, make it plain to every man in and around a mine or connected in any way with mining that it is a good thing for him, individually, to be a member of the State Miners' Association. One of the best ways to do all this is to get a suitable man for secretary, pay him a good salary, enough to justify the demand that he spend his whole time in developing interest in the Association, in securing membership, in pushing the work. That is the business view of it. It wouldn't be business to have a

mine superintendent or millman to whom no salary was paid, who worked just for the love of it, or the pride he felt in the success of the concern, and expect him to neglect his means of livelihood and give his time and efforts gratis; and it is equally impossible to expect to continue so fortunate as the Association has been in the past and get first-class service for nothing. Hence it looks to this journal that this matter of secretaryship is of prime importance, and in homely and honest phrase its opinion is so set down. The life of the Association depends upon renewed interest and increased membership. There is throughout a general friendliness expressed and there need be no insuperable obstacles to making the Association of greater scope and usefulness if it be made the constant business of some one competent man who is paid enough to keep at it all the time. It might be well to have it so arranged by the next State Legislature that the secretary have an office in or with the State Mining Bureau. This can be done. In any event he should have suitable headquarters with facilities for visitors, and when traveling around the State in the interests of the Association have suitable representation in his absence. The active membership of the Association needs to be increased and can be so augmented if miners in general can be shown that membership tends to their individual benefit.

The California Miners' Association is a non-political, non-partisan organization, devoted solely to the general interests of mining, with no reference to strikes, or wages, or sale of mines, or "booming" of mining property, or exaltation of any individual or section, but desirous of remedying any existing evils and advancing the general welfare of the mining industry. It is primarily based on the realization that, single-handed, the miner is handicapped and has little influence; but organized, with clear aims as to what is justly needed, and should be justly secured, common cause can be successfully maintained, and much general good

be resultant. It began at Auburn, Placer Co., Nov. 18, 1891; its first convention was held Jan. 20, 1892. It has done a great deal; allayed resentment; made dignified statement of its rights; has secured their partial recognition; has noted and observed the rights of others, and in a manly straightforward way has won the respect and confidence of the commonwealth. Its strength lies in the continuance of such policy, in the continued organization and maintenance of county miners' organizations, in careful selection of officers, in completing what it set out to do before taking up more complex propositions, and in securing aid from every honorable source without compromising itself or being tied up with any other interests than the great basic industry it represents. Though much has been done more remains to be done, that all forms of mining may go on in a manner that will work no injury to any man nor any interest, and aid the general progress and development of the State.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....Publisher

San Francisco, November 19, 1898.

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THE London mining and financial journals are devoid of glittering prospectuses and advertisements of mining schemes. "The London & California Gold Mining & Milling Company," whatever that may be, has a prospectus setting forth the advantages of a mining property on "the Grizzly, Hog Eye and Alaska claims," near Pike City, Sierra Co., Cal. Shares in the scheme aggregate \$500,000, and the promoters want \$50,000 cash for working capital, which, under the special circumstances, seems reasonably dear.

A GOOD EXAMPLE of what development will do, and an object lesson in energetic working of promising mining property, whether gold or copper, is afforded in the case of the Calumet & Hecla, Mich., Copper Mining Co. In a brief note thereon, the Boston News Bureau of the 4th inst. says: "The present richness of the Calumet & Hecla mine was at one time entirely owned by President Mason of the Quincy Mining Co., and a large part of the richness of the Quincy was at one time in the control of the Franklin Mining Co. If either the St. Mary's Co. or its subsequent owner, Mr. Mason of the Quincy Mining Co., had kept the ground each at one time owned, the Calumet & Hecla mine would not to-day be in existence, and possibly the entire copper region of Michigan might be little more than a lumber camp. It is the wonderful manufacturing development made by the Calumet & Hecla Mining Co. with a dozen shafts and \$20,000,000 of machinery and plant that has given the impetus to Lake Superior copper mining."

Achievements in Telephoning.

Occurrences are now chronicled as ordinary, everyday matters that far exceed in wonder anything in the old legends of magic. This week a citizen of California talked from his residence at Santa Cruz to a friend at Boise City, Idaho—2100 miles. Between the two places stretches a copper wire, 436 lbs. to the mile, and over this are correctly carried all the tones of the human voice, inaudible twenty feet away from the transmitter. Elsewhere in this issue is noted the expectation this week in southern California of successfully transmitting electric energy eighty miles. And, probably, these things in the sunset years of the century are but foreshadowings of greater advances and achievements in the coming years.

Propheying the fruition of what is above chronicled as an accomplished fact, a telephone man recently wrote:

A little while hence, it will be possible for a man in Salt Lake, or Boise, or Helena, to talk with another man, as though face to face, in San Diego, Cal. The knowledge of that fact kindles a hope that by and by a line will cross that other Divide which lies in darkness under the shadow of the valley which we call Death, and that a "far-sound voice" will come to tell us of the beyond.

The suggestion opens up a new and interesting

field of scientific conjecture regarding a question of choice of future abode that has agitated the mind of man since the beginning, and is of overshadowing interest, even to those who have friends in both places.

Labor and Machinery.

An editorial paragraph in last week's issue made brief reference to the Government report of the Department of Labor, showing increased use of machinery and decreased cost of result. The paragraph is made the subject of comment in two of our contemporaries from what is believed to be a mistaken standpoint, and which is certainly a narrow one, the assumption being that the increased use of machinery "hurts labor." It does not. Nothing is more helpful to labor or more productive in affording increased employment than increased machine production at decreased cost; this, of course, not from purely a local standpoint, but in a broad, general way.

The usual argument in these cases is "by machinery one man does the work ten used to do; therefore, the other nine are thrown out of employment." "A new discovery of cheaper process destroys the vocation of a thousand willing workers, throwing them paupers on the community."

Some years ago when this paper, in an editorial article which led to the building of the road, pointed out the necessity and commercial profit of a narrow-gauge railroad to a point in Amador Co., Cal., a paper published therein inveighed bitterly against this paper and the proposition, asking, plaintively, what would become of the men who freighted in wagons, and the men who sold hay to the freighters, etc. So, generally, in the old countries, and in parts of this, where railroads were first introduced, coach makers, stage drivers, hostlers, blacksmiths, and many attendant workers, were thrown out of employment, horses were cheaper and horse feed slower of sale for a time. When a chemist found that a superior article of blueing could be made from coal tar, 100,000 Hindu workers in indigo plantations found their avocation gone. The use of the machine drill in our mines has caused many a man to lay his useless hammer by. The substitution of the linotype in many printing offices has given the faithful compositor an enforced rest. The use of electricity, gas and other modern forms of illumination has seriously interfered with the makers of candles. Columns could be filled with similar showing relative to the "displacement of labor by machinery" and by invention. But all this proves nothing. It only illustrates the spirit of progress.

The one undeniable fact, ignored by those who argue for stationary conditions, is that every new invention, or discovery, or use of machinery, leads to a new field for labor, a new demand for handwork, and calls into profitable employment a new lot of men. Our Amador Co., Cal., friend is now placated because of the increased prosperity of his town and county; more men are employed by the railroad than ever would be or could be by the "freighting industry." The Hindu indigo cultivators are inactive, but a million men are earning good wages in converting coal tar into aniline dyes; miners have in many cases ceased to pound the head of a drill, but they are getting better wages managing machine drills or opening up new mine values, while the manufacture of that class of machinery calls for skilled labor and makes possible a greater mineral development. And so it is in nearly every instance of the "displacement" of labor by machinery.

There is considerable foggy thought, or lack of thought, on this subject. The fact must be noted that where "by machinery one man does the work ten used to do," that ordinarily increases the product to a point where all the displaced workmen are needed to handle it, and that that particular industry soon needs more men than it ever did before. This is not theory; statistics, hard facts, cold figures prove it. It is also good to be remembered that labor-saving machinery increases the practical capacity of labor. If it does enable "one man to do the work of ten," then the labor of nine men had hitherto, in that case, been wasted, and they had to be supported without yielding adequate return, and their useless and unnecessary labor kept wages down. These nine men are now free to create new wealth or sell their labor or its product at increased figures in other departments of industry created and made possible by that

invention or discovery. Whenever one employment occupies the mind and muscle of two men, when one would suffice, one of these two is a drone and is being supported at the expense of that particular industry, and it is only when he is set free to earn a living that he begins to liquidate his account with the rest of his fellow-humans. In the long run, or the short run, no one need be idle unless he doesn't want to work.

Every advanced step in human progress creates a demand for labor; the vacancy is quickly filled; and in this way, labor-saving machinery is Labor's best friend. If any there be who read this and deny its truth, let them ask themselves this question: How does the life of the laborer to-day compare in comfort with the life of the laborer before labor-saving machinery came into general use?

Newspaper "Science."

The "scientific" articles that appear in sundry Sunday newspapers are of possible transient interest in whiling away hours of rest and relaxation on the part of their readers, but are not to be taken seriously. The articles and the illustrations indicate lively fancy and fertile imagination, but are not susceptible of confirmation or consummation. It is, of course, interesting to read that Sir Wm. Crookes has at last found how to talk to a friend in Melbourne, Australia, merely by thinking of him in London, England; that Thos. Edison is going to grind California gold ore and produce the metal 950 fine at a cost of 15 cents per ton; that Lord Kelvin has indorsed and advocated Prof. Emmens' plan for making gold out of silver; that Nikola Tesla has finally acquired complete control of the magnetic forces of the earth and can swing the planet into the sun or straight away from it as the notion takes him; that other men of equal note have discovered perpetual motion; the secret of human immortality; the way to produce "balls of electric light" anywhere, anytime by a wave of the hand; a mode of dispensing with water in all hitherto customary requirements of that useful fluid; the ability to go without eating, relying on absorption of tablets, and sundry other alleged discoveries. But all these imaginings while of pleasant interest are given publicity in the daily papers merely to sell. The paper is sold to the purchaser, and he in turn is "sold" if he believes the stuff. This is mainly in answer to sundry inquiries from Los Angeles, Cal., inquirers regarding some recent wonderful allegations as to ability to "see into the earth" by an ingeniously described "metallic indicator." The only trouble such silly statements can make is to cause those to go crazy who haven't far to go, and to cause credulous people to invest money in crazy schemes that can only result disastrously to all except those who sell stock or interest of any kind therein.

On page 506 appears, in the inventor's own language, the most astounding scientific claim of the year. Tesla has been so often "interviewed" that any of those wildly illustrated "scientific" articles in the Sunday papers alleged to be the result of an interview with him are usually productive of hilarity, but in this case the article on page 506 of this issue is the sober statement of Tesla regarding the patent issued to him last week. It is an interesting statement of an improbable possibility.

RAPID and profitable precipitation is claimed for a process in use by the cyanide manager of the Crown Deep mine, Johannesburg, S. A., a modification of the ordinary use of zinc shavings in securing precipitation of the gold from the cyanide solution used in testing slimes. The process specified occasions electrical action through galvanic couples primarily created by dipping the zinc shavings in acetate of lead. During the two months of experiment a percentage of extraction of 91.58 was secured, as compared with a previous percentage of 89.9. The total length of contact is but two and one-half hours, cyanide consumption .3 lb. per ton. Rand journals say that during the two months the profit from the slimes treatment by the new process at that mine was about \$17,000, more than twice the former profit from that source. If this be so, the system will of course be of universal adoption, not only in slime treatment but in sands solutions as well.

Concentrates.

CALIFORNIA miners are impatiently awaiting the fall rains. The Bodie, Cal., *Miner-Index* notes the success of leasers in that section.

COLORADO mining papers prophesy a '98 gold output in that State of \$25,000,000.

The Navajo hoisting works near Tuscarora, Nevada, were recently destroyed by fire.

MONTANA mining papers rightly think that that State should have a mining bureau.

In and around Fort Steele, B. C., the ruling rate of working miners' wages is \$3.50 per day.

MONTANA got the prize offered at the Omaha Exposition for the best State mineral exhibit.

CALIFORNIA's gold yield in '93 was \$12,422,811; in '94, \$13,923,281; '95, \$15,334,317; '96, \$17,181,562.

CINNABAR is reported to have been discovered in the Sevier M. Co.'s property at Gold Mountain, Utah.

An inventor who lays aside his discovery for years forfeits his right to a patent as against another who has obtained one.

No amount exceeding \$10 can be recovered from the U. S. Post Office Department for the loss of any registered package.

The deepest mine from the surface in Colorado is the California mine on Quartz Hill, near Central City, Gilpin Co.,—2200 feet.

SANDON, B. C., silver mines last week deported resident Chinese competitors. A few Chinese prospectors were allowed to remain.

The trustees of Nevada City, Cal., in response to a committee of citizens, donated \$75 to the Nevada County Miners' Association.

LEPIDOLITE was recently noted and described herein. There is a large deposit in San Diego Co., Cal. It is of little commercial value.

JOHANNESBURG, S. A., mill and cyanide men have organized a society, among other objects, to "stamp out and detect gold thieving."

SCIENTIFIC advertising is getting the largest circulation for the smallest amount of money among the class of people desired to be reached.

ANACONDA, Montana, miners offer a reward of \$10,000 for information that will lead to the conviction of the murderer of one of their number on the 8th inst.

An engine developing 100 H. P., with a mean effective pressure of 50 lbs. per sq. in., and a piston speed of 300 feet per minute, requires a cylinder with a diameter of 16.7 inches.

VISITORS to San Francisco from any part of the mining world are invited to consider the MINING AND SCIENTIFIC PRESS office headquarters, where the papers from their several localities may be seen, etc.

The Salt Lake City, Utah, ore sampling companies maintain that the output of the Utah mines will reach a large increase, some of them predicting that it will nearly double in '98 its previous figures.

The Marion Con. M. Co. at Leadville, Colo., owners of claims being worked through the 1400-foot R. A. M. shaft, have received in royalties from the Small Hopes M. Co. the past two years \$269,708.80.

A FUSIBLE PLUG is a threaded brass plug screwed into the shell of a boiler or into a flue, from the inside. It is filled with Banca tin, which melts at 420° F., or a composition metal melting at a still lower temperature.

The British Embassy has invited the U. S. Government to take part in the West Australian International Mining Exposition, which opens next March—a matter of interest to miners and mining machinery manufacturers.

The miner creates the greatest home market; he is no competitor, but a consumer at cash prices. Each underground quartz miner affords employment for ten men above ground. The mining industry patronizes all others and competes with none.

In Toronto, Canada, last week, was paid \$270,000 cash for 100,000 shares of War Eagle, B. C., mining stock. The purchase was not made for speculative purposes but as an investment. The property is paying dividends of 1½ cents a share per month.

A TRADING, mining, prospecting exploiting, land locating company for the Philippines, will shortly start from San Francisco. Several expeditions backed by Australian and English capital are also reported to be preparing exploiting expeditions.

A POWDER is "smokeless" which leaves no ash when burned, but is converted entirely into gases. A little more than 50% of the products of combustion of common black powder consists of solid matter or ash, and it is this solid matter which makes the smoke.

"The principal recent change in telegraphy" is the disuse of the voltaic battery and the substitution of a dynamo or dynamotor. The clippings sent regarding "transmission," "octoplex," etc., are from some imaginative mind, whose possessor could weigh the unexpressed thoughts of an infant.

In California a statute requires "a second mode of egress" by shaft or tunnel from a mine where there is a perpendicular shaft or incline 300 feet in depth from the surface, and where twelve men are daily employed. The tax on the issue of certificates of stock of stock corporations was repealed March 31st, '97.

At 425 California street, San Francisco, is a working model of the Evans hydraulic elevator, to be used by the Risdon Iron Works in unwatering the Comstock. The necessary apparatus is in process of construction and the work of unwatering the deep levels of the old bonanza lode is expected to begin the latter part of next month.

"A few days ago," writes an Eagleton, Oregon, correspondent, "as Major Frank McGee was climbing the side of a mountain near this place, he stumbled and fell. With the superstitious current among old prospectors, he began to dig, found rich float and a few hours later had uncovered, a short distance above, a 4-foot vein of quartz, liberally sprinkled with free gold."

In Colorado the gold ores of Gilpin county, the deeper ores of Leadville and all the mixed ores of the San Juan carry small percentages of copper. In some mines of the last region, notably the Gaston, the iron and copper pyrites alone carry the precious metals. Small as the copper contents are in such pyritiferous ores as the Gaston and some of the Leadville ores, it is sufficient to collect the precious metals in a matte. This

matte, low in copper and rich in iron, is, when roasted by some lead smelters, their most economical flux.

The next meeting of the California Debris Commission to consider applications to mine by the hydraulic process will be held at Room 59, Flood Bldg., San Francisco, on the 28th inst. To date the Board has received 399 applications, of which number 308 have been granted, 82 rejected and 9 remain to be acted upon. Of the entire number nearly all have been on the Sacramento river or its tributaries.

MANY tunnels, run as stock propositions, have been failures, but the economical features of the tunnel run by the practical miner to cut a known vein at greater depths than possible to reach by sinking without expensive machinery, makes it a favorite, popular and successful method of developing a claim, where the rugged features of a section give rapid depth by means accessible to every miner.

FOR 1898 the Director of the U. S. Mint calculates that the gold yield of South Africa will aggregate \$75,000,000; Australia, \$65,000,000; United States, \$60,000,000; Russia, \$30,000,000; other countries, \$45,000,000—a total of \$275,000,000 world's gold yield for the current year. He estimates the Klondike gold output for '98 at \$12,000,000. The world's '97 gold product was \$237,000,000. The Director figures the '99 output at \$300,000,000, a not unlikely event.

J. B. HASTINGS, manager War Eagle Co., Kossland, B. C., keeps an expense account of all workings on that property, figuring everything in detail. Regarding the relative cost of hand and machine drilling, Mgr. Hastings' figures on that subject in elaborate detail show that drifting by hand costs \$35 per foot; machine drilling under similar circumstances, \$17.50 per foot. Underhand stoping by machine works costs \$2.50 per ton; "the old way" \$7.50.

A GOLD PAINT or varnish may be made as follows: (1) Digest shellac, 16 parts, gum sandarac, mastic, of each 3 parts; gum gamboge, 2 parts, all bruised, with alcohol, 144 parts. (2) Pulverize 1 drachm of saffron and ½ drachm of dragon's blood, and put them into 1 pint of 90 per cent alcohol; add 2 ounces of gum shellac and 2 drachms of siccative aloes; dissolve the whole by gentle heat. Yellow painted work varnished with this mixture will appear almost equal to gold.

In this column last week was reported the statement of Supt. Harvey of the Republic mine, Republic, Wash., that in running a tunnel in October he averaged 13 feet per day, which "broke all mining records on the Pacific coast." N. A. Harris considers Mr. Harvey's record a good one, but cites the fact that while he was running the Big Bend tunnel in Butte Co., Cal. (which, by the way, was 12,012 feet in length), in one month—September, '85—he advanced the tunnel 405 feet, running twenty-nine days that month, nearly 14 feet per day. The tunnel was 8x16 feet, a phenomenal record.

At the Abbott Quicksilver mine, Sulphur Creek, Cal., globules of mercury are found in cinnabar rock with some interesting peculiarities. After exposure to the air for a certain time this cinnabar undergoes a transformation. Out of the rock seems to come a growth of silvery white hair, called epsomite. It is one form of crystallization. The hairy substance is 10 to 12 inches long, is very brittle and has a taste similar to epsom salts. It sometimes occurs that a drift through cinnabar rock, when not used for a time, becomes tasseled with this hairy substance and if undisturbed for years becomes almost choked up with it.

LAST WEEK a Salt Lake, Utah, man refused \$250,000 spot cash for a block of 10,000 shares mining stock. When he bought it, it cost him \$7.50 per share; it has since paid forty-seven consecutive monthly dividends of 25 cents each; at present he is receiving \$30,000 per annum on a \$75,000 investment, which is one of the reasons why, in these days of 3% per annum, that stock in a well-managed mine is a sought-for investment. This mine is now in receipt of twenty-five carloads, 500,000 lbs. machinery, over the carriage of which a contest between three railroads for shipment to Park City, Utah, resulted in the job being given the Rio Grande Western.

THERE is a large and steady export movement of tin scrap from the Atlantic coast to Europe. Some of the more extensive works in that line put out from 50 to 100 tons of scrap tin monthly, which, in most instances, is sold to exporters under a yearly contract. It is baled at the factory and shipped to Antwerp, from whence it is sent to a separating works in Holland, where, by a special process, the tin is recovered and made into pigs, while the steel scrap is sold for various purposes. The average value of the tinplate scrap, in bales, delivered at the dock in New York, is about \$5 a ton. Some of the smaller tinware factories, which have no facilities for baling their scrap, dispose of it loose to the manufacturers of sash-weights.

A GOOD FINE CLAY should contain about 45 per cent silica, about 40 per cent of alumina and 13 per cent of water. The best fire clays come from underlying measures of coal, and they owe their freedom from the alkaline constituents found in other clays to having sustained such a luxuriant growth of vegetation as to have had those alkaline constituents virtually sapped from them. Fire clay when first mined is found hard and stony. After exposure to the air it weathers. It is then ground fine, mixed with water and calcine, a previously burnt clay, and some plastic clay to serve as a bond. It is then moulded into fire brick and burned. "Refractory" brick contains 97 per cent of silica, the cement or bond holding this silica together being lime water. In treating a silicate of alumina the assayer has to use hydrofluoric acid or he fuses the material and proceeds with the ordinary analysis.

OSMI-IRIDIUM is a natural alloy of osmium and iridium, and is not infrequent in northern California and other regions. It is usually in small, ragged grains, flat and scaly, is of a bright metallic color, and in washing out gold concentrates with that metal. It is valuable and will find ready sale at the Selby Smelting & Lead Works, 416 Montgomery St., San Francisco. One of the latest uses for osmium, because of its great specific gravity, is as threads, which are to take the place of the platinum wire, and give an exceedingly bright light when the electric current passes through them. A patent thereon has been secured by Auer von Welsbach. The manufacture of these incandescent light tubes consists in covering a thin copper wire with osmium metal and annealing the wire at the highest temperatures. The copper evaporates, while the coating of osmium remains unchanged in the shape of a hollow thread.

LODES are of considerable variety. One may be no thicker than a knife blade, while another may be a hundred feet in thickness. A lode has been defined as a body of mineral or of mineral-bearing rock within defined boundaries in the mass

of rock, or as a continuous body of mineralized rock lying within boundaries clearly separating it from the neighboring rock. The term "apex" does not mean a point. It means the top of the ledge or lode, the point which comes nearest to the surface of the ground. The part from foot wall to the hanging wall at the top of the lode nearest the surface is the apex. As to the relation of the apex to side lines, it has been held that if one has parallel end lines for his claim his right to the lode extends an indefinite extent vertically downward from the end lines, no matter whether the vein crosses a side line or not; but if the apex of the vein crosses both a side line and an end line, the owner has the right to just as much of the lode as he had above.

In the Southern California Railway arrangement in using petroleum for fuel on some of its freight and passenger engines the oil tank holds five tons of oil and is inside the water tank—that is, the water surrounds the oil reservoir. There is 6 feet of water on the back end of the tank, 18 inches on the sides and front and 6 inches on top. It is provided with an oil-tight manhole and has a gas vent, so that any amount of shaking about or even upsetting will not cause the oil to escape. Provisions for safety from fire or explosions are further secured by two automatic safety valves, one on the top and the other on the bottom of the tank. In case of accident breaking loose the tank from the engine, a rope on the top valve and a chain on the bottom one shut the safety valves and cut off the flow of oil instantly, keeping it confined to the inside tank. Two burners are used with two steam jet atomizers, and the fireman controls the whole apparatus by handles within easy grasp.

A RECENT run of ore at the Sierra Nevada mine on the Comstock, Nev., lode deserves notice as compared with wasteful and destructive mill methods in that region heretofore. This crushing was 221 tons; battery assay, gold per ton \$24.00, \$5323.80; silver 10 ounces per ton, 2210 ounces, \$1326; total, \$6648.89. The returns of this ore were: battery cleanings to Selby 550 pounds, less for moisture 61½ pounds; total, 489½ pounds; gross returns, \$509.99; concentrates to Selby 24,720 pounds, less for moisture 2725 pounds, net weight 21,995 pounds; received: silver, 803 22-100 ounces at 60c, \$481.93; gold, 233 367-1000 ounces at \$19.50, \$4550.66; lead, 682 pounds at 3½c, \$23.55; total, \$5058.14. The amalgam from the pans was sent to the mint, from which the returns were: gold, \$395.03; silver, 491 2-1000 ounces at 59½c, \$294; total, \$689.03; chip, \$1.25; total, \$690.28; a total receipt from battery cleanup, \$509.99; from concentrators, \$5058.16; from pans, \$690.28; total, \$6258.43, over 94 per cent of \$6649.29, the battery assay of the 221 tons of ore crushed.

ABOUT the bottom fact now known about gold is that all original pyrites of small grain texture contain gold to a greater or less extent. Of course, this does not cover such secondary large crystal pyritous deposits derived from veins. It is not yet known whether the gold in this pyrites is in chemical combination with the sulphide of gold or whether each minute particle of gold is simply covered with a coating of sulphide of iron, or whether the particles of gold are in the metallic state but alloyed with silver or other metal which combines more readily with sulphur than the gold does, and consequently forms a coat of sulphide of silver over the gold. The particles of gold are so minute, and the combinations follow so rapidly during the splitting up of these pyrites, that the finest instruments and tests known to chemistry have as yet been unable to settle this part of the question to the satisfaction of all concerned, which goes to show how easy it is to put in a mill that will not save the values. If, however, proper caution be exercised, a plant can generally be secured that will give satisfaction without incurring useless expense and discouragement. Considerable money is often sunk in good mining machinery misplaced.

In boilers the proportionate strength of single and double-riveted seams is given by Fairbairn as about 56 to 70. As to why the longitudinal seams in a boiler are double-riveted, while the other seams are only single-riveted, the *Engineer* says this can be determined mathematically in the following manner: The shell of a ¼-inch iron boiler is 44 inches in diameter and the steam pressure is 80 pounds. To ascertain the strain to part the boiler, for 1 inch in length, the diameter should be multiplied by one and by the pressure per square inch—i. e., 80 × 1 × 44 = 3520 pounds. Since there is ¼ inch of metal on the other side, one-half a square inch of the boiler is subjected to a pressure or strain or 3520 pounds; or the total strain on the boiler acting in a longitudinal direction is 7040 pounds. To find the strain on the roundabout seams, the area of one of the heads is multiplied by the boiler pressure per square inch: 3.1416 × 44 = 138.2 inches, the circumference of one of the heads. The area is found to be 3.1416 × 22² = 1520.53 square inches, and multiplied by 80 = 121,642.4 pounds, the strain to part the boiler. To resist this strain there is 138.2 × ¼ = 34.5 inches of metal. This is subjected to a strain of 121,642.4 ÷ 34.5 = 3525 pounds per square inch. This is approximately half the strain to which the boiler is exposed in the direction of the longitudinal seam. It is for this reason that longitudinal seams are generally double and sometimes triple-riveted.

THE marvelous sensitiveness of the telephone, exceeded only by that of the galvanometer, has made it unusually subject to disturbing influences. Coming into public use at about the same time as the electric light, its lines were extended more rapidly at first and many towns had telephone exchanges before electric lighting plants. When the latter were put into operation, the telephone lines theretofore operating in blissful peace and quiet were seriously menaced, as one of their engineers aptly quoted, by a "pestilence that walketh in darkness" and by "destruction that wasteth at noonday." Hardly had the lines been freed from the disturbing influence of the direct current incandescent and the more troublesome arc circuits, when the alternating current system took the field with its widely scattered lines and its wider range of induction, and the way of the telephone manager was thereafter indeed hard. Hardly had the telephone adjusted itself to the new source of disturbance when still another enemy arose in the shape of the electric railway, which, metaphorically speaking, demanded that the telephone should "get off the earth." Many legal battles have been fought with varying success, but the general conclusion seems to be that no one interest owns the whole earth, and that in case of interference the weaker must look out for its own protection. The remedies proposed for obviating and neutralizing telephonic disturbances are many. As early as 1883 there were 200 patents for preventing induction, and the last fifteen years have been even more prolific.

The Refining of Base Lead Bullion Containing Silver, and High in Gold.*

NUMBER III.

By G. H. BLAKEMORE.

The following assays of the crust after it has undergone the liquation process, and assays of bullion made in the retorts from the dry liquated residue will demonstrate this very plainly.

| Liquated Residue First Silver Crust. | | Retort Bullion from Same. | | Retort Dross off Bullion. | |
|--------------------------------------|----------|---------------------------|----------|---------------------------|----------|
| Ag. Ozs. | Au. Ozs. | Ag. Ozs. | Au. Ozs. | Ag. Ozs. | Au. Ozs. |
| 1342.56 | 0.11 | 2187.1 | 0.1 | 1583.55 | 0.45 |
| 2133.02 | 3.63 | 3059.4 | 15.2 | 1663.50 | 8.60 |
| 2049.35 | 0.71 | 2417.0 | 2.0 | 1708.4 | 24.60 |
| 2191.41 | 0.35 | 2877.5 | 1.5 | 1786.5 | 1.0 |
| 1097.84 | 1.30 | 2567.1 | 4.8 | 1311.60 | 2.90 |
| 1727.34 | 0.48 | 2498.5 | 1.1 | 2098.45 | 0.45 |
| 1912.04 | 0.62 | 2570.1 | 2.1 | 2552.95 | 1.65 |
| 2219.16 | 0.84 | 2619.2 | 4.8 | 1457.20 | 1.55 |
| 2174.27 | 0.84 | 2540.3 | 5.1 | 2189.05 | 0.30 |
| 2352.12 | 0.76 | 2949.6 | 3.6 | 1363.60 | 1.30 |
| 1868.61 | 0.39 | 2136.8 | 0.6 | 1753.27 | 1.28 |

In comparing the above table, it must be understood that the liquated residues assays represent three-ton samples, the retort bullion assays are made on about 450 lbs., and the retort dross is that actually produced from the bullion shown on the same line, the average quantity produced being about 30 lbs. weight per retort charge.

A careful study of the figures will show the uselessness of attempting to make a silver crust that will be free from gold; therefore, the shortest way out of the difficulty is to simply extract all the silver and gold together, run it up to dore bullion, and part it. Time and money are saved by doing thus, for I have proved to my entire satisfaction that the zinc will not take out the last traces of gold unless the whole of the silver is extracted with it as well.

After the silver and gold is all extracted from the kettle, the desilverized lead is syphoned off into the refining kettle with a 1½-inch diameter iron pipe, with a cast iron plug cock on each end. The syphon is made to fit inside the circumference of the kettle, so that ten minutes or so before it is wanted it is heated by placing it on the molten lead. When everything is ready, the syphon is turned up and filled with lead; both plugs are then closed, and one end of the syphon is passed over the side of the kettle into the launder which is to carry away the desilverized lead into the refining or steaming kettle: the plug on the other end, which is beneath the lead, is opened; then the one outside the kettle. The flow commences at once, and, if not let run too fast, the lead column in the syphon will not break, and in twenty minutes or so the desilverizing kettle will be emptied and ready for a new charge. It is first white-washed, this being done to prevent the zinc alloy from sticking to the side of the kettle.

The gold-silver crust obtained in the desilverizing process is then sent to the liquation furnace for further treatment.

Refining the Desilverized Lead.—As soon as the refining kettle has received all of the lead out of the desilverizing kettle, a movable iron hood is pulled down over it and the fire under it is urged a little. In about four hours the lead is all red hot. It is not advisable to heat the kettle to redness in a shorter time, because the kettles last longer if this heating up is done slowly. As soon as the temperature of the lead in the kettle is high enough to burn zinc, steam, delivered by a ¾-inch pipe, or larger if desired, is then turned on. Care must be taken with this part of the operation, or else some one will get hurt. The steam must be dry and the delivery pipe well warmed up by blowing steam through it. Also, it is advisable to have a drain cock as close to the kettle as it can be put, and this cock is left partly open during the whole of the steaming operation. With these precautions, no water can get into the red-hot lead and dangerous explosions in the kettle, resulting from water suddenly entering the lead, are avoided. It takes the least bit of steam to boil up the lead in the kettle, and care must therefore be taken in turning steam on, or else half the lead in the kettle may be blown out of it. The hood of the kettle has two doors in it, on opposite sides. By means of these doors the lead is stirred from time to time. Pieces of wood are also thrown on the lead to assist in the dezincing process and to keep down the quantity of litharge. In three and a half to four hours the lead will be quite soft and practically free from zinc, if proper care has been taken to keep the temperature to the point at which zinc burns. At this temperature, a cherry-red heat, the zinc in the lead has the power of decomposing the steam, forming zinc oxide, and this, together with lead oxide, which also forms, rises and floats on the top of the lead.

When the test strip of the lead shows that the lead is quite soft and clean, the steam is turned off, the movable hood removed, and the kettle allowed to cool somewhat before the scum of lead and zinc oxides is taken off. A scraper is passed down the side of the kettle to remove any clinging dross. The whole of this skimming is returned to the blast furnaces. After standing an hour or so, the lead has cooled down sufficiently to mold into bars. The tem-

perature should be such that the bar has a nice yellow luster on the face when set. If too cool, the face is white; if too hot, it is a deep blue. It is better to mold the lead too cold than too hot, because at the lower temperature it is more likely to be free from the last traces of copper.

The molding is done with a syphon, as before, the stream of lead delivering into a swinging pipe that lifts up or sideways, as desired. The molds are on wheels and are arranged in a semi-circle at the right distance away to suit the sweep of the swinging pipe. The operation of molding the lead is one that the workman needs a little practice at, to prevent delays through chilling of lead in the delivery pipe. The stream of lead should be kept constantly delivering from the syphon into a cup-shaped receiver on the swinging pipe, the size of the stream is regulated, of course, by a cast iron plug cock. The workman starts by filling a mold from the swinging pipe and then moves the pipe over the next mold. While the second mold is filling, he has a scraper in his left hand (if he is working from left to right, in his right hand if filling the opposite way), with which he gathers all the floating dross off the face of the bar in the first mold while the lead is still liquid. The dross is principally metallic lead formed into bubbles in the passage down the syphon and along the swinging pipe. It does no harm to the lead bar in reality, but spoils its appearance. If the delivery end of the syphon is kept below the level of the lead in the cup end of the swinging pipe, the production of dross is very much decreased. Another man comes after the molder, and, with a chisel-pointed bar, cuts off any pieces of lead which may have splashed over out of the mold. A third man wheels away the mold with the solidified bar in it, and, on tipping it up against the wall, the bar of lead comes out easily and stands on its end. With a swinging pipe 8 feet long about twenty molds will be required on the semicircle. As each mold is emptied, it is run back to its place ready for the next round. Usually the men take turn and turn about at the molding, as soon as a man fills one round he is replaced by another. All scrap lead and skimmings are thrown back into the kettle at the end of each round. Each mold holds about 80 lbs. of lead. The molded lead is now ready for the market.

Coal Used.—For the softening process the quantity of coal necessary depends entirely on the kind of bullion to be purified. An ordinary hard bullion produced from lead ores does not require very much coal, because this class of bullion takes very little time to soften. Hofman speaks of softening fifty tons of such bullion in six hours. I have had a 15-ton charge forty-seven hours in the furnace before it was softened. It is, therefore, difficult to give any set weight of coal as being the right amount to reckon on. The consumption depends on two things: the impurities in the bullion and the size of the plant. Working on very dirty bullion in a plant with 15-ton softening furnaces, the coal consumption in pounds per ton of unsoftened bullion may be taken as follows:

| | Pounds. |
|--------------------|---------|
| Softening..... | 180 |
| Desilverizing..... | 60 |
| Steaming..... | 40 |

The bullion that consumed this amount of coal produced 304 lbs. of softening skimmings from every ton of the unsoftened bullion, which will probably give an idea of its impurity. I have treated bullion producing 600 lbs. of skimmings per ton of unsoftened lead, but this bullion was exceptionally dirty.

The same dirty bullion worked in 50-ton furnaces and desilverized in 30-ton kettles would, of course, require considerably less coal to get the same work done, so it is plain that no set figures can be given to suit all the conditions met with in different works.

Life of Kettles.—This is also very uncertain. Those used in the desilverizing work last considerably longer than those used in the steam refining work. But in either case it is possible for a kettle to break during the first charge, or it may last for 10 charges. Good steel kettles are superior to cast iron, if they can be obtained, but it is a very difficult matter to make a good sound steel casting of the size of a lead kettle. The kettles I have used have been of steel of fourteen tons capacity, and they have stood over sixty charges each, both at desilverizing work and refining work, and, with the exception of pinholes that have appeared in the steaming kettles, the kettles are apparently as sound as ever. The pinholes were bored out, tapped and plugged, making a good, sound job. Naturally, the steaming kettles go first, because of the much greater wear and tear on them with the constant agitation of the lead and the temperature the lead is raised to in them. The best method to insure good kettles is to buy them on a contract, and agree to pay the iron founder so much a charge. If they break at the first charge the kettle costs you nothing, and if they last you 100 charges the kettles may cost you £50—but they have been worth it. It is really the only way to make sure of the best metal being put into the kettles, and even if the kettles in the long run cost a little more, still money is saved in the avoidance of the delay occasioned every time a broken kettle has to be lifted out and another put in place.

Zinc Used in Desilverization.—For 1775 tons of un-

softened bullion, 20.05 tons of virgin zinc and 8.09 tons of zinc recovered from the retorts were used, a total of 28.14 tons. This is equal to a consumption of virgin zinc of 1.13%, or, counting in all the zinc used, 1.59%. The average assay of the bullion was 14 ozs. gold, 131 ozs. silver per ton.

If an attempt is being made to extract the gold with as little silver as possible, the following general table will give the result of my experience in zinc consumption:

| Tons Lead in Kettle. | Total Gold in Kettle. | 1 Lb. Zinc Will Take Out. | |
|----------------------|-----------------------|---------------------------|---------------------|
| | | Au. Ozs. | Ag. Ozs. |
| 11 tons. | 300 ozs. | 1.30 | and 1 to 3 with it. |
| 11 " | 250 " | 1.00 | " 1 to 3 " |
| 11 " | 150 " | 0.75 | " 1 to 3 " |
| 11 " | 100 " | 0.50 | " 1 to 3 " |
| 11 " | 60 " | 0.45 | " 1 to 3 " |

Silver zincing gives the following general results:

| Tons in Kettle. | Total Silver in Kettle. | 1 Lb. Zinc Will Remove. Ag. Ozs. | Assay Per Ton of Lead After Zincing. |
|-----------------|-------------------------|----------------------------------|--------------------------------------|
| 11 | 1380 | 5.3 | 2.08 |
| 11 | 1450 | 5.6 | 3.44 |
| 11 | 1200 | 4.1 | 4.78 |
| 11 | 1110 | 3.9 | 0.70 |
| 11 | 775 | 3.5 | 0.69 |
| 11 | 930 | 3.8 | 1.59 |
| 11 | 616 | 3.4 | 0.54 |
| 11 | 560 | 3.2 | 1.70 |
| 11 | 1850 | 2.6 | 0.54 |
| 11 | 132 | 1.1 | 0.40 |
| 11 | 55 | .55 | nil. |

Results obtained when taking out all the gold and as much silver as possible in the first zinc:

| Tons in Kettle. | Total Contents in Kettle. | | 1 Lb. Zinc Takes Out. | | Assay Per Ton of Kettle After First Zinc. | |
|-----------------|---------------------------|------|-----------------------|------|---|-------|
| | Au. | Ag. | Au. | Ag. | Au. | Ag. |
| 11 | 494 | 3110 | 0.59 | 3.60 | nil. | 10.04 |
| 11 | 194 | 1663 | 0.34 | 2.83 | nil. | 3.88 |
| 11 | 296 | 1934 | 0.45 | 2.95 | tr. | 17.46 |
| 11 | 443 | 1833 | 0.64 | 2.30 | tr. | 4.10 |
| 11 | 330 | 2417 | 0.45 | 3.34 | nil. | 8.21 |
| 11 | 204 | 1638 | 0.38 | 2.86 | tr. | 5.22 |
| 11 | 143 | 1330 | 0.28 | 2.65 | tr. | 4.04 |
| 11 | 123 | 1320 | 0.23 | 2.54 | tr. | 20.14 |

(To be Continued.)

The Present Conditions of Gold Mining in the Kochkara Region in the Oural.

NUMBER III.—CONCLUDED.

Written for the MINING AND SCIENTIFIC PRESS by R. HELMHACKER, Prague, Bohemia.

The first reduction of the ores is done with a plant of jaw-crushers and afterward with crushing rolls. The vein stone, reduced to nut size, is conveyed on an endless belt with baskets to the third story, where it is thrown, passing meanwhile an inclined screen to another crusher, where it is granulated to the size of barley. These finer granulated savings, to which are added those which passed the screen, are crushed in chilled cast iron rolls to sand-like size. All these apparatus are connected with a succession of intermediary rotating drum sieves, by which the coarser sized particles are returned to the crushing rolls, while the fine grindings are fanned through tubes by means of a ventilator in a dust or grinding room, all these being conditions promoting uniformity of pulverization. The sizing drums alluded to are lined with copper screens with meshes, and then with punched or perforated sheet iron, exhibiting twelve meshes in the length of 1 centimeter. Thus the size of the grindings is ½ mm. The powdered stuff is then fed into a narrow trough with an Archimedian screw, which, when turned in one direction, conveys the stuff into a funnel and onto a small car on a rail track connected with the reverberatory roasting furnace. This is the case if the ore is high-grade in sulphurets, to be treated in the extracting plant without any further concentration. If the powdered vein stuff is of low grade in its content of auriferous sulphurets, it is conveyed, by setting the screw in opposite motion, into a deep mixing trough, where it is mixed with water. The powdered stuff with water flows as a turbid current through contrivances to intercept the free precious metal, and over gently sloping sluices covered with copper amalgamating sheets; and from them the disengaged suspended sediments in the water current are conducted on the rubber belt of vanners, where the tailings are concentrated to sulphurets and to waste. The copper amalgamating plates which caught the free milling gold are scraped of the accumulated gold amalgam and the sulphuret concentrates, which are to be treated chemically, are put with the roasting stuff.

All the plant, such as crusher and the succession of concentrating contrivances, with a daily treating capacity of fifty tons of vein stuff, was made in Eng-

land and is run by a 50 H. P. compound steam engine.

Other mills treat the friable vein stuff more simply. The vein stuff to be treated is put directly into the Chilean arrastras, in which is added some mercury, where it is crushed by the mullers to sand or to slime. The turbid current is then lead over the copper amalgamating plates to catch the free gold, and is then concentrated to sulphurets.

As already alluded to, the mill tailings from which the gold has been caught by dressing and amalgamation were heaped on tailing dumps as waste; but since the year 1886 they have been treated chemically. Now the old (not concentrated) tailings, regarded as waste, as well as the high-grade sulphuretted ores in pulverized form and the concentrates, are lixiviated; but first they are roasted to drive off the sulphur and arsenic—if not entirely so, to the greatest possible extent—and to oxidize the metallic bases, so as to obtain a product containing particles of free Au in the highest possible division. The first roasting furnace to treat the tailings had no flue-dust chambers, and had only a capacity to treat six tons of ore in twelve hours.

The present reverberatory roasting furnaces are two-staged, 15 m. long, 4 m. broad, with nine working holes on either sides. The bottom of the roasting furnace is made of talcstone. The ore is filled in at the furnace end on the opposite side of the fire room, through a funnel, to which the charges are brought in a car by a lift. In twenty-four hours 67 to 99 tons of tailings or concentrates can be roasted. Before the gases and fumes of As_2O_3 reach the chimney they pass through flue-dust channels 118 m. in length, where the dust and the As_2O_3 are condensed. The roasted mass is spread on the paved cooling mill floor and then sent to an elevator, which discharges it into the third or lixiviating story.

As one began to treat the roasted ores by lixiviation all methods proved unsatisfactory except the Plattner one of chlorination, which was still modified. The cooled roasted ore was run through funnels into boiler plate cylinders, coated inside with sheet lead, in charges of 16½ tons, from which daily (in twenty-four hours) 4 or 5 tons can be chlorinated. These rotating cylinders have a gas-tight, screwed lid. The ore within the cylinder is mixed with hypochlorite of lime and sulphuric acid, by which the disengaged chlorine gas unites with the Au to form soluble Au_2Cl_3 . The chlorinated content of the rotating cylinder is let out into a tank, then rinsed with water. The liquor in the settling tank is allowed to settle for four hours, and, when cleared enough, elevated through a lead pipe into other precipitating vessels or basins, either of wood or glass, to precipitate the Au from the gold-chloride solution. It is alleged that the precipitation of the gold with charcoal was not satisfactory, while the precipitation of gold metal with iron sulphate in wooden tanks, or of gold sulphite with sodium sulphite into glass balloons, gave good results.

But, besides this method, other modifications of it were tried, thus: to roast the ore in chlorinating manner with some salt, or to introduce the chlorine gas formed in an extra apparatus through lead pipes directly into a tank with the suspended roasted ore, or through a false bottom, and other treatments with other agencies, some of which are too slow or uncertain in their operation and others altogether conjectural.

In the roasting mill is a melting furnace to fuse the gold bullion and a muffle furnace for tests, in which 100 kg. stuff can be treated.

Some of these new methods, though they are theoretically well founded, gave no good results, as there were no trained engineers to handle these processes. From 1886 to 1895 were extracted, mostly from the dumped tailings, 497.2 kg. gold, in the extraction mill of the Russian mining engineer, Zelenkov, who first introduced this lixiviating process into Russia.

It would be of great interest to know exactly how much of the chemically bound gold contained in the tailings can be lixiviated by the chlorination method, and how much, on an average, rests in the water unextracted.

To lixiviate the tailings of other mining properties the first promoter of this chlorination method formed a company under the title, "The Russian Works for Chemical Extraction of Gold;" but as the new works were ready to operate the Government made trouble for them, as the Russian gold mining regulations prohibit one gold miner from selling his product to another gold miner. Therefore the company, to escape this point, was obliged to lease the mines, with their tailing dumps, and expressed a desire to have the tailings lixiviated. Thus the same thing, in spite of the mining regulations, was permitted.

In the meantime the cyanide process was introduced to recover the gold from tailings. The gold in the solution is precipitated with zinc shavings. In 1897 one of the largest producing mines was bought by a French-Belgian society for the somewhat high price of 3,000,000 francs, and this stock company is now erecting a great cyanide-lixiviation plant for treating the tailing dumps, with electrical precipitation of the gold in solution. It is expected to have the plant in operation the present year.

Temperature of Battery Water.

Written for the MINING AND SCIENTIFIC PRESS.

Some millmen claim the battery water in stamp mills may be ice cold without detriment to amalgamation. The greater number, however, seem willing to admit that a temperature of between 60° and 70° F. is best for amalgamation, but will deny that warmer than this is desirable. During the past two years the writer has had opportunities of noting some of the results of using warmer water, and submits a few of his observations, hoping some of them may find time and opportunity for making a thorough investigation of the subject by careful and conclusive experiment.

In one mill, of which we know, where the temperature could be readily changed from ice cold to hot, a saving of 90 per cent was effected with water of about 80°, as against a saving of 80 per cent with the water at about 60° under otherwise similar conditions. The use of water warmer than this was not attempted. The ore carried iron pyrites and some galena, which was concentrated on Frue vanners. For some reason unknown to the writer, the concentration seemed to be improved by using the warmer water. Battery amalgamation was practiced, the chuck blocks as well as the apron plates being cleaned up each twenty-four hours.

I noticed the warmer water seemed to increase the greenish film of oxide of copper on such portions of the plates as it appeared. At the same time the percentage saved in the battery was increased, which would partly account for it, less gold coming out on the plates to help it down; still this oxidization was probably increased somewhat by the warmth of the water. The mercury squeezed from amalgam carried more gold in solution than usual. After being cleaned with dilute nitric acid and cyanide of potassium, this mercury was used in the batteries and on the plates on account of it not draining off the plates as readily as that retorted. In dressing the plates the amalgam was left as stiff as it could be well worked with the broom, in order to overcome this difficulty. During cold weather a dribble of the warm water was allowed to pass over the plates while dressing them to keep it soft. The most striking instance, however, of the use of warm battery water was found at the mill of the Virtue mine, near Baker City, Oregon. The water left the lower levels of the mine at a temperature of 120°, and by the time it reached the batteries it was not less than 90°.

This was somewhat of a compulsory test of warm water, as there was none cooler available, and comparative results were not to be had. The following facts, however, of which we are credibly informed, make a very satisfactory showing: The ore milled from \$10 to \$25 per ton, the average for the year being about \$12. The tailings assayed from 40 cents to \$1 per ton, very seldom exceeding the latter figure, and only when milling unusually rich ore. The average assay of the tailings did not exceed 60 cents, showing a saving of 95 per cent, which was very good, especially as the ore, though considered free, carried a fair percentage of iron pyrites.

These were concentrated on vanners, much overloaded the greater part of the time. The twenty stamps, of 850 pounds each, crushed about sixty tons per twenty-four hours. As high as 90 per cent of the gold saved was found in the batteries—an unusually high percentage. There was much less mercury fed per ounce of gold than would have been required with colder water. The amalgam in the battery and on apron plates was kept quite hard, having a frosty appearance similar to that on the back of a mirror. To one accustomed to the usual appearance of amalgam on plates it seemed much too hard, but we were assured the best results were thus obtained, the mercury draining off the plates when it was softer. In his work on stamp milling of gold ores, T. A. Rickard mentions a mill in Australia in which warm battery water was used, accompanied by a less loss of mercury than in a neighboring mill using water at ordinary temperature, which would not be cold in that country. He attributes the difference to the lime used to take up the grease in the water condensed from the exhaust steam of the engine, which was allowed to mingle with the battery water. (We quote from memory.) While he is a close observer and usually draws correct conclusions, we are inclined to believe that at least a part of the difference was due to the temperature of the water. He also mentions placer miners in the mountains of New Zealand who claim their gold will not readily amalgamate in cold weather. This seems also to be the almost universal opinion of Snake river placer miners, some using burlaps in winter and amalgamated plates in summer for this reason.

In view of these facts, we may perhaps be permitted to briefly theorize upon the subject. Most chemical combinations are assisted by heat. We note the cyanide men are giving more attention to this fact. It may be objected that amalgamation is more in the nature of an alloy. Admitting this, gold being readily dissolved in molten lead would seem to favor the use of warmer mercury amalgamation. In making sodium amalgam it is necessary to heat the

mercury to assist the amalgamation or alloy of the two metals.

The amalgamation of gold is analogous to these processes. The surface of the gold being slightly dissolved by the mercury at ordinary temperatures, the process would naturally be assisted by heat. The greatest objection to its use seems to be the tendency of the mercury to drain off the plates on account of being thinner. This may be met, as at the Virtue, by keeping the amalgam harder. Mercury squeezed from the amalgam may also be used with advantage, provided it is not sickened by base metals or sulphur in the ore. In any case it would probably be better to clean it with acids at least before using. It is possible that ores carrying a higher percentage of sulphurets than in the above-cited instance (which was about 1 per cent) might sicken the mercury and cause loss in that way, but we have observed nothing which would support such a natural conclusion. Probably this difficulty would not appear save where an excess of mercury was present. We venture to conclude, however, that the use of battery water of a temperature of not less than 80° F. is helpful to amalgamation on free gold ores or those carrying sulphurets up to say 1 per cent. Further than this we leave to be determined by future experiment.

MINE SUPERINTENDENT.

Baker City, Or., Nov. 6th, '98.

English and American Methods.

There is material difference between American and English methods in furnishing account sales in copper purchases. Following are copies of two actual transactions; the first is from England:

| ACCOUNT SALES OF 2077 BAGS COPPER MATTE. | | | | | | | | | |
|--|--|--|--|--|---|--|--|--|--|
| Ex. "Baltic," @ New York. | | | | | Sold on account of | | | | |
| April 27, Produce, 66½ p.c. Cu. @ 8s. 6d. pr. Unit. | | | | | Payt.—2 Mos. | | | | |
| Contract. Weighting..... | | | | | T. cwt. qrs. lbs. | | | | |
| | | | | | 31 0 0 0 N. | | | | |
| Mar. 22, Mois., 30 Gns. 2 | | | | | cwt. qrs. lbs. | | | | |
| Draft, ¾ lbs. | | | | | 2 18 | | | | |
| pr. 3 cwt..... | | | | | 6 1 23 9 0 13 | | | | |
| 2240 lbs.—20 cwt..... | | | | | 30 10 3 15 | | | | |
| 2352 "—21 " | | | | | 29 1 3 @ £28 3 1¼ 818 17 7 | | | | |
| Weighting | | | | | 19 6 2 0 N. | | | | |
| Moisture, 36 Gns. 1 | | | | | cwt. qrs. lbs. | | | | |
| Draft..... | | | | | 3 26 | | | | |
| | | | | | 4 0 2 6 0 0 | | | | |
| | | | | | 19 0 2 0 | | | | |
| | | | | | 18 2 2 . @ 28 3 1¼ 510 3 3 | | | | |
| Weighting..... | | | | | 25 5 0 0 N. | | | | |
| Moisture, 35 Gns. 2 | | | | | cwt. qrs. lbs. | | | | |
| Draft..... | | | | | 3 3 | | | | |
| | | | | | 5 1 1 7 3 4 | | | | |
| | | | | | 24 10 0 24 | | | | |
| | | | | | 23 14 . . @ 28 3 1¼ 666 7 4 | | | | |
| Weighting..... | | | | | 21 10 0 0 N. | | | | |
| Moisture, 31 Gns. 1 | | | | | cwt. qrs. lbs. | | | | |
| Draft..... | | | | | 3 17 | | | | |
| | | | | | 4 1 26 6 1 15 | | | | |
| | | | | | 21 3 2 13 | | | | |
| | | | | | 20 3 2 . @ 28 3 1¼ 567 16 4 | | | | |
| Empty Bgs. Good 240 wg. 1 | | | | | cwt. qrs. lbs. | | | | |
| " Bad 1837 " | | | | | lbs. | | | | |
| | | | | | 3 25 @ 5s. pr. 120 . . 9 2 | | | | |
| | | | | | 14 3 20 @ 2s. 6d. " 1 14 10 2 4 . | | | | |
| | | | | | 2565 8 6 | | | | |
| Charges. | | | | | | | | | |
| Insurance on £2800 @ 5s. p.c..... | | | | | £8 10 | | | | |
| Less Discount @ 10 p.c..... | | | | | 12 5 17 . | | | | |
| Plus Stamps..... | | | | | 6 6 8 3 6 | | | | |
| April 19— T. cwt. qrs. lbs. | | | | | | | | | |
| Freight on 97 12 3 | | | | | 17 G. @ 5s. p. ton. 24 8 3 | | | | |
| Primeage @ 5 per cent..... | | | | | 1 4 5 25 12 8 | | | | |
| Pd.—Master portage on 97 12 3 | | | | | | | | | |
| 1s. per ton, 70 per cent..... | | | | | T. cwt. qrs. lbs. | | | | |
| Less 15 per cent for not weighing..... | | | | | 17 G. @ | | | | |
| | | | | | 25 7 5 | | | | |
| | | | | | 16 2 | | | | |
| | | | | | 4 11 3 | | | | |
| Plus 2¼d. per ton for putting into flats..... | | | | | 18 4 5 9 7 | | | | |
| Dock and town dues on 96¼ tons @ 1s. 4d. per ton. | | | | | 6 8 11 | | | | |
| Lighterage from steamer to ore wharf..... | | | | | 5 .. | | | | |
| Assaying each lot for copper..... | | | | | 1 10 .. | | | | |
| Interest on frt. charges from April 19 to June 30, 72 days..... | | | | | 8 8 | | | | |
| Liverpool ore wharf charges for: Receiving, weighing, warehousing, stowing in shed, crushing, sieving, mixing, sampling, reweighing, delivering, rent, etc.; 97¼ tons @ 6s. per ton..... | | | | | 29 6 6 | | | | |
| Commission on £2565 8 6 @ 1 per cent..... | | | | | 25 13 .. 105 12 10 | | | | |
| Net proceeds due in cash, June 30..... | | | | | £2459 15 | | | | |
| E. & O. E., Liverpool, May 29. | | | | | | | | | |
| AMERICAN SYSTEM. | | | | | | | | | |
| Messrs..... | | | | | | | | | |
| Sold for account of | | | | | | | | | |
| Messrs..... | | | | | | | | | |
| 93 Bbls. Copper Matte, assaying..... | | | | | | | | | |
| Silver, per ton of 2000 lbs..... | | | | | 47.55 per cent copper. | | | | |
| Gold, " "..... | | | | | 117.50 ounces. | | | | |
| Moisture..... | | | | | 0.12 " | | | | |
| Weight..... | | | | | 0.01 per cent. | | | | |
| Less moisture..... | | | | | 116,853 pounds. | | | | |
| | | | | | 12 " | | | | |
| Net weight..... | | | | | 116,841 " | | | | |
| Copper assay, less 1.3 units..... | | | | | 46.25 per cent. | | | | |
| Copper paid for, 46.25 per cent of 116,841 pounds..... | | | | | 54,039 pounds. | | | | |
| Silver paid for, being 85 per cent of all present..... | | | | | 6,864.41 ounces. | | | | |
| Gold paid for..... | | | | | 7.01 " | | | | |
| 54,039 pounds copper at 7¼ cents..... | | | | | \$4,188.02 | | | | |
| 6,821.19 ounces silver at 67¼ "..... | | | | | 4,385.50 | | | | |
| 7.01 " gold, paid for at \$20..... | | | | | 140.20 | | | | |
| | | | | | \$8,713.72 | | | | |

The multiplied and complicated charges in the English system are noticeable. English smelters at a recent conference recognized this and propose to modify their standard terms for treating copper furnace material. They will abandon the "miner's

ton" of 2880 pounds and the draft. They retain the returning charge on silver, but have reduced this 6d. to 2s. per unit of copper and have agreed to buy at a price per unit of copper by assay. These changes will simplify English invoices and bring their terms of sale nearer to the simpler and more satisfactory American system.

The Reduction Works for Silver Ores at Aduana, Sonora, Mexico.*

M. TR. ARMAS.

Sulphides.—Twice a week all the accumulated sulphides are thrown upon a cloth filter in a vat with a false bottom, and dried. The sulphide is calcined in a reverberatory furnace at a very low temperature, and then incorporated in the cupellation with litharge. 11.75 pounds of sulphide treated with lime and boiled with steam for an hour gave 54 liters calcium polysulphide solution of 2° B. with 5.380 grams of sulphur per liter; the residue was incorporated in the cupellation without any difficulty, any excess of lime in the remaining sulphide coming out of the cupel with the litharges.

Concentration of the Copper in the Leaching Waters.—Experiments proved that the free iron, always found in mattes of lead smelting, would easily precipitate the copper found in the solution as chloride or sulphate, besides the silver that it may contain. Furthermore, the mattes were to be exported, provided they contained a sufficient amount of copper to pay the expense of freight and duties, the real profit coming from the silver contained in them. It was decided to enrich the mattes destined for exportation by allowing all the leaching waters to pass over them. The results were satisfactory, as mattes of 35 per cent of copper could be enriched to 40 per cent.

Concentration.—During the last half of 1897 we treated 2380 tons of ore, containing 65,321 ounces concentrates; obtained 410,972 pounds, containing 48,768 ounces concentrates. Cost per ton of ore treated:

| | |
|-----------------------------|-------|
| Labour in crushing | 80 \$ |
| Crushing | 87 |
| Labour at the concentration | 84 |
| Store expenses | 24 |
| Machinery, pumps, etc. | 58 |
| Total | 333 |

Smelting.—All the ores of a grade superior to 130 ounces per ton, as well as the concentrates, are smelted in a water-jacket furnace of the following dimensions:

| | |
|------------------------------------|---------------------|
| Diameter | 36 in. |
| Capacity | 40 T. |
| Number of tuyeres | 6 |
| Boiler pressure | No. 4 |
| Blow pressure | 4-1/2 in. |
| Number of revolutions per minute | Between 100 and 125 |
| Volume of air taken per revolution | 15 cubic feet |
| Diameter of blast pipe | 14 in. |

As we go deeper in the mine the ore is becoming more bluish. The concentrates are rich in zinc. No roasting of the ore could be done successfully as the losses in silver by volatilization were great, as is the case with rich ores.

For the zinc there was only one remedy in ordinary smelting, that of fluxing it with a large amount of slag. Slag containing more than 5 per cent of Zn did not give satisfactory results, but a large amount of slag, cost in fuel, time and iron, neither of which is cheap. On the other hand, as we had to contend with Indian unskilled workmanship, we were liable to be the victims of their carelessness, especially with ores containing such a large percentage of Zn and As.

The speiss formed (As, Fe) is not readily fusible and not liquid when melted, forms scum-like accretions, and prevents a good separation of lead. To prevent this it is necessary to select a slag that requires a great heat for the formation, and fuel is dear in Aduana. Furthermore, any neglect on the part of the Indian at the tap-hole, for instance, by not keeping it in the proper level and nearer to the hottest part of the furnace, is liable to cause the speiss floating on the lead beneath the matte to chill. The scarcity of iron ore and fuel, and the accidents mentioned above, compelled us to resort to matte smelting with as little flux as possible, trying, however, to obtain all the silver in the base bullion as long as the hearth was kept in good condition.

By operating in that manner we could get rid of the greater part of Zn and As. In the second operation, re-smelting the mattes, most of the lead and silver were recovered and the mattes themselves reconcentrated to about 40 per cent of copper, which would pay very well to export.

In direct smelting, causing accidents and the large consumption of fuel, about 26 per cent, to say nothing of the losses to silver by volatilization, the cost was greater than by smelting first for mattes and then re-smelting the same. Indeed, the latter required a lower temperature, was easier to smelt and did not cause important volatilization of silver.

The consumption did not exceed 23 per cent in both operations together.

In direct smelting, when it was attempted to extract the greater part of the silver, the matte could not be exported at a large profit. The figures below indicate the composition of mattes by the first and second methods of operation:

| DIRECT SMELTING. | | |
|------------------|-----------------|----------------|
| Mattes. | Per Cent. | Per Cent. |
| Cu | 35.0 | 27.5 |
| Pb | 38.1 | 27.9 |
| Fe | 12.9 | 15.1 |
| S | 22.7 | 30.9 |
| As | 5.3 | 4.8 |
| Ag | 27.5 oz. per T. | 168 oz. per T. |

BY THE METHOD OF SMELTING FIRST FOR MATTE.

| | Per Cent. | Per Cent. |
|----|-----------------|----------------|
| Cu | 42.8 | 41.9 |
| Pb | 21.6 | 21.4 |
| Fe | 9.2 | 10.1 |
| S | 22.1 | 23.4 |
| Zn | 3.0 | 1.9 |
| Ag | 97.5 oz. per T. | 130 oz. per T. |

No automatic separation of slag and matte was made. The slags did not carry more than 1.3 ounces per ton. The charge was prepared in stalls, in thin alternating beds, so as to insure a more nearly perfect mixture of the ore and fluxes. The charcoal was of mezquite wood and could stand well the crushing effect of the charge. Its price varied from \$2.50 to \$2.75 per 300 pounds. Iron ore cost from \$1.25 to \$1.75 per cargo of 300 pounds.

Cupellation.—For the extraction of the silver from the base bullion and the sulphides from the lixiviation, no modern methods could be applied on account of the local conditions and because of the first expense, which the company would not permit. Cupellation is an effective process, and the Mexicans are experts in handling it. The loss in silver did not exceed 0.7 per cent. We use the English cupel; dimensions: 46x59 inches. The lining was made of a mixture of limestone and decomposed rhyolite, in the proportion of 100 of the former to 46 of the latter.

Each cupel necessitates 1,379 pounds of the mixture, which was moistened very slightly and passed through a No. 4 mesh screen. The tamping is done by proceeding from the center in the form of a spiral. The circular indentations should overlap in part. At Aduana the tamping was done on a great number of layers. The cupel, once in place, is heated very slowly so as to avoid cracking, and towards the end, that is, after forty-eight hours, heated intensely and varnished with litharge, when it is ready for charge. The sulphides of silver are incorporated in the lead bath with twice as much litharge. The base metals and foreign matter of the base bullion are carried away by the litharge and the skimmings. Some of the copper, however, remains until the last moment, and only comes out with the last litharge, which is very rich, and, as a rule, is re-refined and treated in the cupellation.

Two tuyeres furnish from a small ventilator the blast at a pressure of 7 ounces per square inch.

The capacity of a cupel is 3,500 pounds. The duration of a cupel is forty days, if managed carefully.

| | |
|---|----------------|
| Losses in silver | 10.7 per cent. |
| Consumption of wood per twenty-four hours | \$7.50 |
| Labour per twenty-four hours | \$2.50 |
| Cost of cupellation per ounce of silver | 388 |

As the mint of Alamos accepted bars of silver with 955 fineness, we never tried to pass 992; the average, though, was 990. Our monthly production in fine silver could be increased considerably, since the construction of two more reverberatory furnaces was effected.

Mr. Dorton conceived the idea of the utilization of the bed of the river, which is dry most of the time, as a filter for all the water coming from the reduction works. A mile from the reduction works a well was dug, and the waters accumulated there. An electric pump pumped the water back, and thus the concentration could go on almost all the year without interruption. These two facts ought to increase the production considerably, if everything is managed skillfully.

During the year 1896 the cost of 1 ounce of fine silver can be stated as follows:

| | Per Cent. |
|---------------------------------|----------------|
| Cost in mining | \$ 321 or 35.0 |
| Cost in smelting | 286 or 25.4 |
| Cost in administrative expenses | 75 6.9 |
| Profit | 333 30.7 |
| Total | \$ 1015 100.0 |

Tesla's Latest Claim.

Following is a verbatim statement from Nikola Tesla, in his application for a patent which last week was issued to him:

The problem, for which the invention forming the subject of the present application affords a complete and practicable solution, is that of controlling from a given point the operation of the propelling engines, the steering apparatus and other mechanism carried by a moving object, such as a boat, or any floating vessel, whereby the movements and course of such body or vessel may be directed and controlled from a

distance, and any device carried by the same, brought into action at any desired time.

So far as I am aware, the only attempts to solve this problem, which have heretofore met with any measure of success, have been made in connection with a certain class of vessels, the machinery of which was governed by electric currents conveyed to the controlling apparatus through a flexible conductor. But this system is subject to such obvious limitations as are imposed by the length, weight and strength of the conductor which can be practically used, by the difficulty of maintaining with safety a high speed of the vessel or changing the direction of movement of the same with the desired rapidity, by the necessity for effecting the control from a point which is practically fixed, and by many well understood drawbacks inseparably connected with such a system.

The plan which I have perfected involves none of these objections, for I am enabled by the use of my invention to employ any means of propulsion, to impart to the moving body or vessel the highest possible speed, to control the operation of its machinery and to direct its movements from either a fixed point or from a body moving and changing its direction, however rapidly, and to maintain this control over great distances, without any artificial connections between the vessel and the apparatus governing its movements, and without such restrictions as these must necessarily impose.

In a broad sense, then, my invention differs from all of those systems which provide for the control of the mechanism carried by a moving object and governing its motion, in that I require no intermediate wires, cables or other form of electrical or mechanical connection with the object, save the natural media in space. I accomplish, nevertheless, similar results, and in a much more practicable manner, by producing waves, impulses or radiations, which are received through the earth, water or atmosphere by suitable apparatus on the moving body and cause the desired actions, so long as the body remains within the active region or effective range of such currents, waves, impulses or radiations.

The many and difficult requirements of the object here contemplated, involving peculiar means for transmitting to a considerable distance an influence capable of causing, in a positive and reliable manner, these actions, necessitated the designing of devices and apparatus of a novel kind in order to utilize to the best advantage various facts or results which, either through my own investigations or those of others, have been rendered practically available.

As to the part of my invention which involves the production of suitable waves or radiations and the conveying of the same to a remote receiving apparatus capable of being operated or controlled by their influence, it may be carried out in various ways which are at the present time more or less understood. For example, I may pass through a conducting path, preferably enclosing a large area, a rapidly varying current and by electro-magnetic induction of the same, affect a circuit carried by the moving body. In this case the action at a given distance will be the stronger the larger the area enclosed by the conductor and the greater the rate of change of the current. If the latter were generated in the ordinary ways, the rate of change, and consequently the distance at which the action would be practically available for the present purpose, would be very small; but by adopting such means as I have devised, that is, either by passing through the conducting path currents of a specially designed high-frequency alternator, or better still, those of a strongly charged condenser, a very high rate of change may be obtained, and the effective range of the influence thus extended over a vast area, and by carefully adjusting the circuit on the moving body so as to be in exact electro-magnetic synchronism with the primary disturbances, this influence may be utilized at great distances.

Another way to carry out my invention is to direct the currents or discharges of a high-frequency machine or condenser through a circuit, one terminal of which is connected directly or inductively with the ground and the other to a body, preferably of large surface and at an elevation. In this case if the circuit on the moving body be similarly arranged or connected, differences of potential on the terminals of the circuit, either by conduction or electrostatic induction, are produced, and the same object is attained. Again, to secure the best action, the receiving circuit should be adjusted so as to be in electro-magnetic synchronism with the primary source as before, but in this instance it will be understood by those skilled in the art that, if the number of vibrations per unit of time be the same, the circuit should now have a length of conductor only one half of that used in the former case.

(To be Continued.)

A curious state of things is said to have been observed in investigating the electrolysis of water pipes in Dayton, Ohio. It was found that stones and pebbles near the pipes in some cases seem to have been electroplated with the metal of the pipe, which one of the experts believes has never been observed before.—Electrical Review.

* Condensed from Journal Franklin Institute.

Coast Industrial Notes.

—Kittitas county, Wash., shipped 60,000 sheep this year.

—Among the imports from Hawaii last week were 19,332 bags of sugar.

—Over 20,000 boxes of oranges were shipped from Riverside, Cal., last month.

—The Los Angeles Co., Cal., exhibit at the Omaha Exposition received ninety-nine prizes.

—Forty-five carloads of goods have been shipped from the Pomona, Cal., cannery this season.

—The Great Northern Railway will build sixty miles from Bonner's Ferry, Idaho, to Nelson, B. C.

—At Anacortes, Wash., two canneries put up 24,000 cases of salmon this season, and at Fairhaven two firms put up 24,000 cases.

—The Southern Pacific Co. will rebuild the departments of its manufacturing plant at Sacramento, Cal., recently destroyed by fire.

—The Inland Co. has completed its telephone line into Northport, Wash., making it possible to send one's voice to San Francisco, a distance of 1,400 miles.

—The Pine Manufacturers' Association has again raised the price of lumber \$1 per M. feet, the reason given being the advance in logs on Puget Sound.

—The Santa Fe has secured a water-front freight terminal in San Francisco, the block bounded by Spear, Main, Harrison and Bryant Sts., at a cost of \$300,000.

—Three carloads of lumber and machinery have arrived at Johannesburg, Cal., for the California Borax Co. that is erecting works at Borax lake. They propose to erect a plant capable of turning out 100 tons of refined borax a day.

—California will produce more beet sugar in '99 than ever before in a year. The Union Sugar Company at Santa Maria and the Huemene factory will each use 1000 tons of beets daily; Spreckels' factory at Salinas, 3000 tons; the Los Alamos factory near Los Angeles, 700 tons; the Crockett factory 500 tons a day.

—J. A. Flicher of the Cal. State Board of Trade has a letter from the managers of the Commercial Museum, Lisie, France, offering free space and free care of any non-perishable products of California. The idea is to make a perpetual exhibit in that city of every unperishable article that can be produced in California.

—A rush of work is reported on the New Mexico divisions of the Santa Fe and on the whole of the Santa Fe Pacific. All the rolling stock at Albuquerque, Las Vegas and Raton is on the move, and double the present amount could be used to advantage. The road has given rush orders to hurry the completion of thirty new locomotives. The road is also short of freight cars at many points between El Paso and Topeka. The volume of freight and passenger business is greater than ever before at this season.

—Direct communication between South American markets and San Francisco will soon be established by a large French steamship company. The Chargeurs Reunis will start a monthly service next March between San Francisco and Liverpool, which will make stoppages at Mazatlan, Acapulco, Guayaquil, Callao, Peru; Valparaiso, Chile; Montevideo, Uruguay; Santos, Brazil; Liverpool, Havre and possibly a Belgian port. The company has been organized and operated since 1873, and is now having constructed three 6000-ton additional steamers for the Pacific trade.

—Next week the water will, for the first time, be turned into flumes and tunnels of the Southern California Power Company in the Santa Ana canyon, Cal. The plant has been two years in building, and has cost \$500,000. There are three and one-half miles of tunnels through solid granite mountains, and two miles of fluming. In this distance a fall of 75 feet is secured, and the water is conveyed from the canal line to the power-house in 30-inch steel pressure pipe 2000 feet long. A pressure of 310 pounds to the square inch is developed. This is turned on water wheels in the power-house. There are four connected directly with the generators. Each complement of machines is capable of developing 100 H. P. Electricity of a voltage of 33,000 is sent over the copper wire to Los Angeles, eighty miles away—the longest transmission of electricity in the world.

Personal.

J. SHAW is appointed Supt. Stanley mine, Jacksonville, Cal.

W. E. COUL is Supt. Philadelphia gravel mine, Columbia, Cal.

R. B. HARPER is Supt. Santa Clara Q. S. mine, San Simeon, Cal.

D. MOORE, Supt. Culbertson mine, Graniteville, Cal., is in San Francisco.

P. LANGDELL has been appointed Supt. Eureka mine at Middle Creek, Cal.

MAJOR A. G. METERS, a mine owner of Yreka, Cal., is in San Francisco.

C. B. WINGATE has returned to San Francisco from his mines at Dedrick, Cal.

GEO. BLAKE, a mining superintendent from Tuttletown, Cal., is in San Francisco.

CAPT. RICHARD A. PARKER has returned to San Francisco from Grant's Pass, Or.

S. NEWHOUSE has returned to Salt Lake City from his mining properties in Mexico.

P. G. GOW, Gen. Mgr. Jumper M. Co., San Francisco, has returned from Dedrick, Cal.

L. G. STEVENSON succeeds A. E. Dawson as Supt. Hearst mines, Santa Rita, New Mexico.

O. L. BARTON, Supt. Herman mine, Deadwood, Cal., has returned from San Francisco.

At a recent meeting of the San Francisco Co., Cal., Miners' Association, Julian Sonntag

was elected president and Chas. G. Yale secretary.

W. R. WOODWARD has been appointed Gen. Mgr. Barstow Reduction Works, Barstow, Cal.

E. K. STEVENSON of San Francisco has been examining mining properties in Shasta Co., Cal.

S. W. CHEVNEY, Gen. Mgr. Garfield Con. mines, Whitehouse, Cal., has returned to San Francisco.

D. M. DE LONG, managing owner DeLong M. Co., Oroville, Cal., has returned from San Francisco.

D. H. JACKSON, Gen. Mgr. Gold Bug M. Co., Placerville, Cal., has returned from San Francisco.

W. H. THOMAS, Mgr. Niagara mine, Bingham, Utah, is on his way from New York to San Francisco.

J. SONNAT, Secy. Cal. State Miners' Association, has returned to San Francisco from Nevada City, Cal.

W. P. HAMMON is elected Pres. Butte County, Cal., Miners' Association at Oroville and A. Ekman Treas.

E. L. BARNES, owner Falls mines Igo, Cal., passed through San Francisco on his way home from Pony, Mont.

C. E. LANGE, Mgr. Grand Central mine, Mammoth, Utah, is in San Francisco. He accompanies Mrs. Loese, who is in poor health.

J. T. DANNEHLAN has resigned as Supt. Boston & Methuen M. Co. of Twisp, Wash., to take a like position with the Black Warrior Copper Co. of Globe, Ariz.

At Nevada City, Cal., last week, F. Zeitler was elected Pres., G. Mainhart Vice-Pres., and W. F. Englebright Sec. of the Nevada County Miners' Association.

J. FETZ of San Francisco, Vice-Pres. Champion M. Co., Nevada City, Cal., is on his annual visit to the several mining properties in which he is interested in that locality.

A. M. McDONALD, Supt. Kanaka mine, Groveland, Cal., is in San Francisco. Mr. McDonald was elected recently to represent Tuolumne county in the State Legislature.

PROFESSOR VON OSTINGEN of Leipzig, Germany, has received official permission to go to the Transvaal to investigate the suitability of electric methods for the extraction of gold in the Johannesburg district.

MR. FRANK E. SHEPARD and MR. LEWIS SEARING, who for many years have been associated together, have assumed control of the Denver Engineering Works Co., Denver, Colo., manufacturers of mining, milling and smelting machinery. Mr. Shepard is a graduate of the Massachusetts Institute of Technology, member of Am. Soc. Mech. Engs. and member Am. Soc. Min. Engs., and will act as president and treasurer, and will also act as superintendent of the works. Mr. Searing, who is a graduate of the Stevens Institute of Technology, a member of Am. Inst. Elec. Engs. and a member of Am. Soc. Mech. Engs., will occupy the position of vice-president and general manager of the company.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MASSAGE MACHINE.—Dr. White Wolf, San Francisco, Cal. No. 613,559. Dated Nov. 8, 1898. This invention relates to an apparatus which is especially designed for the massage treatment of persons. The object of the invention is to provide an apparatus by which a rubbing, pressing and general massage treatment may be applied to various parts of the body and limbs of the patient without the exhausting work which is necessary when such treatment is effected by hand. The apparatus consists of a supporting stand having arms pivoted to and adjustable with relation to it, and rack and pawl mechanism by which these arms may be adjusted so as to raise or depress the outer ends, the arms remaining essentially parallel in the manner of a parallel ruler. At the outer ends of these arms are fixed the rubbers, and a mechanism is provided comprising a crank and pitman connection by which the rubbers are actuated. In conjunction with this are springs by which the bars carrying the rubbers are drawn toward each other so as to maintain a constant rubbing pressure during the movements of the rubbers. The rubbers may be either roller or frictional and are adjustable upon the movable arms. Mechanism is also provided by which the pressure of the rubbers may be regulated.

WIPE ROD HOLDING ATTACHMENT FOR GUNS.—D. L. Howard, San Francisco, Cal. No. 613,560. Dated Nov. 8, 1898. The object of this invention is to provide a convenient, removable attachment for wiping rods so that they can be carried in conjunction with magazine and other rifles or shot guns. It consists of one or more elastic plates curved to enclose more than half the circumference of the magazine with outwardly curving convex wings having the upper ends approaching the sides of a barrel so as to form channels between the wings and the interior meeting angles of the barrel and magazine, these channels being sufficient to receive the wiping rod sections which are held in place by grooves or notches which hold the magazine in place. The same construction adapted to clasp the barrels or shot gun will also form sockets for wiping rods of this class of guns.

PRUNING SHEARS.—J. Simon, Santa Rosa, Cal. No. 613,570. Dated Nov. 8, 1898. The object of this invention is to construct a pruning shears in such a manner that a positive drawing out of the blade is produced while the strength of the pivot joint is increased,

and in conjunction with this to provide an automatic opening or separation device for the cutters which will not be hard and tiring upon the hands of the operator. It comprises the moving cutting blade and pivoting magazine jaw, with extensions formed on each which cross each other rearwardly, the wing projecting from one side of the magazine jaw, and a corresponding jaw projecting from the base of the cutting blade supported upon and connected with the first named jaw and pivoting pivot pin so that the wings form a fulcrum at the side of the blade. A separating spring is fitted adjacent with the pivot pin and connected in a socket formed for the purpose which prevents its being moved or interfered with while the cut is being effected.

MAHINERY & CASTING LEADS IN FIRE-NEW LINES.—Erik Magnus, Astoria, Oregon, No. 613,581. Dated Nov. 8, 1898. The object of this invention is to provide a machine which is designed to cast leads or solder upon distances of several feet apart as may be desirable and with accuracy, at the same time making said leads so that the ownership of the net can be readily determined. It consists of mold sections having semi-circular formed upon their outer faces, guides upon which the sections are slidable toward and from each other, with means for regulating the opening of the sections, a horizontally disposed transverse bar by which the sections are movable, with other bars extending horizontally upon each side of the sections having grooves formed in them, removable disks with projecting lugs within which the notches are in position to engage when the molds have been closed and a lever connecting with the disks whereby the molds are secured, clamped after being closed. The set line is passed backward and forward through the channels and molds and hook-shaped vertically movable appliances are adapted to engage the rights of the line to produce a tension while the casting of the lead upon it takes place.

ALMOND HULLER.—Walter G. Read, Colusa, Cal. No. 613,587. Dated Nov. 8, 1898. The object of this invention is to provide an apparatus for removing the hulls from almonds and separating them and dirt, leaves, sticks, etc., so as to deliver the almonds in a substantially clean condition. It comprises a rotary cylinder formed with open spaced parallel peripheral bars, interior arms fixed to a central shaft and rotating therewith, means for delivering the unhulled almonds to the cylinder, the almonds and hulls discharging from the opposite end and rubbing boards or flaps supported so as to press against the bars of the cylinder to loosen the hulls from the nuts, the loosened hulls being drawn through between the cylinder bars. Beneath the cylinder are pans which receive the nuts and constantly remove them. The unhulled almonds are delivered by a suitable feed device into one end of the cylinder and the greater part of the almonds and hulls are discharged at the opposite end. A blast appa-

atus forces a current of air across the falling mass of the almonds and directs away, before they reach the discharge, leaves, sticks, the shuckers, and a large portion of the husks and light refuse a blow down and is carried away upon a traveling water. The discharged almonds and hulls are received upon a pan and separating rider formed of wire mesh and having the curved bars through the wires of the rider, while the almonds discharge from the upper end and are carried to the bottom upon a traveling bar, where they are separated from the few remaining hulls.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOV. 8, 1898.

413,581—LAWSON MACHINERY—W. G. Read, Colusa, Cal.

413,582—STATIONARY ENGINE—J. H. Hart, Bridgeport, Cal.

413,583—WATER PUMP—J. C. Brown, Fresno, Cal.

413,584—MACHINE—J. E. Brown, Fresno, Cal.

413,585—TANK—J. C. Brown, Fresno, Cal.

413,586—WATER PUMP—W. G. Read, Colusa, Cal.

413,587—HEATING AND COOKING APPARATUS—A. H. Brown, Fresno, Cal.

413,588—SAFETY VALVE—J. S. Brown, Fresno, Cal.

413,589—MASSAGE MACHINE—W. G. Read, Colusa, Cal.

413,590—WATER PUMP—J. C. Brown, Fresno, Cal.

413,591—HEATING AND COOKING APPARATUS—A. H. Brown, Fresno, Cal.

413,592—BRIDGE—A. E. Brown, Fresno, Cal.

413,593—DENTAL CHAIR—J. W. Brown, Fresno, Cal.

413,594—CANNING LEADS IN FIRE-NEW LINES—E. Magnus, Astoria, Ore.

413,595—TIRE TIGHTENER—Macdonald & Everett, Spokane, Wash.

413,596—FIREARM—M. Magnus, Astoria, Ore.

413,597—PORTABLE SHED—H. E. Brown, Los Angeles, Cal.

413,598—BAR SHAKER—H. J. Brown, Fresno, Cal.

413,599—ALMOND HULLER—W. G. Read, Colusa, Cal.

413,600—SMELTING FURNACE—J. H. Brown, Fresno, Cal.

413,601—CRIBBAGE BOARD—R. S. Brown, Fresno, Cal.

413,602—ENGINE—J. P. Brown, Fresno, Cal.

413,603—ENGINE—J. P. Brown, Fresno, Cal.

413,604—PRUNING SHEARS—J. Simon, Santa Rosa, Cal.

413,605—DILLON FACTORY—J. Brown, Fresno, Cal.

413,606—RAILROAD SWITCH—J. H. Brown, Fresno, Cal.

413,607—ADVERTISING DEVICE—T. Brown, Fresno, Cal.

413,608—FIREARM—J. Brown, Fresno, Cal.

413,609—SHED—A. Brown, Fresno, Cal.

413,610—DILLON FACTORY—J. Brown, Fresno, Cal.

NOTE.—Plans and Copyright Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., special agents for the Pacific Coast, American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.



A Los Angeles, Cal., Establishment.

Southern California is developing the mineral wealth of that section, and its business men are realizing the opportunities therein. Among prominent Los Angeles firms is to be noted the handsome establishment of William H. Hoegge, 136 South Main St., Los Angeles, Cal., wholesale and retail dealer in texts, drawings, maps, hammocks and mining supplies, occupying the great hall formerly the site of the Hall of Industry, with a frontage of 61 feet, where he is utilizing every day 50,700 square feet of selling space. A chief

feature of the business is miners' supplies, his stock and assortment embracing about everything that a miner may need. Mr. Hoegge's factory for the manufacture of canvas articles is thoroughly and modernly equipped for promptly making anything from a feed bag to the "largest" tent. Sporting goods and coating supplies each share a generous amount of floor space. By the way, the clause used in Mr. Hoegge's advertisements, has become proverbial in that region, through the popularity of his factory prices. Mr. Hoegge has studied the needs of the general prospector, and in the knowledge that he was able to furnish many men to better advantage than at some points nearer these gold fields.

Horizontal Tubular Boiler.

The essentials of a good steam boiler may be enumerated as follows: The heating surface must be ample, and must be so arranged as to promote a free and rapid circulation of water and absorb the greatest possible amount of heat; the steam room and the evaporative surface must be large, so as to allow of an easy release of the steam from the water, and afford a steady supply, of uniformly dry quality; all parts of the boiler should be as accessible as possible for examination, repairs and cleaning; the structure should expand as uniformly as possible, so that there shall be no severe strains produced when the temperature of the boiler varies from any cause; the boiler should be durable and should possess an excess of strength, when new, in order to provide for wear and other deteriorating influences; it should not be liable to expensive repairs, and its first cost should be as low as is consistent with the other requisites already mentioned.

The horizontal tubular boiler has been considered to conform very closely to these requirements, and for this reason it came into general use. The best methods have not always prevailed either in the design or in the erection of this type of boiler; but this is no fault of the type itself. Fewer tubes should be used than was formerly the custom; ample space should be left between the tubes and between the tubes and the shell; and the feed pipe should be so disposed that the entering water might not cause severe strains in the shell plates. The evaporation of two pounds of water per hour per square foot of heating surface (or a duty of one nominal horse power for each 15 square feet of heating surface) was realized as an average performance with this type of boiler, before the recent improvements in its design, and these data were used in computing the commercial rating of such boilers; but owing to the lack of uniformity in design there was a corresponding variation in the economical results that were obtained.

The advent of high pressures has called for a stronger mode of construction and thicker shell plates, and some engineers and boiler makers have feared that the thicker plates would reduce the efficiency of the heating surfaces by diminishing their power of absorbing heat in a marked degree. It has also been feared that the thick plates would deteriorate rapidly under the action of the high temperatures to which they are exposed. Many boilers constructed of half-inch plate have been in constant operation for the past ten years, however, showing good efficiency and so little deterioration that not one dollar has been expended for repairs. While the thickness of the plate must necessarily have some influence on the heat-transmitting power, it is so small that it may be neglected in practical work. Engineers experimenting with plates ranging in thickness from one-eighth to three-eighths inch have found that when all other conditions are the same the heat transmitted through a given plate in a given time is sensibly independent of the thickness. Experience indicates that these results are true for a considerable distance beyond the range indicated above. The resistance of a plate of metal to the passage of heat through it appears to lie principally at the two surfaces of the plate, where the heat enters and leaves it. Rankine calls this skin resistance the "external thermal resistance" of the plate, to distinguish it from the resistance opposed by the body of the plate, which he calls the "internal thermal resistance;" and he says in his *Steam Engine*, Part 3, Chapter I, Section 3, that "the external thermal resistance of the metal plates of boiler flues and tubes and other apparatus used for heating and cooling fluids is so much greater than the internal thermal resistance that the latter is inappreciable in comparison, and, consequently, the nature and thickness of these plates

have no appreciable effect on the rate of conduction through them."

Heat transmitted through a given heating surface may be considered to be independent of the nature and thickness of the plate through which it is to pass and to be simply proportional to the difference in temperature between the water that touches the plate on the one side and the hot furnace gases that touch it on the other. The temperatures of the gases and water in contact with the respective sides of the plate will vary with the circulation in the furnace and in the boiler; for, with poor circulation on both sides, the gases in immediate contact with the plate are cooler than the average temperature of the combustion chamber, and the water in contact with the plate is warmer than the general mass of water in the boiler, so that the temperature difference between the two surfaces of the plate is smaller than it would be if the circulation were good, and the heat transfer is correspondingly less. In well-proportioned boilers having free circulation and large evaporative surfaces, the steam bubbles that form on the heating surface are rapidly disengaged or thrown off and rise quickly to the surface. Where the circulation is poor, or the steam bubbles have a long distance to travel before they can escape from the water, the steaming qualities of the boiler are necessarily impaired. The horizontal tubular boiler, when properly constructed, fulfills these desirable conditions.

The setting of an externally fired boiler has an important influence on the efficiency of the boiler, and hence it is necessary to design and construct the setting intelligently. If the specific heat (at constant pressure) of the furnace gases be assumed to be sensibly constant, it follows that the maximum efficiency will be realized by securing the highest possible furnace temperature, simultaneously with the lowest admissible temperature of the gases that escape to the chimney. To secure this combination, the proportion of grate surface to heating surface must lie within certain limits, and the coal consumed per square foot of grate per hour must also be carefully considered. In certain experiments with a small horizontal tubular boiler, in which the ratio of the grate surface to the heating surface was as 1 to 25, the highest economy was obtained when eight pounds of coal were burned per hour on each square foot of grate. With a more rapid rate of combustion, the capacity of the boiler was increased, but the economy was diminished. This result appears to be well substantiated by many boiler trials that have come under our observation. When the grate area stands to the heating surface in the ratio of 1 to 50, the rate of combustion can be increased to fifteen or sixteen pounds of coal per square foot of grate per hour, and the heating surfaces, if well arranged, will absorb and utilize the heat. By an increase in the ratio of heating surface to grate area, it is therefore possible to burn more coal efficiently on each square foot of grate area. This means that a greater intensity of combustion—or, in other words, a higher temperature—may be realized in the furnace, without a corresponding increase in the chimney temperature; and in accordance with the principle laid down at the beginning of this paragraph, this means that the efficiency of the boiler would be increased.

Storing Dynamite.

The question is often asked, "How long can dynamite be kept if properly stored?" Prof. Prister of Johannesburg said that temperature had the greatest influence on the stability of nitro-glycerine. The first condition was that the nitro-glycerine used in the manufacture of dynamite should be absolutely pure and free from any acid, and from mono and from dinitro-glycerine. Pure nitro-glycerine supported only for a few hours a temperature of 212° Fahr. Kept at 158° Fahr., it gave off acid vapors after ten to

fifty minutes. At 113° Fahr. to 122° Fahr., its stability was greatly impaired in a few weeks. At 112° Fahr. it could be kept unaltered for months. Traces of nitric acid or nitrous acid favored its decomposition.

The absorbing powders employed in the manufacture of dynamite were of great importance. Two years ago a decomposed dynamite exploded and destroyed a store merely in consequence of the bad composition of the absorbents which were sulphur, nitrate of soda, collodion-cotton and coal. It was well known that sulphur should be excluded from these mixtures as it might become acid, especially if sublimate sulphur were used.

In the above mentioned case probably the small quantity of pyrites in the coal initiated the decomposition of the whole.

Chlorides and chlorates, as well as the organic acids formed in drying woodmeal, reduce the stability of dynamite. Prof. Prister recommended that a certificate be obtained from the manufacturer guaranteeing the good quality of the explosive, as it was impossible for each mine to afford to pay an explosives expert to examine it. Uncartridge dynamite No. 1, exposed to wet air, might absorb $\frac{1}{2}$ per cent of moisture per day. The average amount of moisture in good dynamite was $\frac{1}{2}$ per cent. If, on entering a dynamite store, the smell of nitric acid was noticed, the explosive should be destroyed without delay.—Mining Bulletin.

Discrepancies in Slime Treatment.

At the last reported meeting of the Chemical and Metallurgical Society of South Africa, as set forth in the Journal of the Society for September, in a discussion of the paper on "Discrepancies in Slime Treatment" by W. A. Caldecott, A. F. Crosse said that the only correct way to estimate the total gold in a sample containing dry moist slimes containing dissolved gold would be to dilute a weighed portion of the sample having estimated the moisture. To two litres with water take one litre off by decantation. Estimate the gold by precipitation with silver nitrate and fusing with lead oxide and cupellation. Double the result. Then pour the bottle into a large cone having an opening at the bottom and one or two openings at the side.

If the slimes be now diluted with several litres of weak lime water they will soon settle, and the clear solution containing the dissolved gold can be drawn off. If this operation be repeated twice, there will be practically no dissolved gold left.

The washed slimes can now be dried in a prospecting pan, without any danger as regards loss of gold; but when slimes are dried in contact with a solution of gold, the result of the assay is not to be relied on and a check assay from such a sample will be equally valueless.

The object of the following experiments was to find out the loss of gold, if any, on scorifying and cupelling large buttons of lead with very small quantities of pure gold, such as would be obtained in a fusion assay with slimes or tailings. The gold was in the form of very fine wire. Pure grain lead was taken and wrapped in lead foil, a small piece of pure silver wire was added to each lot, equal to five or six times the weight of the gold.

The first five lots were scorified down to a moderate size (about 34 grammes), then cupelled.

| Weight of lead. | Weight of gold. |
|-----------------|--------------------|
| 1. 90 grammes. | 1.25 milligrammes. |
| 2. 90 " | .50 " |
| 3. 90 " | .30 " |
| 4. 70 " | 1.25 " |
| 5. 50 " | 1.25 " |

The next lot were cupelled, the heavier ones in extra large cupels.

| | |
|----------|---------|
| 6. 50 " | 1.25 " |
| 7. 50 " | 1.25 " |
| 8. 33 " | 1.00 " |
| 9. 33 " | 2.00 " |
| 10. 33 " | 5.00 " |
| 11. 33 " | 10.00 " |

In each case, after parting the little button of gold and silver, the exact weight of gold was obtained, which had

been originally added. Accurate assays can be made of slimes containing a solution of dissolved gold, and if large buttons are obtained in a fire assay, it does not effect the result nor cause any loss of gold.

W. Bettel: I should like to ask Mr. Crosse to explain why in the last sentence he said that the soluble gold in the sample of slimes could be readily estimated and in an earlier part of his remarks says that if solution of gold be present in the sample of slimes it should be washed out and separately assayed to get at the correct original gold contents.

A. F. Crosse: I meant to say that the fact of the gold being in solution did not affect the assay in any way; it only affected the sampling. There was a mechanical loss, but if one has five assay tons of matter containing gold in solution dried on a filter the assay of this small quantity is a different thing from drying moist slimes in a prospecting pan.

W. Bettel: So far as my experience goes there ought to be no loss in evaporation. If the slimes were put over a furnace and boiled recklessly there would be loss; but if placed on a water bath in a porcelain dish there would be no loss of gold. If assays were properly done, from 95 to 97 per cent of the actual amount of gold in the material should be obtained.

The President: I understand that Mr. Crosse explained for the loss in evaporation on account of the gold which was contained in the solution sticking to the vessel and it being difficult to remove it. If the operation is performed in a pan there will be a loss on account of the rough surface.

W. Bettel: I evaporated in large porcelain dishes. With regard to Mr. Caldecott's paper, I am sorry it has been put forward, because if the results he gave were the average results on the Rand it would be a disgrace to the society. But I hope that not many assayers on the Rand will turn out such bad results. I have never found assays so very incorrect. But if assayers melt at a high rate of speed all the gold would not be brought down and the assayer doing it cannot swear by his results.

I do not see why accurate results should not be obtained in every case except where the general manager overburdens the assayer with work so that he has no option but to work at high pressure without giving thought to refinements in assaying which ensure accuracy.

Meteorite Found in Oregon.

TO THE EDITOR:—In September Jas. Arthur was excavating a ditch on his placer mines near Cornucopia, Or., and came in contact with what seemed at the time a cigar-shaped bunch of brown clay; to get grade, half of it was removed, which took off 18 inches from the top of the bunch, which was 4 feet long. The grade was changed last week in the bottom of the ditch by the heavy current of water, but the "clay" remained as left when the ditch was completed. Mr. Arthur, seeing the obstructions, took his pick to remove the clay, and found a hard substance imbedded in the clay, which was removed with ease and nothing thought of it. The frost acted on the clay and also on the ditch bank, and the whole of the clay and hard substance was caved into the ditch and received a thorough washing. Then it was discovered that it was a meteorite, 9 inches wide, 22 inches long and 4 inches thick, with sharp edges on two sides and one end. The other end looks as if broken. The surface on both sides is covered with something like pointed warts.

MINER.

Cornucopia, Or., Nov. 10th, '98.

The largest freight train ever hauled went eastward from Altoona, Pa., to Columbia, on the 8th, over the Pennsylvania Railroad, 130 cars coal, a train 3877 feet in length. The total weight of the train behind the tender of the engine was 5212 tons.

Mining Summary.

ALASKA.

Juneau Miner: The Comet mine, one of the Berners Bay Co.'s group, continues profitable. The tunnel driven last season intersects the vein at a depth of 1000 feet. Up-raises are being made. Seventy feet above the 1000-foot level in the upraise a valuable body of ore was encountered, which will average 6 feet in width. The mine alone supplies twenty stamps. In the Kensington mine, a quarry, a tunnel has been run to facilitate winter work. The ore body is 80 feet wide. This mine supplies twenty stamps. The new 20-stamp mill being built by Mellen M. & M. Co. on its Berners Bay property will soon be ready for the machinery. A gravity railway 4000 feet long has been constructed and two wire trams connect this railroad with the upper workings of the mine. A force is employed driving tunnels and sinking the shaft, and the machinery has already been landed on the dock at Seward preparatory to being taken to the mine.

ARIZONA.

The Sheeptrail mill near Kingman is turning out a good amount of bullion monthly. The Old Dominion Copper M. & S. Co. at Globe employs over 300 men. The Black Warrior Copper Co. has resumed hauling ore to the Globe smelter. The daily shipments amount to sixteen tons.

At the Barrett copper camp there are 1000 tons of ore ready to smelt and the smelter will be blown in. On Gum creek, in Gila county, Gowan & Prantz are developing a gold and copper claim. A. Solano bought the old Diana mine at Chloride for \$8000. W. J. Murphy is developing a property near Chapparral which is producing good ore. The development of the mine will be continued during the winter. Col. Brodie will place a 10-stamp mill, a steam hoist and other equipment on the Crown Point mine in Castle Creek district, Yavapai county. At the 300 level the ore chute had 2 feet of quartz which contained good values.

Yuma Sun: A cyanide plant of 160 tons daily capacity is being put in by La Fortuna M. Co. for extracting the gold from the tailings accumulated in two years at the 20-stamp mill at that place. These tailings, according to conservative estimates, will go from \$3 to \$5 per ton. The ore is said to have paid for two years 10 per cent per month on the money invested by the stockholders of La Fortuna Co.—The Daisy Dolores near Tyson's Wells, owned by E. Steward and associates is being successfully developed. A large body of ore has been opened and the lowest assays received are \$10. Much of it will be shipping ore.

Tucson Citizen: Jacobs & Childs sold to W. Shotwell of Denver, Colo., the Cardinoff mine in the Ojo district, Pima county, for \$100,000. A 40-ton plant is to be erected and will be enlarged till it reaches a capacity 300 tons daily. The ores are copper and gold. The owners receive \$100 each every month and 30 per cent of the gross proceeds.

Mohave Miner: At the Klondike mine near Mohave the mill is crushing ten tons every twenty-four hours. The cleanups are satisfactory.

Globe Times: A. Heller has in operation a water power arrastra on Spring creek near Payson. The ore is hauled two miles. The returns of this arrastra are good.

Tucson Star: The mill connected with the mining department of the University is being put up for a test on a couple of carloads of wolframite ore from the Dragoon mountains. T. L. Ayres has several men at work on the Golden Gem mine at Cerbat.

CALIFORNIA.

Amador.

Jackson Ledger: Scarcity of water causes the Kennedy mine at Jackson to use steam at both hoists.—Sinking at the Zeila continues. Two and one-half feet is made daily. Sinking has reached 1310 feet and 100 feet more will be sunk before drifting begins at the new depth. Fifteen stamps are operated, daily crushing from sixty to seventy tons of ore.

Jackson Republican: The Keystone mine and mill at Amador City have been running with a full force, but owing to a scarcity of water the mill will be idle about a week. The ore runs \$6 per ton.—The lease on the Median mine to J. A. Bennetts has been extended to May 1, 1899. The South Spring Hill mill is being used to crush the rock.—A San Francisco mining man is building a small mill on the Empire mining property in Plymouth.

Jackson Dispatch: The Cooper gold mine at Oleta has a 20-stamp mill to crush the gravel, and work proceeds with favorable prospects.—The Kennedy Co. at Jackson has decided to sink a new shaft as soon as the necessary machinery can be placed. The shaft will be a half mile east of the present works, and intersect the vein at a depth of 3500 feet. It will be a vertical shaft, with three compartments, 4½ feet each in the clear. At first it is intended to put hoisting machinery in place that will permit of sinking the shaft to a depth of 1500 feet, and then to put in engines that will hoist ore at a high speed.

Butte.

Oroville Register: The Sunnyside mill, near Oroville, owned by McClung & Co., started up last week. There is enough ore to keep the mill running steadily.

Calaveras.

San Andreas Prospect: A 4-foot vein of good ore has been found in the Paragon mine at West Point.—The Bonanza, New Discovery, Wonder and Washington quartz mines near San Andreas have been bonded to M. C. Hawes of San Francisco for sixty days. Work has begun on the Bonanza and Washington. The Bullion has an 8-foot ledge. The Wash-

ington has a 4-foot ledge and in the Bonanza there is a 4-foot ledge.

San Andreas Citizen: L. Emery Jr., of Bradford, Penn., has seventy-five men digging a water ditch 5 feet wide and 2 feet deep from the Little Mokelumne river to El Dorado, whence another ditch will be dug to the Rose Hill mines near El Dorado. Mr. Emery will expend \$50,000 before any returns can come from the outlay. Along the route of the ditch are mines now idle which will begin operations when water is secured which is promised this month.

Angels Echo: The Utica Co.'s mines and mills will not start up till the rains set in.

Jackson Dispatch: At the Gwin mine, Mokelumne Hill, work is progressing. Shifts are drifting south on the 1000, 1200 and 1400 levels, working from the north shaft, and taking out a good quality of ore in sufficient quantity to keep the 40-stamp mill running day and night. The pump and air compressor have been transferred from the south to the north shaft, and all the work is being done through the latter. The mill is run by water power and the hoist by steam. Circular saws and machinery for framing timbers are being put in the timber yard, and other important improvements are in contemplation.

El Dorado.

Work has resumed at the Miller mine near Diamond Springs.

Placerville Nugget: W. C. Greene & Co. have bonded the Atlantic mine in Placerville and are developing the property.—On the Gold Bug, D. H. Jackson is sinking a new shaft.—F. Staples at Logtown is opening the old Capital claim and will soon start milling. He has opened on paying ore in a 2-foot ledge. The Capital has lain idle for many years.

Georgetown Gazette: In the El Dorado Gravel M. Co.'s property, near Josephine, development work is in progress. A channel has been struck by boring and a tunnel will be driven.—Hayward & Lane have bonded the Phillips claim near Mt. Gregory, and preliminary work has begun.

Kern.

G. M. Rose and partners, working a group of claims seventy-five miles east of Johannesburg, will build a stamp mill the first of the year.—Shipments of lumber and machinery are being made to the California Borax Co.'s new plant near the old Seales works. They expect to turn out borax Jan. 1st.—The Bordon Borax works have also a large property of borax and mineral lands, on which they are doing development.—The Red Dog mill is running on ores from the Butte and Wedge mines.

Los Angeles Review: It is estimated that the clean-up of the Yellow Aster mines at Randsburg for October will be \$50,000.

The Red Dog mill is running on ore from the Butte and the Little Butte mines.—A. W. Collins has bought the O. K. group of claims and will immediately begin development work.—The new pump at the wells of the Yellow Aster M. Co. has been set to work, and the lumber is on the ground for the tank, which will contain 100,000 gallons.

Randsburg Miner: In excavating for the walls for the Yellow Aster 30-stamp mill at Randsburg they encountered the 15-foot Olympus ledge in decomposed quartz gravel.

The Rand tunnel, in crosscutting to the Tribby ledge, encountered the Vertical ledge and two other ledges which ran high in value. The whole Tribby mountain in this crosscut is intersected with ore seams. Wherever this company has excavated for hoists, magazines or mills they have encountered pay ore. Supt. Singleton will sink a shaft at the mill, with 30 H. P. hoist and double-decked cages. This will explore the whole underground workings of the Olympus and Tribby mountains at 2500 feet deep, besides saving all surface tramways and handling. All ore will come direct from this incline, which will have two compartments and a manway. The electric plant of the mill will furnish 500 incandescent lights.—The Eureka mill has been running recently on a number of small lots of ore, in nearly all cases rich. They are now at work on Wedge ore.

Mariposa.

(Special Correspondence).—Capt. A. H. Ward has arranged to work his Spencer and Grub mines, adjoining the Tendon, at Whitlocks, and arrived here last week to begin operations. Good ore bodies are in sight in both claims.

The Egenhoff Bros. are taking out high grade ore from their claim on Quartz mountain, near the Merced river.

The mines and mill of the Merced Co. at Coulterville closed on the 5th, the water in the reservoir being exhausted. It will not be possible to resume till the fall rains set in. The Mary Harrison mine is in excellent shape at present, the main ore shoot being opened up from the 400 to the 700 level. This shoot is about 300 feet in length and 6 to 12 feet wide, and is said to mill "better than \$10 per ton." Since the cost of extracting and milling this ore is somewhere between \$3 and \$4 (exclusive of the cost of development work of the past year, which was between \$1 and \$2 per ton of ore blocked out), the stockholders may at last look forward to some return on their investment. A crosscut is being run through the big ankerite vein on the 700 level in the hope of encountering another ore body on the hanging wall.

The Golden Crown Co. has between thirty and forty men working at the Big Betsey. Large hoisting works have been erected and a mill is soon to be placed on the property. The ore is base, carrying a high percentage of iron pyrites.

J. H. Galey of Pittsburg is working the Murphy mine, half a mile south of the Mary Harrison, at Coulterville. New machinery is being put up. Some rich ore has been taken out and the present workings show 5 feet of high grade milling rock on the 100 level. Mr. Galey has also secured an option on the Por-

ter mine, near by, from which the manager and the clean-up recently disappeared.

The California Exploration Co. is making preparations in a small way to resume work on the Virginia about Jan. 1.

The Merced Co. and an outfit said to be in the interest of the Shawmut Co. of Jacksonville are digging ditches on the South Tuolumne. Five years ago the former bought the old Oak Flat ditch, which had then been abandoned a score of years. They did nothing with it, however, till recently, when the water was relocated, presumably for the Shawmut people. The water right is considered valuable, as during a large portion of the year there is considerable water, and the stream has a great fall. Both sides announce the purpose of building electric plants. The matter will probably reach the courts.

Mariposa, Nov. 15th, '98.

Mono.

Bodie Index: The Bodie tunnel mill is running on ore extracted by leasers; there is a good quantity ready for crushing.—E. Juhl, at the Little Stranger mine, took out eight tons of ore, of which he is making a test crushing.

Bridgeport Union: At the Arnot and Par-value mines, near Green Creek, a 4-foot ledge has been struck which is said to yield \$60 a ton. Twelve tons of ore have been daily taken out and hauled to the Dunderburg mill. The mines have closed down for the winter.

Nevada.

The old Home M. Co. at Blue Tent have again struck the ledge. It is about 4½ feet in width.

Grass Valley Union: W. L. Wallace contemplates the erection of a small mill on his mining properties near Graniteville.

Nevada City Transcript: There is only 6 feet of water in Fordyce reservoir, the usual amount at this season of the year being 40 feet. Unless rain falls this week the South Yuba Co. will completely shut off water supply to the mines, which will necessitate stopping the pumps, which up to the present have had power supply.

Transcript: In Washington and Maybert districts the Grey Eagle, the Lindsey and the Ocean Star are all making a good showing.

Placer.

Colfax Sentinel: The mill at the Herman mine near Deadwood is running day and night. Thirty-five men are employed. The ledge is from 10 to 12 feet wide, all milling ore.—The Golden West quartz mine near Blue canyon has 700 feet of tunnel on the ledge. A new tunnel will soon be started 200 feet lower on the river, 32 feet above high-water mark.—The tunnel of the Blue Canyon M. & D. Co. is in 1150 feet. The company uses a machine drill and employs five men.—J. W. Schmutzler, with seven men, is working the Dardanelles and Big Spring gravel mines near Forest Hill.

Plumas.

At the DeLong mine, near Long Bar, forty men are employed. The preliminary work for working the bar and river banks has been completed. Heavy machinery has been brought in.

Quincy Bulletin: At the Nugget mine, near Granite basin, J. Peppin is hauling 150 tons of ore from his mine to the Robinson mill for crushing.—See & Jolly are opening a good ledge in their mine. The ore body is large.

San Luis Obispo.

The San Francisco company operating the Santa Clara quicksilver mine at San Simeon has four retorts of five tons capacity running and twenty men employed.

Shasta.

Connors & Son are getting out high-grade ore from their Salt Creek property in Lower Springs, and at the first rain will start their quartz mill.—The mill at the Spanish is silent for lack of water, but the force is getting out ore.—Capt. Roberts of Harrison gulch has secured a controlling interest in the White Oak at Lower Springs, and it is locally reported that he will sink a shaft soon.—Near Shasta the Shurtleff Hill mine is doing development work.—The Mt. Shasta has thirty men taking out ore.—Pugh & Menzell are hauling ore to their mill on Clear creek. The country is filled with prospectors.

Redding Free Press: Salee & McDonnell have resumed shipping ore from the Bully Hill mine at Copper City to the smelters at tide water.—E. P. Conner, near Shasta, has men developing a new property.—The mill at the National mine, near Buckeye, has resumed operations. The power for the mill is furnished by the Paul and Garlick electric plant near Copley. The water supply has increased. There are 300 tons of ore ready to be worked.—The Gopher mill, near French Gulch, owing to a lack of water, has closed until the rains come.—A. Halen has sold to T. Anderson the Santa Claus quartz mine in the Buckeye district.—Mullen & Blackwell sold to L. H. Snell for \$500 a one-third interest in the Golden Eagle quartz mine, Harrison Gulch district.—G. Reinhaus bought from T. J. Montgomery the Fisher and Pick Up quartz mines, French Gulch district.—L. Thompson, for \$300, sold to T. F. Morrissey the Gray Eagle quartz mine, Harrison Gulch district.

Redding Searchlight: The Eureka mine at Middle Creek, which has been idle over two years, will resume, litigation having been settled. The property has about 3000 feet of surface cuts, from which high grade tellurium has been taken. Under the present ownership, development work will determine values at depth.—Near Delta, the Advance M. & M. Co., a corporation of San Francisco and Oakland capital, has erected a 15-ton cyanide plant on the Tought mine. Tests prove the practicability of the cyanide process on these ores.—On the Bard & Hunter mine, at McCall's, the owners are putting in a Hunting-

ton mill. The owners of this property recently bought the Delta mine.

Sierra.

Grass Valley Union: Near Alleghany everything in the mining line is looking well. New claims are being opened and improvements going on in every direction.—The Plumbago mine is said to be yielding \$25,000 per week. The ore is more gold than quartz. Two years ago this mine was idle for the want of capital to develop it.

Siskiyou.

M. Souther, managing agent of the Eastern company prospecting Yankee creek basin, near Yreka, the past summer, is expected to close for the land next week and work the same on an extensive scale. The ground has been prospected by steam augers, but the success obtained is only known to the men superintending the work.—Fry & Macauley's mill on Cherry creek will soon begin crushing quartz from the Ironside ledge, recently bought by them. They will also crush prospecting quartz from the Hunter & Co. ledge, until the latter puts up a mill.—B. G. Reeder is getting good quartz from his ledge in Fool's Paradise district, Shasta river.

The miners feel hopeful of having a good winter season for rain and snow, and are prepared for extensive operations. A good deal of prospecting has been done during the past summer.

Yreka Journal: A Boston company is finding good prospects at the old Eagle mine on Indian creek. The Grizzly, or old Bonanza, ledge, in same vicinity, is to be worked again next spring.

Yreka Reporter: The King Solomon mine on Canyon mountain has again started up.—The Wilson Bros. have resumed work on their claim on Eddys gulch, in the Salmon country.

Yreka Journal: The new owners of the Commodore quartz mine at Barkhouse are working twenty men and taking out good quartz. The 6-stamp mill has been running for several weeks.—The quartz miners in Quartz valley are making preparations for carrying on work during the winter.—At Oro Fino the Eastlick and Wright hydraulic mines are being fixed up for extensive operations.—The cold mornings make trouble in working at the river claims on the Klamath, as the melting of frosty ground during the middle of the day causes caves of banks.—W. A. Chamberlain has been prospecting in the McCloud mountains, at the Siskiyou and Shasta county boundary line, and found some good quartz, which he intends developing.

Tuolumne.

The Santa Ysabel mine, near Quartz, struck the central ore chute at the fourth level. It is estimated that the ore can be treated at a profit of \$10 per ton. The mill will be started when water supply can be had.—The Trio property, in which owners of the Santa Ysabel are interested, is said to be showing well, and the erection of a mill is contemplated.

Sonora Democrat: Forty men are employed at the Densmore mine near Sonora. Mechanics are putting up a mill of four 1000-pound stamps, triple discharge. This is supposed to give a crushing plant equal to an ordinary 10-stamp mill. Enough ore has been taken out to run for a long while. Water will be piped from the Tuolumne Co. Water Co.'s ditch.—On the old Excelsior mine sinking the new shaft continues.—In the Cave Diggings district of the East belt several claims are being opened up.

Jamestown Magnet: The Dutch mill, at Quartz, began dropping fifteen stamps last week. The management hope to keep the mill running to at least half of its capacity.—The Stanley mine and adjoining properties near Jacksonville are being retimbered.—At the Mazepa mine, near Stent, a 4 H. P. engine, to operate the blower, is being set up. Sinking the shaft continues.—At the Rappahannock mine eighteen men are employed.—At the Bonita mine a shaft will be sunk 300 feet. Hoisting works will be erected.—At the Philadelphia diggings, near Columbia, ninety men are at work on the ditch and flume from the Stanislaus river.—The Jamestown Light & Power Co. have completed their plant and are ready to begin operations as soon as water is available. The completion of the reservoir at Hale's mill, on Herrin creek, makes the water supply reliable. The contemplated reservoir at Strawberry is to be built of masonry 100 feet high and will assure a supply to generate 300 H. P. at their power plant with two dry seasons in succession. The starting of this plant insures a permanent supply of water to the Mother Lode regions, as the water, after passing the power house, is retained in Phoenix lake, where it can be distributed as required. Motors have already been installed at the App and Rawhide mines, where the lines have been run, and extensions will be commenced on the pole line from Rawhide towards Angels, Coulterville and the Black Oak district.

COLORADO.

BOULDER COUNTY.

A drift was started from the 600 level in the B. & M. mine at Boulder on a body of ore 44 inches wide of a smelting quality. Supt. Bosson has forty-one men employed.

The Mogul tunnel at Eldora has cut several veins, and two of them, the Somerset and the Little Stranger are producing ore. The Little Stranger has recently been bonded for \$25,000.—The mining activity in Boulder county continues. A larger number of new mills are in operation all over the county and a larger amount of ore is being shipped out than ever before. Conservative estimates place the yield of this county for this year at \$2,000,000.—The old Pennsylvania mine at Sunnyside will resume operations immediately, the final payment of \$20,000 having been made by the Eastern purchasers.

CHAFFEE COUNTY.

The ninety-day bond and lease on the Independence mine at Whitehorn has been taken

up and \$25,000 cash paid for it. The deal was made by O. W. Crawford, who is one of the owners of the Golden Eagle. W. H. Welch of Chicago is at the head of the new company. He is also at the head of the M. J. King G. M. Co. that is operating extensively at Turret. The Waverley mine at Turret City, owned by the King G. M. Co. of Chicago, is said to have ore that yields \$125 to \$175 a ton in gold. —O. W. Crawford has bought the Independence mine, Whitehorn district, and made the first payment of \$5000. The mine will be worked in connection with the Golden Eagle, Cameron and Eastern View. Twelve men are employed and the first shipment has been made. The vein has been opened 1257 feet and ranges in width from 8 to 54 inches, the ore carrying values of from \$20 upwards.

CLEAR CREEK COUNTY.

The Pelican-Dives and Seven-Thirty group at Georgetown, which turns out a very large percentage of silver ore in the district, made heavy shipments last week, almost every lessee on the mine making a shipment. The mine employs 125 men and has over eighteen miles of underground workings.

At Idaho Springs lessees on the Champion have opened into copper ore in the fourth and fifth levels and made a shipment that netted \$45 per ton. The Dove's Nest has begun shipping ore, the first in six or seven years. They have cleaned out the levels and find a big body of mill dirt from the surface down.

EAGLE COUNTY.

From Red Cliff were shipped last week eight carloads of ore, making a tonnage since Jan. 1st of 10,580.

The Eagle River M. & M. Co. of Red Cliff is driving a tunnel to develop 1000 acres of mineral territory. The tunnel is in 300 feet and is to be driven two and one-half miles farther, which will take five years.

EL PASO COUNTY.

The output from the Legal Tender at Victor last month averaged ninety tons per day. The greater portion of it was low-grade mill ore. The Vindicator is one of the big shippers of Cripple Creek district. Last month from the company's workings 1500 tons were sent out and by lessees 1100 tons, making the total for October 2600 tons. When the new ore bins are completed and the spur of the Golden Circle Railroad is in operation to the mine the Vindicator will ship at the rate of 150 tons per day. The Keith & Grube lease on the Vindicator produced 800 tons in October, with an average of \$40 to the ton. Two new shafts have been started on the lease.

The Victor Record announces that Eastern capital within five months will have in operation in Victor a plant with a capacity of 500 tons a day, to handle low grade ore exclusively. The plant will be erected by the Oneida Co. at a cost of \$200,000. The Murphy electrical process will be used, which, it is claimed from experiment, will save 37 per cent of the values.

Victor Record: Lessees Miller & Co., on the Black Belle, Victor, received returns from a shipment of 9½ tons of ore at the rate of 7.77 ounces to the ton, and, after deducting treatment and transportation charges, netted over \$1000, after paying a royalty of 20 per cent to the owners of the mine and 5 per cent to the original lessee. There are eight sets of lessees developing the Black Belle and every one in ore. The lease has but a few weeks longer to run. Keith & Grube, the heaviest shippers of the Vindicator lessees, started for a new level. The shaft is down 125 feet. Ore production will be curtailed during development.

GILPIN COUNTY.

C. H. Werdnhoft has leased to S. Johnson the Lillian group, near Central City, for \$12,000.

Central City Observer: Two hundred and fifty pounds of ore from the Topeka mine, Russell district, gave 305.28 ounces gold and 27.94 ounces silver per ton. For the bar of bullion was received at the mint \$5146.96.

GUNNISON COUNTY.

The Black Queen mine of Crystal is being developed with thirty men. The mine was formerly a heavy producer of silver.

HINSDALE COUNTY.

The Lake City M. & L. Co. are erecting an electric hoisting plant on their Wisconsin mine. Sinking will be continued to 400 feet. The Varden Belle mine of Lake City has been leased to W. A. Bial for \$3000. It has an 8-inch pay streak which runs high in silver.

LAKE COUNTY.

The Maid of Erin Silver Mines Co.'s output at Leadville for October was over 3000 tons. About sixty men are working as leasers and employees. Seven shafts are in operation. The output is principally oxide iron. A lead carbonate, carrying iron, is also being shipped.

The Fanny Rawlings output in October 1000 tons of gold-copper oxide and sulphide ore. The Leadville Pumping Association is throwing 2100 gallons of water per minute with the four large special Snow sinking pumps hanging in the Penrose and Bon Air shafts. Three additional sinkers will be put to work. The water has been lowered 90 feet. The work is progressing satisfactorily. When the two station pumps are recovered at the Bon Air and Penrose the levels will be rapidly cleared. The recent manganese discovery made on the Modoc mine promises to be a steel iron mine. Twenty-five tons daily are shipped in developing this deposit. The ore is sent to Chicago. One of the next large undertakings to be got under way is the sinking of the three-compartment shaft on the Wolfstone, which is at present 600 feet deep. This will necessitate the unwatering of the miles of workings in the Maid of Erin, Adams and Wolfstone mines. This is said to be one of the requirements of the new lease that will be given by Pres. Hendrie of the Wolfstone Co.

The Resurrection M. Co. of Leadville is making extensive improvement about the mine. New ore houses with a capacity of 500

tons have been erected, and the shaft is being retimbered. More than 100 M. feet of lumber was used. The new mill will be begun next spring.

Leadville Miner: At the Union smelter at Leadville are roasted sixty tons daily of lead and iron sulphides from the R. A. M., Mahala and A. Y. and Minnie. They contemplate having the Denver & Rio Grande build tracks to the works in the spring. They also intend to rebuild the present furnaces, four in number, and add six new ones.

PITKIN COUNTY.

The mines at Aspen have not been worked so steadily since the fall of silver in 1893 as at present. They are largely worked on the leasing system, but some of the big companies are operating with fair success. There are very few, if any, good miners in the camp that are not at work.

SAN JUAN COUNTY.

The Excelsior of Silverton district has opened a 3-foot vein of galena. A streak of sand carbonates alongside the galena yields thirty-six ounces silver and 60 per cent lead.

The Ridgeway mine, Silverton district, shipped two cars of ore last week which netted \$1300 per car.

SAN MIGUEL COUNTY.

The U. S. & B. C. mill at Telluride is completed and will be in operation soon. About 100 tons of ore is ready for the mill.

SUMMIT COUNTY.

In October forty cars of ore were shipped from Breckenridge district, besides that treated at the different mills.

IDAHO.

A strike is reported from the Lone Star mine near Salmon City. This property is owned by the Bell M. Co. of Denver. The vein is extensively opened and yields \$8 to \$10 ore, most of which is base, carrying lead and copper concentrates and irregular bunches of rich ore.

Near Wallace the Hecla mine, in the last 400 feet of the 1400-foot drift, has been in continuous ore, and the face is in 7 feet of shipping ore, which assays 65 per cent lead and fifty ounces silver. J. A. Finch, A. R. Campbell and P. Clark of Spokane are the chief owners. The workings are at a vertical depth of 700 feet. The company has been shipping ore for some time, and it is locally reported here is planning to build a mill.

Pres. I. E. Blake of the Northwest Railway Co. and associates were at Seven Devils, where they bought the Peacock mine and let a contract to sink a 100-foot shaft and to run 200 feet of tunnel on the property. The Blue Jacket mine, near Seven Devils, has thirty men employed and is showing good copper ore. A new strike is reported near the Peacock, made by Rogers & Gardner. It is said the lead is from 4 to 12 feet wide and can be traced for half a mile.

The new dredge on the McNutt placers, at Moose creek, was started Oct. 29th to test the machinery, which was found to work in perfect order. The scow and metallic sluices are being attached, and the boat will be ready as soon as the ground thaws in the spring. This is said to be the largest placer dredge machine built. It has a capacity of 5000 cubic yards a day; it has been constructed under the supervision of H. J. Reiling. There are several patent appliances for catching the drippings, and it is estimated that the machine will save 96 to 98 per cent of all the gold contained in the gravel. The pay streak is from 100 to 300 feet wide, and runs from 60 cents to \$1 per cubic yard.

Hailey Times: Three carloads of ore were shipped from Hailey last week. There are 500 sacks of ore from the Narrow Gauge mines in Hailey for shipment. W. H. Wickham, Mgr. Cyanide works on the Hailey gold belt, has shut down for the winter. Work is progressing at the Tiptop mill and the pipe line is completed.

Idaho City World: In the Klondike quartz claim, near Idaho City, the ore continues to improve, the ore chute is 120 feet in length and the ore mills at the rate of over \$100 a ton.

Florence Miner: The Jumbo claim, in Robbins mining district, has a ledge from 12 to 24 feet wide and runs from \$15 a ton upwards.

Salmon Recorder: The carload of ore recently shipped to Butte from the Copper Queen mine at Salmon yielded \$16 in gold per ton, five and one-half ounces in silver and 2.78 per cent copper.

MONTANA.

Blewett & Cobb shipped eighty sacks of ore from Copperopolis that runs 30 per cent copper. They will soon ship 600 sacks of the same grade.

The East Helena smelter plant is being operated by the electrical plant at Canyon Ferry, on the Missouri river. All the machinery formerly run by steam power is now driven by electricity. The blast furnaces were shut down but four hours while the steam power was being cut out and the electricity installed. There are a number of motors, two of 175 H. P. each, three of 100, one of 50, one of 30 and one of 20.

The new Diamond shaft of the Anaconda Co. was begun two years ago to develop to the 2000-foot level. Work has been in progress since the shaft has reached 1700 feet, and will be continued until the 2000 level is reached. It is said to be the quickest work in sinking mine shafts in the history of mining. The shaft cuts the mammoth copper ledge at a depth of 1650 feet, where the ore showed an average value of 50 per cent copper and high in gold. A monster engine, similar to the one at the Anaconda, is being constructed in San Francisco for this shaft. At the Copper Jack mine, Butte, drifting has begun at the 100 level, where there is 18 inches of ore. At the 200 a crosscut is being driven.

Garnet News: The steam shovel on the Summit placer mine, near Garnet, is working successfully, handling and washing from 500

to 800 cubic yards of dirt in ten hours. The placer deposit is at an elevation of 6000 feet. Water is pumped to a perpendicular elevation of 1000 feet.

Winston Prospector: The East Pacific mine at Winston has been increasing its output for several months, and the ore is piling up in the bins. The new bunk house, 50x100 feet, for 150 men, is nearly finished.

Garnet News: The shipment of high-grade ores from this district to the smelters continues. An attachment was placed on the Silver Butte mine and plant, near Vermilion, by J. Willis, to secure a claim of \$6148 for merchandise. The Kentucky & Montana M. Co. of Louisville, Ky., owns the Silver Butte properties.

Ciancy Miner: At the B. & G. ore hauling has been resumed and the tramway project has been for the present abandoned. Three cars of ore per week are produced.

Basin Progress: H. L. Frank of Butte has bought a controlling interest in the Basin G. & C. M. Co. At the Eva May the mill is running night and day and ore and concentrates are being shipped to the smelters. At the Bobby Burns the tunnel has reached 600 feet. Out of this mine eighty-four tons of ore brought \$3200.

Virginia City Madisonian: The German Bar Placer M. Co., near Virginia City, closed down for the winter after a successful season's operations. The Conrey Co. will also close. During the season the two companies have acquired a large acreage of placer mining ground, which would indicate that their new devices for mining flat placer ground are commercial successes. They will resume operations with the early spring.

NEVADA.

The West Walker River G. M. Co. in Lyon county has bonded its mines for six months to J. S. Cain of Bodie and R. L. Laws of Hawthorne.

The Dexter of Tuscarora has another shipment of gold bullion and auro-cyanides on the road. The power plant is nearing completion, and the forty stamps will soon be in motion.

The North Mountain M. Co., in White Pine county, shipped 340 pounds of auro-cyanides, valued at \$5600.

At Virginia men are placing the pipe to convey water to the pump at the C. & C. in condition, and the work will be completed before the pump arrives. Supt. Edgar of the Occidental, at the Utah, put six men to work last week. They are running a drift and have struck some good ore.

Pioche Record: Work has resumed on the Peck mill at Bullionville, and it will be ready for operation within thirty days.

Hawthorne Bulletin: The Drinkwater tunnel at Silver Peak last week cut through the big ledge. At the point of crosscutting, the ledge is 60 feet wide, and the ore is estimated to go \$20 per ton. In J. Chiatovich's mine at Silver Peak the ledge is about 6 feet thick, and ore is being extracted.

Virginia Enterprise: A force is employed at the C. & C. shaft, Comstock, overhauling the hoist engine. The machinery is to be placed in good condition, as the lowering of lumber for the drainage boxes will soon begin. A few men have been put to work at the Utah.

Virginia Chronicle: The south lateral branch of the Suro tunnel is to be extended to Silver City to drain the mines of that district between 500 and 600 feet below the present workings. Draining to 500 feet below the present workings of Silver City and Devil's Gate district mines will admit of the extraction of large ore reserves known to exist below the present deepest workings, which are only 200 feet below the surface, the heavy inflow of water causing a suspension of work below that level. The sale of the Golden Eagle mine in Humboldt county to Salt Lake and Chicago mine is about completed. The price is not given.

NEW MEXICO.

Hillsboro Advocate: At Hillsboro the Porter mill is working on seventy tons of Richmond ore. Six dry washers were started in the Hillsboro placers last week. The Eureka Co. is making a sample run of thirty tons of its first class ore at the Porter mill. A thirty-five-ton lot of Freiburg mine second grade ore is being treated at the Charter Oak mill. At the Andrews cyanide mill work began on 500 tons of custom ore from different mines in the district.

Santa Fe New Mexican: The Santa Rita Copper and Iron Co., near Silver City, is shipping 100 tons of iron ore daily to the smelters.

The Cochiti G. M. Co., from one week's run, shipped a gold brick weighing twenty-five pounds. The present capacity is 125 tons daily. Six leaching tanks are being added.

The Snake mine, near Hillsboro, made an eighty-ton shipment to the smelter. The Tripp mine, of Hillsboro, shipped fifty-five tons of \$110 ore. The Mills Tunnel Co., in Grant county, has finished its New Moon shaft at a depth of 175 feet, and are in solid ore. Another shaft of 150 feet will be sunk elsewhere on the property.

The Santa Fe New Mexican states that the most encouraging features in the past year in the advancement in growth and wealth of New Mexico is the increased output of ores from the mines in the Territory, and a consequent development of mining properties.

Silver City Enterprise: At Central the shaft on the Texas mine has reached 485 feet. The mill is working satisfactorily. At Santa Rita on the Hearst mining properties the force will be increased immediately and developing the ore bodies will be pushed.

OREGON.

F. S. Lewis bought the Deer Lodge mine, near Baker City, for \$100,000. There has been 800 feet of work done on the mine and it shows a vein 16 feet thick. It is the purpose of the new owner to drive a tunnel on the vein 2000 feet, securing 1400 feet of overhead stoping. A 40-stamp mill is to be erected.

The Bellvue in Granite county made its last shipments for the season in marketing 950

sacks of concentrates carrying good values in gold and silver.

Canyon City News: The Prairie Diggings property, near Canyon City, has been sold to P. Helmer, who says he will erect a 10-stamp mill and make other improvements early in the spring. There are between 500 and 1000 tons of ore on the ground ready for the mill.

Ashtland Journal: The gold output for Jackson county this year is \$150,000—two-fifths less than last year on account of scarcity of water. Ferguson & Sorrick, who bought the Miller & Dysert and other placer claims on Jump-off-Joe, have incorporated under the name of the Jump-off-Joe G. M. Co. Their new ditch is completed and everything will soon be in shape for the winter's run. Godfrey & Tabor, owners of the Red Boy mine in Baker county, brought into Baker City last week the first clean-up of their new 20-stamp mill, amounting to \$10,000. The mill has been running about two months. H. B. Compton and others recently bought the General Sheridan and Custer quartz claims in the Wolf Creek district, Josephine county. The price is not made public. The ledge shows 12 feet of ore, which is high-grade concentrating. The new owners will begin operations in the spring. The Vindicator M. Co. has made application to the Government for patents to 220 acres of mining ground in Grave Creek district, Josephine county.

Ashtland Tidings: The Lewis mine at Leland is working twenty men. Operations will shortly be resumed on the Basin mine on Briggs Creek. A. Carter has bonded the Anderson mining property on Williams creek for Colorado people. The cleanup at the Sterling hydraulic mine on Alieague is just being completed and operations will soon begin on another season's run. The Booth & Carter mine on Grave creek received a carload of iron pipe last week.

SOUTH DAKOTA.

Deadwood Times: The Garden City cyanide plant is in operation. The ore supply is from the Garden City M. Co.'s ground and from the Rainbow property.

UTAH.

The strike made in the Golden Gate mine at Logan runs \$20.40 in gold and 2½ ounces of silver.

The Sunbeam of Tintic shipped twenty-eight tons of ore last week that yielded \$40.50 per ton.

The Silver City Star reports the shipments of thirty-four carloads of ore from that district for last week. The electric power plant at the Overland mill at Sunshine is finished and the crushing and leaching of ores has begun. The crushers have a capacity for 300 tons a day, though Mgr. Peyton will start with 100 and increase the amount gradually. The present hoisting plant will be replaced by a larger one. On the ore bodies over 2000 feet of work has been done. The assay register shows an average of \$6 per ton in gold and the ore is free from refractory properties. At Marysvale 200 tons of gold ore valued at \$15 a ton are on the Dalton dump, and the amount is increased with each shift. From 50 to 100 tons of red oxide of iron are brought monthly from Monroe, Piute county, to Salt Lake, whence it goes as a pigment to Eastern paint markets. The producers get \$5 per ton for it. About sixty tons of antimony per month are marketed by the lessees of the Antimony mine, near Marysvale. Markets are found at San Francisco on the west and Chicago on the east. The lessees realize a good margin despite the long hauls. The Albion M. Co. at Alta will continue marketing ore through the winter. The lowest returns from the furnace show 18 5/8 per cent lead and 22 ounces silver per ton, while the highest show 63 per cent lead and 67 ounces silver. The ledge is 26 feet.

The Niagara mine at Bingham is marketing 300 tons of good grade ore a month. Mgr. Schenck of the Dalton & Lark bought the Howell placer, Bingham, and work will begin soon.

C. Lammerdsdorf, manager of the Sevier M. Co. of Gold Mountain, reports more activity there in mining than at any time in twenty years. The development of the Holland group will be resumed at once and continue until ores have been blocked out for a mill.

The Red Wing M. Co. has bought nine claims near Bingham. The price is said to be \$100,000.

The Tintic Miner says that eighty cars of ore were shipped last week, and five of concentrates and two bars of gold bullion.

The Bingham Bulletin says the strike at the West Mountain placer is yielding profitable returns. The Dewey mill finished a 200-ton lot of ore from the Red Wing and started on 2000 tons from the Old Telegraph. C. B. Allen is starting work under a lease on the Morning Star No. 2, near Bingham. They have been idle a long time, and the old workings are caved. Hirsh & Snow will do continuous work this winter on the Rosa group. It is giving good milling ore. Crouch & Benedict of the Zelnora are in a body of high grade ore. The York made a 50-ton shipment last week.

The Silver City Star reports shipment of thirty-two carloads of ore.

Tintic Miner: At the Jo Bowers, Eureka, a station has been cut on the 300 level and drifting begun. There is a 2-foot vein of high-grade galena, besides a considerable body of jiggling ore. A shipment of ore was made that showed 41 per cent lead, forty-one ounces silver and 60 cents in gold per ton. This is followed by two others in transit. At Death Canyon in the Happy Jack is a good showing of silver-lead ore, and a shipment is en route. In the Silver Bell in Silver City a vein of high-grade ore has been found which will probably run 200 to 300 ounces to the ton. In the Albion at Alta an 8-foot breast of ore has been opened. At the Bullion-Beck of Eureka in the 1300-foot level the winze is being continued down and is in ore that is good and indicates that it will continue to great depth. On the south the chute in which copper predominates yields an average better

than \$7 in gold, with some silver, per ton.—At Park City the Silver King, supposedly a silver property, outputs over \$11 per ton in gold, and the ore bodies in which it occurs are said to be ten years ahead of the means of smelting and milling them.—At the Star Co.'s mine and mill near Bingham the leaching of ore is in progress. A good percentage of the metal is being saved. The company hope to keep the mill in operation through the winter.—At Mercur the Sacramento has for some time been blocking out ores equally as productive of gold as originally found in the north workings of the Mercur. The company has exposed five ore chutes whose values run \$27 gold per ton.

Park City Record: Supt. Curtis of the Massachusetts started the pumps and power drills last week.—Shipments of ore from the Mackintosh sampler for the past week were 1,438,410 pounds.

WASHINGTON.

Near Kettle Falls the Northport Smelter Co. is doing development work on the south half of the Colville reservation. They are working copper and galena indications with a view to supplying their smelter from this section.—Considerable prospecting is being done on the placer locations on the west banks of the Columbia river near Kettle Falls. The black sand and gravel runs well in colors and an effort is being made to save the fine gold which is readily washed away in the panning process. Preparations are being made to work the property all winter.

At Republic the Golden Harvest is again in ore which yields \$17.50 per ton from average sample. The tunnel is in 305 feet and is 147 feet below the surface. The ledge 7½ feet wide.—The Butte & Boston tunnel continues to give the workmen much trouble on account of the slide rock and slow progress is made.

The Princess Maud tunnel is progressing at the rate of 4½ feet per day.

Near Boundary the Lakeview mine is taking out ore.—J. F. Hall has a force on the White Cap drifting on the ledge, the crosscut having tapped the ledge at 150 feet. The ledge is 3 feet wide with 3 inches of solid ore.

Everett News: F. J. Scougale and J. J. Sheehan returned from Ruby creek, where they have been at work on the placer mines owned by the Everett Hydraulic G. M. Co. of which Mr. Scougale is president. Owing to the wet weather the company stopped on the flume until spring when it will be resumed.

FOREIGN.

BRITISH COLUMBIA.

(Special Correspondence).—The B. C. Ex. Co., Ltd., which acquired the Slough creek

gravel property for \$165,000, has started a three-compartment shaft at the old camp. The ground near the mouth of Slough creek will be tested this winter by a series of bore holes.

A contract has been let to run a drainage tunnel 1600 feet in length on Cornish creek. The owners of this ground are F. C. and H. W. Laird, W. C. Fry, and Eastern people. Mr. Fry is superintending engineer. Laird, at Willow creek, is installing more powerful pumps to replace those drowned last winter.

F. T. Hamshaw has sunk a shaft 80 feet on Summit creek between the Hauser ground and Van Winkle lease. A shaft house, wheel and pump will be completed this winter, and an effort will be made to reach bedrock next summer.

Development is nearly finished on the Burns creek hydraulic, under the management of S. Medlicott. The Slough creek bench hydraulic between Nelson and New creeks, under the same management, is ready for piling early next season. W. Thompson will be in charge this winter while Mr. Medlicott is in England.

On the Bradford, Cariboo & Yukon Co., Ltd., ground on Antler creek, the old channel has been found 19 feet deeper than the present channel, and a drainage and working tunnel started to tap the deep ground; this is in 135 feet. Mgr. H. E. C. Carry has returned from the Yukon and will go to England this winter. In the meantime work is suspended on this property.

The Slocan & Cariboo Co. is putting in a tunnel on Canadian creek, near the mouth. Two shifts are working with M. Windt in charge.

Work will soon be resumed on the Devil's Lake Mining Co., Ltd., placer.

The Cariboo Gold Fields, Ltd., elevator on Williams creek had a very short season, notwithstanding the fact that the season throughout the district was fully up to the average. It is now seen that the volume of water required for elevating 97 feet through a 14-inch throat can be obtained for a period of more than six weeks in the year. As the ditch will furnish a minimum flow of 300 inches at 700 feet head, the company will probably put in an electric power and lighting station and dredge the ground. In this way the working season would be lengthened to six months.

Between Cariboo and Cassiar the vast auriferous area known as Omenica is again coming into prominence. In '71-'72, when labor was from half an ounce to \$20 per day, and transporting supplies from Victoria cost \$1 a pound, about \$2,000,000 was taken out by rocking, drifting and windgunning. Under these conditions only the richest and easiest ground

was worked, and the district was all but abandoned in '73 for the richer diggings in Cassiar and remained so until two years ago. In '96 the 43rd Mining Co., Col. Wright Mgr., and the Victoria Co., Cap. Black Mgr., began work. The efforts of these two companies have been so encouraging that the Hudson's Bay Co. has established a store at Manson creek; the Government is reopening old trails and building new ones, and next summer will expend \$50,000 in making the Fraser, Nechaco and Stewart rivers navigable for steamboats as far as Tatla landing. The cost of transporting supplies from Victoria is now down to 17 cents per pound and next season will be cheaper via Quesnelle. About 100 prospectors were in the district this summer and some good discoveries made, notably on Black river, where 40 rocker diggings are said to have been found, and on the west branch of the Findley. All the prospectors in the vicinity of Fort Graham have gone to the latter strike.

T. R. Moore and C. E. Perry of the St. Anthony Mining Co. have secured an option on the Victoria Co.'s property on Manson creek at \$130,000.

C. McKinnon sold his claim on Lost creek to D. Cumberland for \$5000.

The Chinese Co. on Vital creek sold to Victoria people for \$12,000.

The 43rd Mining Co. will have one elevator at work next spring on Kildare gulch.

J. Kavanaugh worked the Victoria Co.'s hydraulic this season and cleaned up \$1.08 per cubic yard of gravel.

There were three railway surveying parties in Omenica this summer. If a railway enters that field the output of gold from the district will be large within a few years.

Barkerville, B. C., Nov. 5th, '98.

The Rossland Miner is informed that the Second Relief mine at Erie has been sold for \$300,000.—Shipments from the Bosun mine, Slocan, amount to 220 tons.—Ore shipments from Sandon for the week ending Nov. 12th were 805 tons.—The ore shipments at Rossland the past week amounted to 3800 tons. Of that the Le Roi furnished 3000 tons, while the War Eagle contributed 800 tons. For the same period last year the shipments amounted to 1035 tons, and the increase in the twelve-month is over 300 per cent.—Near Nelson, F. W. Garland has been ground sluicing on the Hattie N. claim for twelve months with success. His is the only claim on the creek upon which ground sluicing has been tried.

The Fort Steele Prospector says that the Regina claim, owned by Bracebridge & Co. has been bonded to M. Thompson of Nelson for \$12,000. It is a copper property with a ledge varying from 10 to 20 feet in width.—R. Jaffray of the reorganized Toronto Co.

which controls the Cariboo, camp McKinney, mine, reports that the first two weeks' run of the 20-stamp mill resulted in saving of 870 ounces of gold.

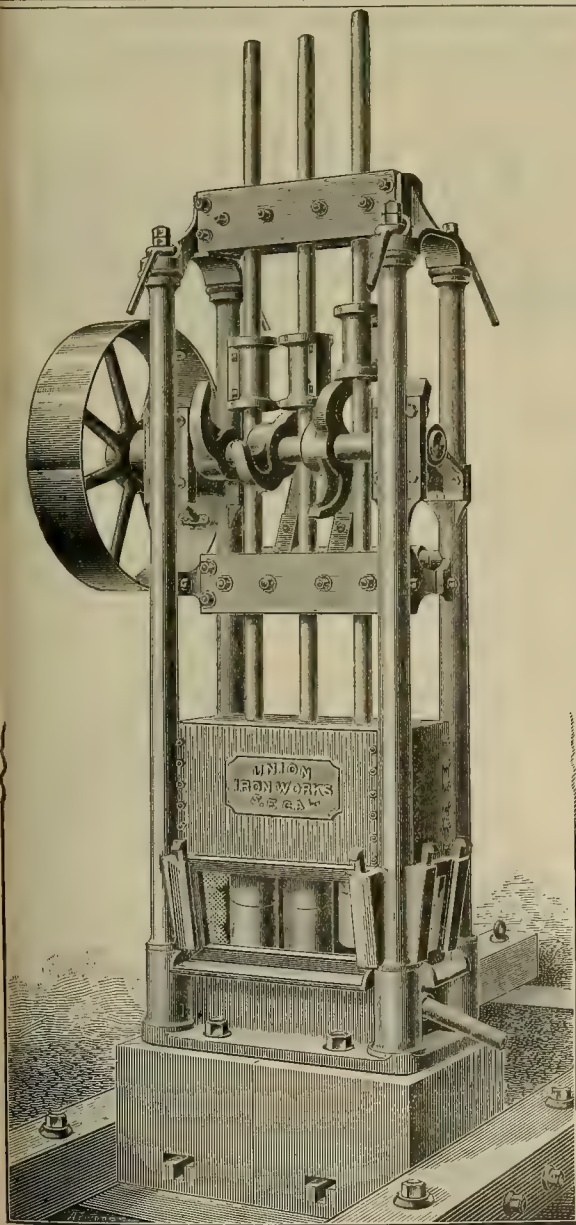
LOWER CALIFORNIA.

The San Juan gold and silver mines on the gulf coast were brought into prominence by the Crazz Bros. of San Jose, Cal., who disposed of their interests several years ago. The present owners are Moraga Bros. of Santa Barbara, Cal., J. A. Altamirano of San Diego, Cal., and H. W. Schramm of Burlington, Iowa. The mines are several hundred miles south of Yuma, on the summit of San Juan mountain, and eighty men are on the payroll. A cable takes the ore from the top of the mountain ten miles to the 25-stamp mill at the coast. The cable system cost \$50,000. The ore contains \$13 to \$14 in gold and about forty-one ounces of silver to the ton. The company is working 132,000 tons of tailings by the bleaching process. The mines are said to have always paid well.

MEXICO.

Globe, Ariz., Times: At Nacosari, Sonora, work has been stopped in the shafts of the United Globe mines on account of water. A tunnel is being run 5000 feet to tap the ore body on which the shafts were being driven. This will cut the ore body 700 feet below and drain the mines. The contemplated railroad which runs to the Sonora line will run to the tunnel. Air drills will be used in the tunnel. A 400-ton smelter is being erected and eight 100 H. P. gas engines will furnish the power.

Nogales Oasis: The Tucaba mine, near Magdalena, Sonora, has a group of claims through which several ledges run. The largest varies from 60 to 150 feet in width and the ore runs from \$7 to \$10 per ton. Another ledge is 16 feet wide, a third 12 feet wide and a fourth 8 feet wide. Over 2000 feet of development work has been done.—Development work in the Animas mine, near Llano, is progressing. High-grade ore is being extracted.—Unwatering the Ahogado mine is in progress.—The Apache mine, near La Dura, is owned by D. A. Richardson & Co. The ledge is about 4 feet in width and the ore is chloride of silver and is paying all costs of development work.—El Cielo mine, near Hermosillo, is being worked with good results by J. Grant & Co. There is a 5-foot ledge which assays \$25 in gold per ton, \$140 silver and a large percentage of lead. A shipment made recently yielded \$16 gold, about \$300 silver and considerable lead. A tunnel has been run on the vein 250 feet long.—The Pan-American M. Co., which bought some years ago the tailings dump, deposited by the old Prietas mill, have worked out all their ground and suspended operations.



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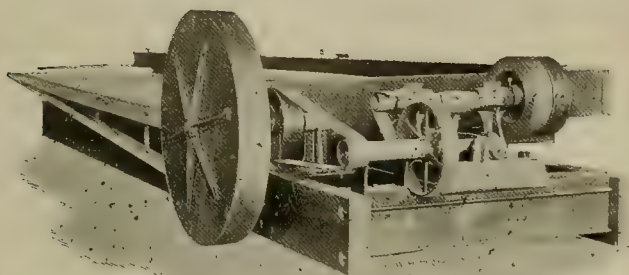
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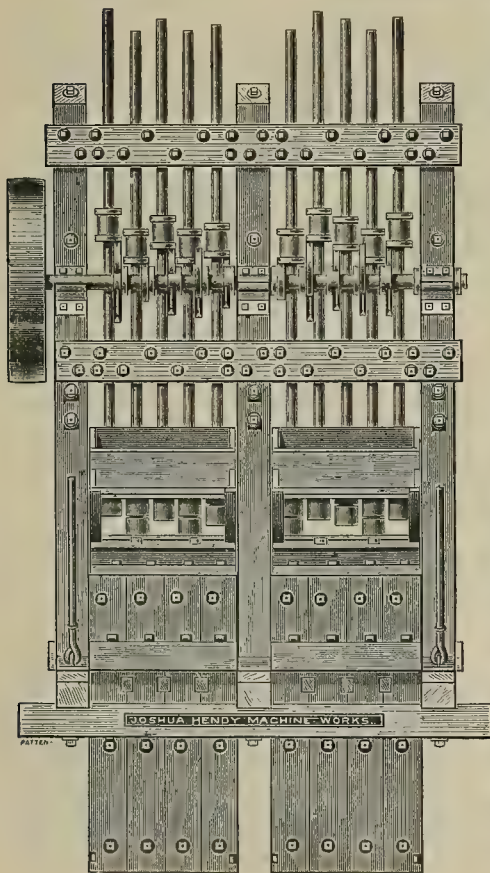
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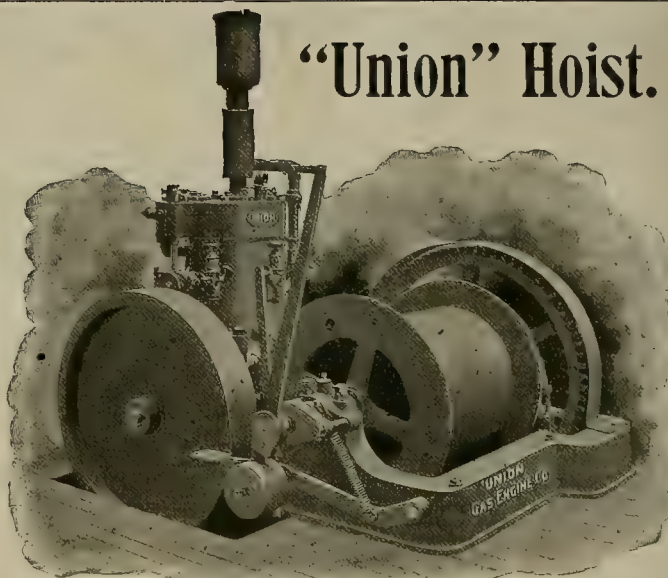
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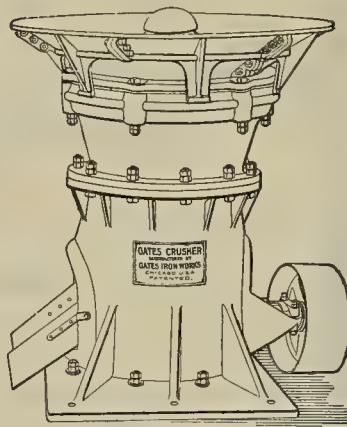
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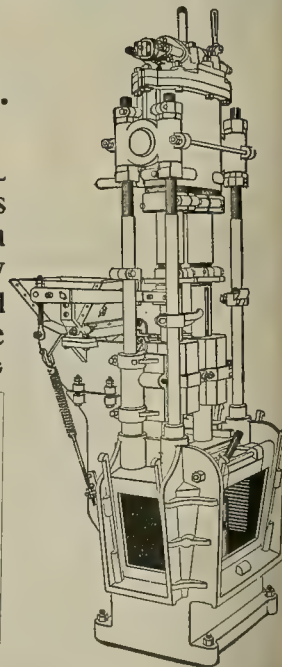
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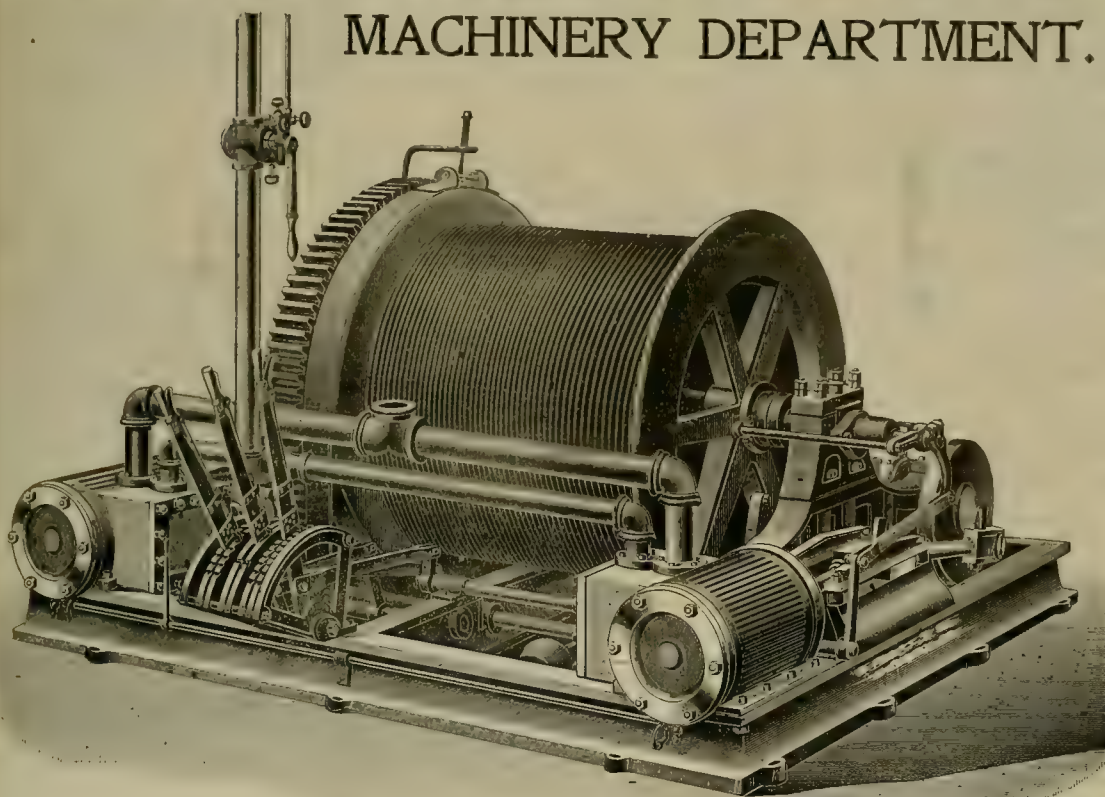
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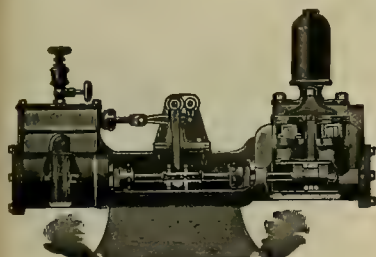
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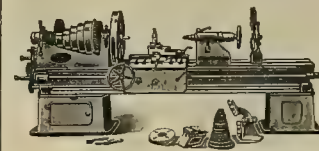
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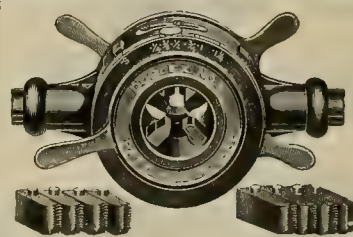
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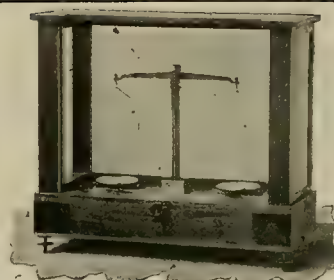
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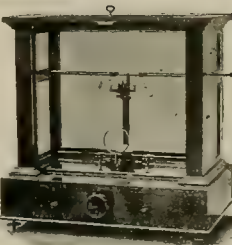
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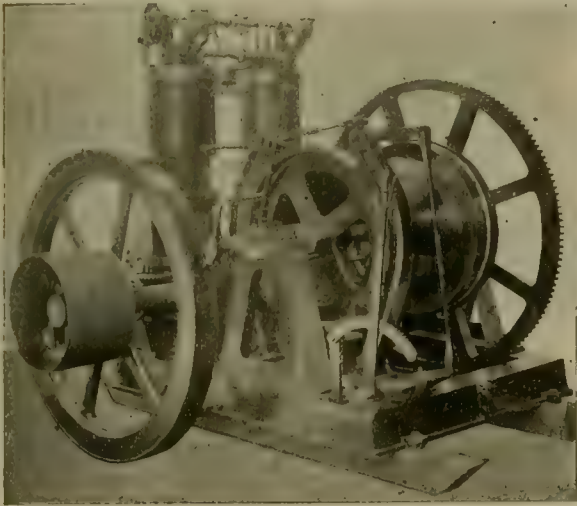
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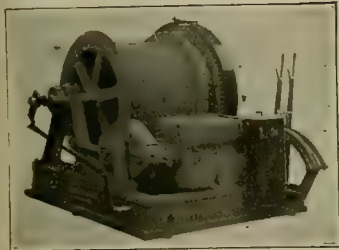
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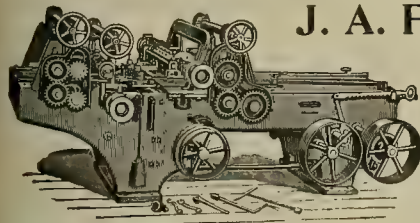
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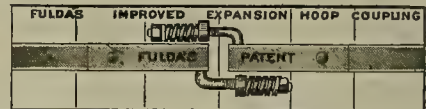
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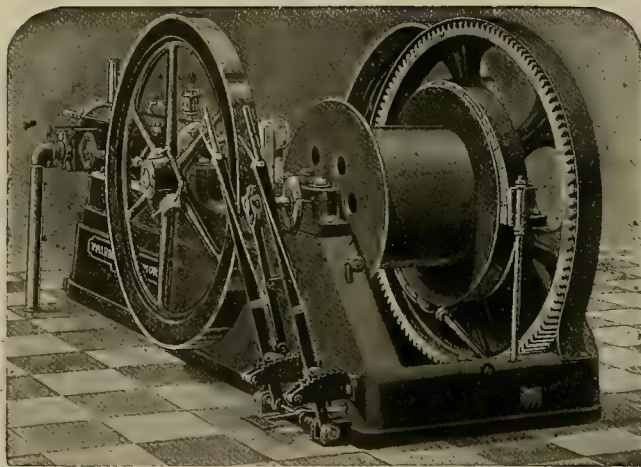
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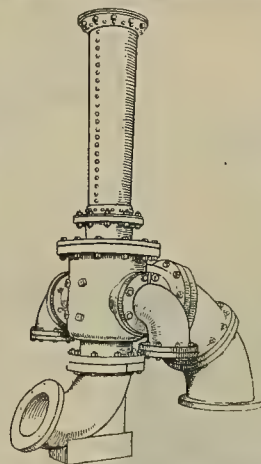
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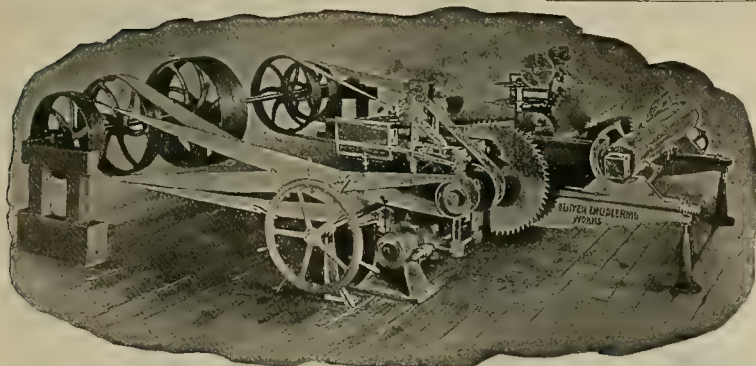
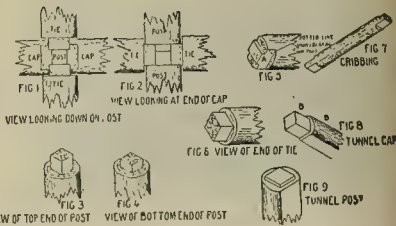
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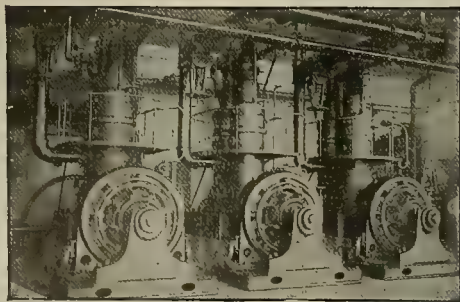
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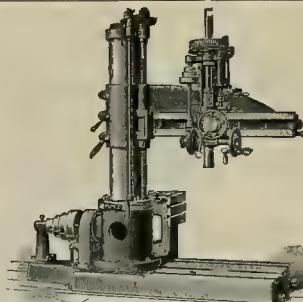
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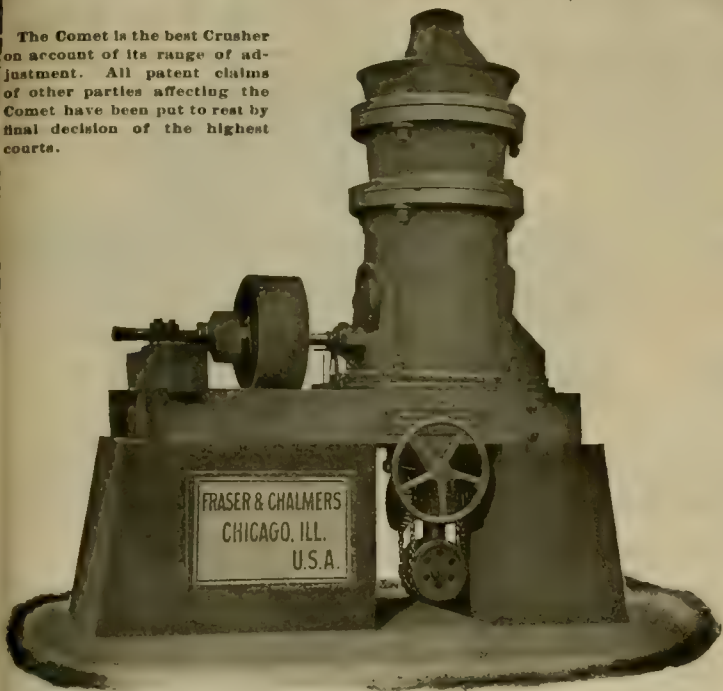
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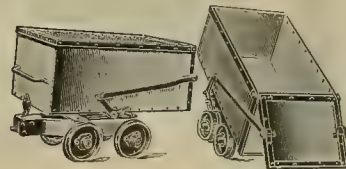
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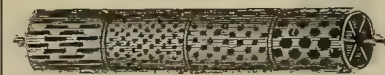
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SIMPLE. DURABLE. EFFICIENT.

No. 2.—44 in. x 24 in. x 20 in. Weight 425 lbs. \$30
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THE BEST ORE CAR IN THE FIELD.



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Improved Facilities! Finest Work! Lowest Prices
Perforated Sheet Metals, Steel, Russia Iron,
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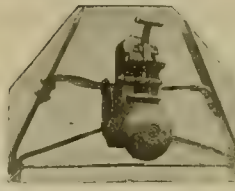
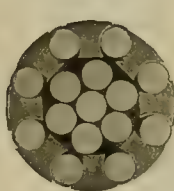
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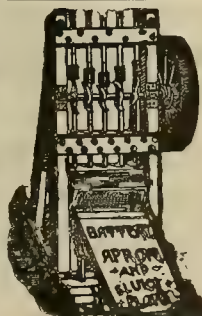
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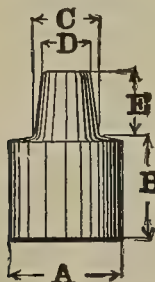
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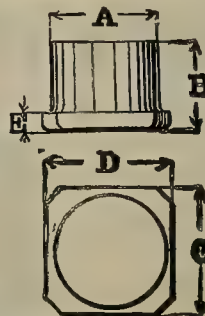
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B=..... "
C=..... "
D=..... "
E=..... "

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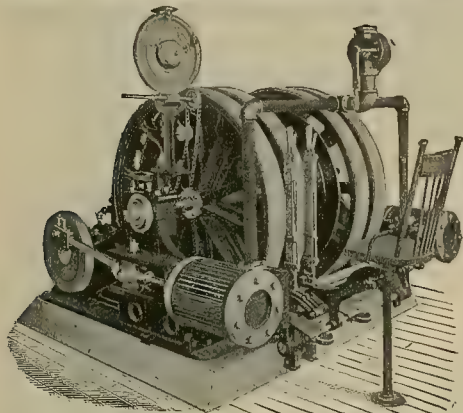
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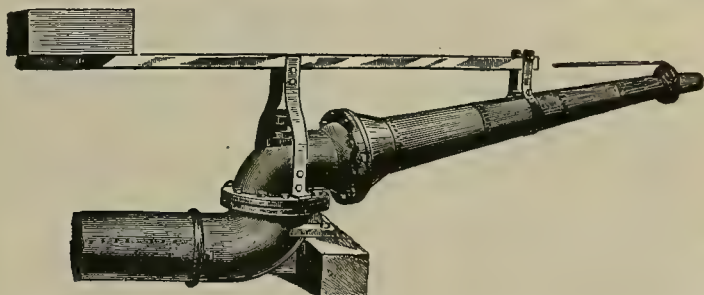
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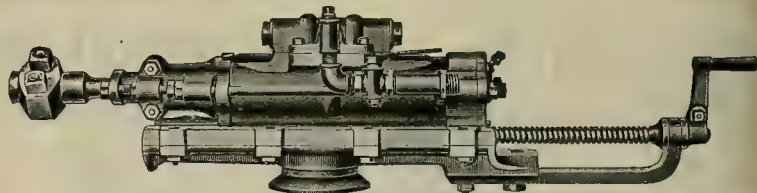
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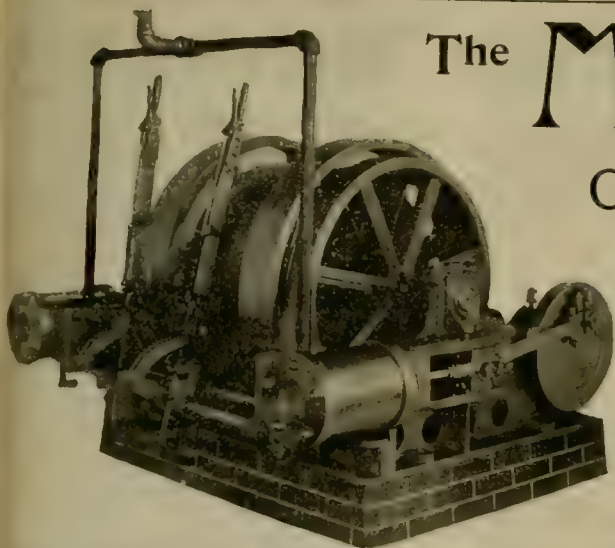
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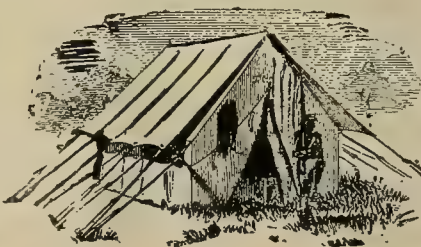
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Adapted to all Heads from

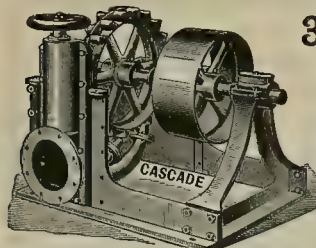
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Our experience of 33 YEARS building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

Send for a Pamphlet of either Wheel and write full particulars.

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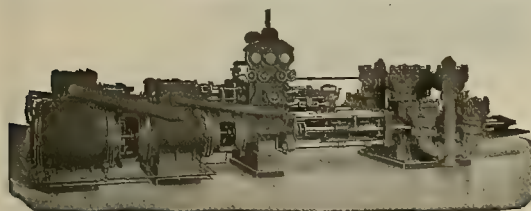
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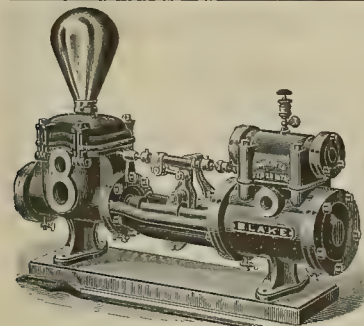
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Of the Latest Improved
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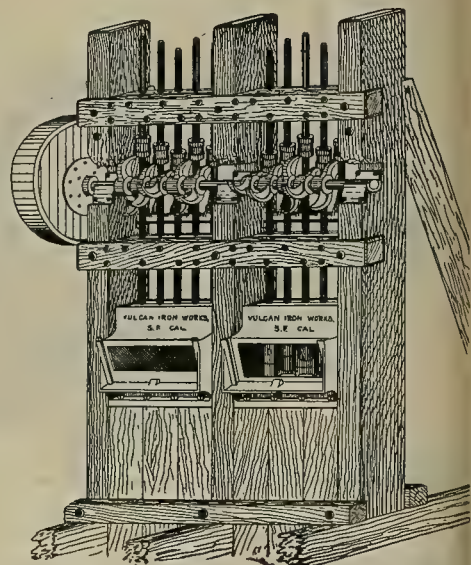
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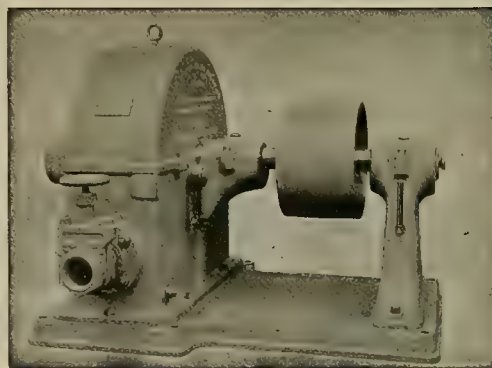
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An experience of more than fifteen years, involving both the theory and practice of hydraulic engineering as relates to power development in its widest range of application, is at the service of its customers.

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Pelton wheels afford the most reliable and efficient power for such service and are running the majority of stations of this character in the United States, as well as most foreign countries.

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Something Entirely New

For all those interested in
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Full particulars in our latest pamphlet.

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***** CHROME CAST STEEL *****

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for illustrated Circular.

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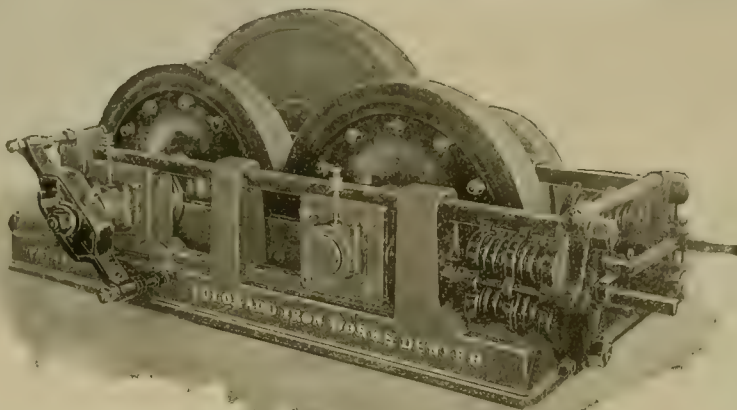
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as being the most efficient and the most economical machine for fine dry crushing ever placed upon the market. The rolls having

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can be fed evenly over the whole width of faces with certainty, and hence the faces or crushing surfaces are easily kept true. Descriptive pamphlet on application.



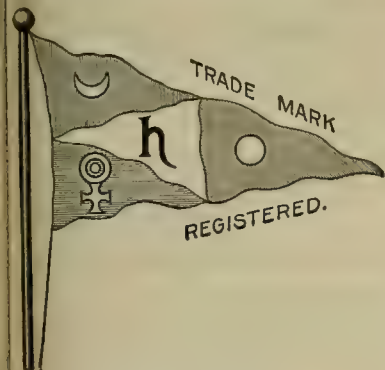
HIGH SPEED SPECIAL ROLLS, WITHOUT HOUSING.

Double rope tramways are acknowledged to be superior to those of the single rope type, and any one contemplating the erection of a tramway should investigate the merits of the . . .

THE ONLY AUTOMATIC TRAMWAY BUILT.

FINLAYSON PATENT AUTOMATIC WIRE ROPE TRAMWAY.

In this system the cost of transportation is brought below any figure heretofore reached. Its tonnage capacity is unsurpassed. Further information on application.



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BLUE VITRIOL, ZINC SULPHATE.

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BUYERS OF ALL CLASSES OF GOLD, SILVER, LEAD AND COPPER ORES, Bullion, Mattes and Furnace Products, GOLD BARS, SILVER BARS, SULPHIDES AND CYANIDE PRODUCTS.

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Watch this Space for Description of the Above Machinery.

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W. H. BIRCH & CO.,

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WRITE FOR A CIRCULAR ON THE

"BIRCH" IMPROVED TWO-STAMP MILL.

IRON FRAME, TRIPLE DISCHARGE, 850-LB. STAMPS, FORGED STEEL SHOES AND DIES.

Price, \$450 f. o. b.

Manufacturers of the LIGHTNER QUARTZ MILL.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 17, 1898.

SILVER.—London, 28d; New York, 60½; San Francisco, 60½; Mexican Dollars, 47½@47¾. New York exchange, sight, 15; telegraphic, 17½ cents premium.

LEAD.—New York dispatch, dull, \$3.70 bid, \$3.75 asked. The firm naming the settling price for leading miners and smelters at the West quotes Lead \$3.50.

Local, pipe, 6@6½c; sheet, 6½@7c; pig, 5½c; bar, 6c.

COPPER.—New York reports Lake firm, \$12.87½@12.95 asked.

Imports of copper into the United States for the first nine months of this year compare with the same period in two previous years as follows according to official Government returns:

| | 1898. | 1897. | 1896. |
|--------------------------|-------------|--------------|-------------|
| Ore and regulus, tons. | 1,848 | 3,516 | 1,979 |
| Bars, pigs, ingots, etc. | | | |
| Total value of above | \$9,858,909 | \$10,649,675 | \$8,334,847 |
| Imports | \$3,266,518 | \$1,477,223 | \$950,592 |

The bulk of this year's copper imports was Mexican copper in transit via Arizona for re-exportation to Europe.

IRON.—American, soft, \$21.75 and \$23.75 per ton; Scotch, \$24.25.

SPELTTER.—5½@5¾.

TIN.—Mento Roofing, redipped, \$7; English, to arrive, \$4.50; Pig, 18c; Bar, 19c.

"Although it has attracted less attention than the rise in copper, tin has made a rapid advance in price recently, and, while opinions are divided, there are people in the trade who are predicting a 'boom' in the article," says *London Money*. "The curious thing about the rise in price is that it has been brought about in the face of a smaller export trade, not only for last month, but for the nine completed months of the year, while there are no indications of any increase in consumption in the near future. In other words, the rise is the result of market manipulation, and as the rise is having the effect of bringing the old works into operation again, it appears fairly safe to say that we shall see lower prices for tin in the reasonably near future."

ANTIMONY.—9½, 10.

BABBIT METAL.—10-12-14—best 16c.

QUICKSILVER.—Local dealers report an advance to \$42; export, \$37.00@37.50; carload lots, special rates.

POWDER.—F. o. b., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1* 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2* 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices:

Wellington.....\$8 00 Coos Bay.....\$5 00
Seattle.....6 00 Southfield.....7 50

Cargo lots, Eastern and foreign:

Wallsend.....\$7 50 Cumberland.....\$8 00
Brymbo.....7 50 Cannel.....9 50
Pennsylvania, hd.. 14 50 Welsh Anthracite. 12 50
Scotch.....8 00 Rock Springs.....7 60

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.08

per gal.; bbl., \$1.03; pure No. 2, cs., 85c; bbl., 80c; Baker's AA Castor Oil, in case lots of 200

gals. and upward, \$1.06; less than 200 gals., \$1.10; in bbls., 4c per gal. less than case;

Baker's Crystal, \$1.26; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 44c; cs., 49c;

raw, bbl., 42c; cs., 47c; lots of 5 bbls., 1c less;

Lucol, boiled, bbl., 39c; cs., 43c; raw, bbl., 38c; cs., 41c; lots of 5 bbls., 1c less.

Kerosene—Pearl, cs., per gal., 17½c; Astral, 17½c;

Star, 17½c; Eocene, 19½c; Extra Star, 21½c;

Elaine, 22½c; Water White, bulk, in tanks, 11½c;

Mineral Seal, iron bbls., 21c; wooden bbls., 23c;

cs., 26c; Mineral Sperm, 27c; Deodorized Stove Gasoline, bulk, 13c; do.,

cs., 18c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c;

63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½c; do., in cs., 16½c;

Lard Oil, Extra Winter Strained, bbl., 56c; cs., 61c;

No. 1 bbl., 46c; cs., 51c; Neatsfoot Oil, bbl., 65c;

cs., 70c; No. 1 bbl., 55c; cs.,

60c; Sperm, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31c per lb.; carloads, 29c; in 10-lb. tins 37c; sulphuric acid, 2½c per lb. 66% B.; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½c per lb.; blue vitriol, 4½c per lb.; borax, refined, 5@6c per lb.; chlorate of potash, 9½@10c; roll sulphur, 2½c; alum, \$1.90@2.00; flour sulphur, French, 2½@2¾c; California refined, 1½@1¾c; nitric acid, in carboys 8c per lb.; caustic soda, in 10-lb. tins 15c per lb.; Cal. s. soda, bbls., 65c; sks., 60c @ 100 lbs; chloride of lime, spot, 2.10 @ 2.25c; salt peter, 15c; chlorate of potash, 25c; caustic potash, 12c.

CANDLES.—Electric Light Candles—6s, 16 oz., 7½c; 6s, 14 oz., 6½c; 6s, 12 oz., 5½c; 6s, 10 oz., 4½c; Granite (Mining) Candles—6s, 16 oz., 8½c; 6s, 14 oz., 7½c; 6s, 12 oz., 7½c; 6s, 10 oz., 6½c. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8c; colored, 9c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.35; cut, \$2.25; 10 to 20d, wire, \$2.40; cut, \$2.30; 8d, wire, \$2.45; cut, \$2.35; 6 and 7d, wire, \$2.55; cut, \$2.45; 4 and 5d, wire, \$2.65; cut, \$2.55; 3d, wire, \$2.80; cut, \$2.70; 2d, wire, \$3.05; cut, \$2.95. In carload lots, 10c per keg less.

CORDAGE.

| | Sisal. | Manila. |
|---|--------|---------|
| 1¼-in. cir. (7-16 dia. and upward)..... | 9½ | 10½ |
| 12-thread (¾ dia.) | 9½ | 11½ |
| 6 and 9 thread (¾ and 5-16 dia.)..... | 10½ | 11½ |
| Bale Rope (3 and 4 strand)..... | 9½ | 10½ |
| Bale Rope (2, 6 and 8 strand)..... | 9½ | 11½ |

San Francisco Stock Board Sales.

SAN FRANCISCO, Nov. 17, 1898.

9:30 A. M. SESSION.

| | | | |
|------------------------|--------|------------------------|-----|
| 500 Belcher..... | 20c | 400 Potosi..... | 15c |
| 500 Cal. & Va..... | \$1 25 | 500 Savage..... | 20c |
| 400 Crown Point..... | 19c | 530 Sierra Nevada..... | 79c |
| 400 Gould & Curry..... | 19c | 200 Union Con..... | 23c |
| 400 Justice..... | 16c | 300 Utah..... | 12c |
| 250 Ophir..... | 69c | | |

2:30 P. M. SESSION.

| | | | |
|-------------------------|--------|------------------------|-----|
| 300 Ophir..... | 67c | 500 Crown Point..... | 19c |
| 700 Mexican..... | 18c | 200 Sierra Nevada..... | 82c |
| 300 Gould & Curry..... | 17c | 600 Utah..... | 13c |
| 100 Best & Belcher..... | 25c | 100 Overman..... | 05c |
| 450 Cal. & Va..... | \$1 20 | 800 Justice..... | 19c |
| 1000 Chollar..... | 23c | 300 Union Con..... | 28c |
| 300 Potosi..... | 14c | | |

Recent Mining Incorporations.

Swayne M. Co., San Francisco; capital stock, \$100,000; subscribed, \$85,000; G. E. Morse, H. R. Cooper, C. P. Bennett, S. P. Dunn, W. B. Hale.

Shasta Slate Co., Oakland, Cal.; capital stock, \$100,000; subscribed, \$3400; W. J. Dingee, F. J. Woodward, W. A. Winsboro, F. A. Losh, W. C. Beatie.

Joaquin River M. Co., San Francisco; capital stock, \$50,000; subscribed, \$25,000; P. B. Donohoo, J. Heenan, A. Fuhrman, C. W. Muller, J. E. Hayden.

Oriental G. M. Co., Nevada City; capital stock \$30,000, all subscribed; M. W. Mather, F. Godfrey, F. B. Hill, H. L. Johnson, W. J. Landers.

Jackson Butte M. & M. Co., Sulsum; capital stock \$150,000; subscribed \$100,304; F. J. Devlin, C. E. Mayfield, H. G. Perry, R. L. Marsh.

Recently Declared Mining Dividends.

Mercur, Utah, \$25,000; Nov. 10.

Portland, Colorado, 2 cents per share, \$60,-000; Nov. 15.

Mercur, Utah, \$25,000; Nov. 15.

Bullion-Beck, 10 cents a share, \$10,000; Nov. 15.

Jersey Leasing Co., Colo., 3½ cents per share, \$5,535.84.

Acetylene Gas.

A handsome new illustrated catalogue will tell you where and by whom the new light is being used, and what the verdict is. Mailed upon application. **PACIFIC ACETYLENE GAS CO.,** 115 New Montgomery St., San Francisco.

Quicksilver

FOR SALE IN LOTS TO SUIT.

Agents for Redington Quicksilver Mine.

REDINGTON & COMPANY, Wholesale Drugists, 23-25-27 Second Street, San Francisco.

Mining Man of Experience,

Owner of four gold quartz mines, 3 to 20-foot ledges, about \$10 ore, 20,000 tons of quartz in sight near surface; considerable developments; quartz works by cyanide process; facilities for working quartz first class.

ONE-HALF INTEREST

Will be given to parties who will erect a milling plant of fifty tons daily capacity.

A. P. ANDERSON,

Oriental, Esmeralda County.....NEVADA.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Geo. W. Allen and E. P. Thomas, in the Hangman's Gulch Mine, near Placerville, El Dorado Co., to deposit tailings in Hangman's Ravine; from Sam B. Lusk and J. J. Millar, in the Sampson Mining Claim, in Gold Lake Mining District, Sierra Co., to deposit tailings in a ravine below the mine; from E. Reynolds and F. Carter, in the Morrilstown Mine, near Port Wine, Sierra Co., to deposit tailings in west branch of Little Canyon Creek; from Geo. D. H. Meyers, in the Myers Placer Mine, near Placerville, El Dorado Co., to deposit tailings in Johnson's North Canyon; and from Frank and Antonio Leveroni, in the Corsica Mine, near Sierra City, Sierra Co., to deposit tailings in old pits, gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on November 28, 1898, at 1:30 P. M.

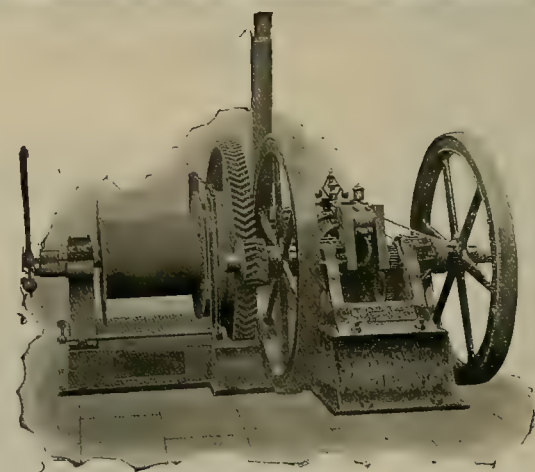
Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco



FRESNO, June 25, 1898

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gasoline engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LODGE
M. & D. CO.,

Per N. W. Moodey, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

WEST COAST OF MEXICO.

WÖHLER, BARTNING Suc's, Mazatlan (Sinaloa), Mex.

Bankers, Importers, Exporters and Commission Merchants.

Representatives and Agents of the principal Mining Companies in the State of Sinaloa and the dependencies of the Pacific coast in the States of Durango, Chihuahua, Sonora, Lower California and Jalisco.

ORE BUYERS AND EXPORTERS. - MINING SUPPLIES.

Diamond Drill for Hire.

DRILL CAN BE HIRED, TOGETHER
WITH EXPERT TO OPERATE.

DIAMONDS FOR SALE.

Apply to J. A. MURRAY, care of Risdon Iron Works, San Francisco.

ANTIMONY.

We buy Antimony Ore in any quantity and pay prompt CASH for same. Write us and let us know what you have.

Chapman Smelting Works Co.,

(INCORPORATED.)

422 Battery Street.....San Francisco, Cal.

W.&P. PLASTIC SLATE.

A Preservative Coating.

For Flumes and Damp and Tropical Sun Exposed Woodwork. Cheap, durable, unequalled.

PACIFIC REFINING & ROOFING CO.

113 New Montgomery St., S. F.

Correspondence solicited.

Silver City Reduction Co.,

SILVER CITY, GRANT COUNTY,
NEW MEXICO.Purchasers and Smelters of Gold,
Silver and Copper Ores.This Plant is Owned and Operated by the Estate
of the Late Senator George Hearst of California.

TUBBS CORDAGE CO.

(A CORPORATION.)

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Duplex Rope, Tarrad Manila Rope, Hay Rope, Whale Line, etc., etc. Extra sizes and lengths made to order on short notice

611 and 613 Front St., San Francisco, Cal.

CAPITAL DESIRING TO INVEST IN RICH
and Extensive Gold-Bearing Gravel Deposits.

Address

JOHN W. GRAY, 923 Linden St., Oakland, Cal.

SANTA FE
ROUTE

The Most Comfortable Way to Travel
ACROSS
THE
CONTINENT.

EVERY day in the year Pullman Palace Sleeping Cars and Pullman Tourist Sleeping Cars leave Oakland Mole for Chicago and the East.

HARVEY'S DINING ROOMS

And Lunch Counters Offer Good Food Well Cooked and Decently Served at REASONABLE PRICES.

THE altitude of the plateaus and mountains crossed renders the trip cool and pleasant after the desert is passed. No matter which way you go the desert must be crossed and there is less of it on the Santa Fe than on other lines. It is a popular mistake to suppose it is a hot line. Close connections are made in Chicago and Kansas City for all Eastern cities.

Ticket Office, 628 Market St., San Francisco, Cal.

JNO. L. TRUSLOW, JNO. J. BYRNE,
Gen. Agt. Pass. Dept. Gen. Agt. Pass. Dept.
San Francisco, Cal. Los Angeles, Cal.

Mining, Mill, Driving,
—AND—
Locomotive Headlights.

SIZES ON HAND:

24-inch,
20 "
17 "
14 "
12 "
10 "
8 "

Boesch Lamp Co.,
585 MISSION STREET, SAN FRANCISCO.

PACIFIC EXPLORATION COMPANY
Finds buyers or working capital for meritorious
mines or good prospects. Correspondence invited.
W. E. Holbrook, Pres't. L. F. Haskell, Sec'y.
29-30 Chronicle Building, S. F.

J. D. BETHUNE,
(Late Associate Justice Supreme Court.)
Attorney at Law,
Mining Law,
PRESCOTT, ARIZONA.
A Valuable Gold Property for Sale.

UTAH
Mines—Dividend Paying
and Investment Stock.
W. E. HUBBARD & CO., 15 W. 2d So. Street,
SALT LAKE CITY.

Mines or prospects operated on contract to purchase,
MONEY loaned, or under lease on fixed royalty or percentage.
PROPERTY acquired, financed and managed. MINES, prop-
erty, mineral lands, mining securities, contracts, bonds,
stocks, leases and options bought and sold or negotiated.
EXAMINE mines, prospects and mineral lands as to their
value, method of working and condition of their titles.
Assay and chemical work done.
EDW. N. BREITUNG, Marquette, Mich.
Cable address Edue Codes, Lieber's Bedford,
McNeil's A & C Universal Commercial. U. S. A.

Assessment Notices.

EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Forest Hill, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of October, 1898, an assessment (No. 14) of one-half of one cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, No. 1207 Claus Spreckels building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of November, 1898, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 11th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. J. CRAWFORD, Secretary.

Office—No. 1209 Claus Spreckels Bldg., San Francisco, California.

CONSOLIDATED ST. GOTHARD GOLD MINING COMPANY.—Location of principal place of business, 113 Crocker building, San Francisco, California; location of works, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of November, 1898, an assessment (No. 16) of Ten Cents (10c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 113 Crocker building, sixth floor, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 14th day of December, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 30th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. F. HOLLING, Secretary.

Office—113 Crocker building, sixth floor, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of November, 1898, an assessment (No. 85) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of December, 1898, shall be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 23rd day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. FRED K. DORROW, Secretary.

Office—Room 29, Nevada block, No. 309 Montgomery street, San Francisco, California.

ARRASTRAVILLE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of November, 1898, an assessment (No. 2) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 214 Jackson St., San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of December, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 17th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. MIDDLETON, Secretary.

Office—213 Jackson street, San Francisco, California.

THE MOST DIRECT AND CHEAPEST ROUTE

—TO—

The Eastern Oregon, Mining
The Coeur d'Alene, Districts
The Kootenai,

—IS VIA—

-----THE-----

Oregon & Railroad
and Navigation
Company's & Lines.

For Information, Address

W. H. HURLBURT, or E. C. WARD,
General Pass Agent, General Agent,
Portland, Or. 630 Market St.,
San Francisco.

Northern Pacific Ry.

TICKETS AT LOWEST RATES TO

Spokane,

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AND ALL EASTERN CITIES.

Through Cars and Magnificent Service.

Send six cents in stamps for illustrated book
"Wonderland," to T. K. STATER,

Gen. Agt., 638 Market St.,
San Francisco.

DELINQUENT SALE NOTICE.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Riverside County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 11) levied on the 16th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------------|-----------|-------------|---------|
| W. H. Bailey, Trustee..... | 30 | 2,000 | \$50 00 |
| W. H. Bailey, Trustee..... | 261 | 2,000 | 30 00 |
| W. H. Bailey, Trustee..... | 262 | 10,000 | 150 00 |
| C. A. Bailey..... | 133 | 1,000 | 15 00 |
| C. A. Bailey..... | 135 | 1,000 | 15 00 |
| C. A. Bailey..... | 136 | 1,000 | 15 00 |
| C. A. Bailey..... | 138 | 500 | 7 50 |
| C. A. Bailey..... | 109 | 2,000 | 30 00 |
| R. L. Cheney, Trustee..... | 245 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 246 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 247 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 248 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 249 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 250 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 251 | 2,500 | 37 50 |
| R. L. Cheney, Trustee..... | 252 | 1,000 | 15 00 |
| W. H. Bailey, Trustee..... | 256 | 3,300 | 49 50 |
| W. H. Bailey, Trustee..... | 259 | 7,300 | 109 50 |
| W. H. Bailey, Jr..... | 147 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 148 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 149 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 150 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 151 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 158 | 2,000 | 30 00 |
| W. H. Bailey, Jr..... | 208 | 4,000 | 60 00 |
| W. H. Bailey, Jr..... | 209 | 532 | 7 98 |

And in accordance with law, and from order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 508 Safe Deposit building, San Francisco, California, on TUESDAY, the 1st day of November, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

R. L. CHENEY, Secretary.

Office—Room 508 Safe Deposit building, San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed to THURSDAY, December 1st, 1898, at the same hour and place. By order of the Board of Directors.

J. W. PEW, Secretary.

Office—310 Pine St., Room 15, San Francisco, Cal.

DELINQUENT SALE NOTICE.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the 22nd day of August, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------|-----------|-------------|----------|
| C. Rehn..... | 75 | 2,000 | \$200 00 |
| C. Rehn..... | 77 | 1,000 | 100 00 |
| C. Rehn..... | 79 | 500 | 50 00 |
| C. Rehn..... | 81 | 499 | 49 90 |
| C. Rehn..... | 82 | 1 | 10 |
| C. Rehn..... | 161 | 150 | 15 00 |
| A. Rehn..... | 176 | 250 | 25 00 |
| M. Schmitt..... | 8 | 100 | 10 00 |
| G. F. Ochs..... | 95 | 250 | 25 00 |
| G. F. Ochs..... | 105 | 200 | 20 00 |
| G. F. Ochs..... | 170 | 100 | 10 00 |
| E. S. Heller..... | 10 | 100 | 10 00 |
| A. Schmitt..... | 12 | 50 | 5 00 |
| G. Warmann..... | 155 | 200 | 20 00 |
| I. Hechemann..... | 15 | 200 | 20 00 |
| E. Fey..... | 17 | 100 | 10 00 |
| E. Fey..... | 74 | 200 | 20 00 |
| E. Fey..... | 108 | 500 | 50 00 |
| F. J. Sullivan..... | 20 | 1,000 | 100 00 |
| F. Knottner..... | 110 | 500 | 50 00 |
| F. Knottner..... | 111 | 500 | 50 00 |
| E. Knottner..... | 112 | 500 | 50 00 |
| E. Knottner..... | 113 | 150 | 15 00 |
| E. Knottner..... | 114 | 100 | 10 00 |
| G. Knottner..... | 115 | 100 | 10 00 |
| G. Schmitt..... | 47 | 5,000 | 500 00 |
| G. Schmitt..... | 48 | 2,000 | 200 00 |
| G. Schmitt..... | 49 | 2,000 | 200 00 |
| G. Schmitt..... | 51 | 1,000 | 100 00 |
| G. Schmitt..... | 53 | 1,000 | 100 00 |
| G. Schmitt..... | 221 | 500 | 50 00 |
| G. Schmitt..... | 41 | 500 | 50 00 |
| G. J. Iles..... | 142 | 4,150 | 415 00 |
| S. M. Fernandez..... | 146 | 100 | 10 00 |
| F. Woenne..... | 154 | 1,000 | 100 00 |
| J. H. Sievers..... | 156 | 500 | 50 00 |
| I. Joltke..... | 159 | 200 | 20 00 |
| I. Joltke..... | 160 | 100 | 10 00 |
| H. Page..... | 203 | 1,000 | 100 00 |
| H. Page..... | 205 | 1,000 | 100 00 |
| H. Page..... | 206 | 1,000 | 100 00 |
| W. J. Smith..... | 207 | 1,000 | 100 00 |
| W. J. Smith..... | 218 | 700 | 70 00 |

And in accordance with law, and from order from the Board of Directors, made on the 22nd day of August, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, room 57, 916 Market street, San Francisco, California, on FRIDAY, the 25th day of November, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

GEO. W. FLEISSNER, Secretary.

Office—916 Market street, room 57, San Francisco, California.

DELINQUENT SALE NOTICE.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 11) levied on the 3d day of October, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------|-----------|-------------|---------|
| Peter Heinrichs..... | 71 | 500 | \$50 00 |
| J. Young..... | 276 | 200 | 20 00 |
| Jos. Rohrer..... | 278 | 50 | 5 00 |
| Kathe. Young..... | 280 | 50 | 5 00 |

And in accordance with law, and from order from the Board of Directors, made on the 3d day of October, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, No. 237 Twelfth street, San Francisco, California, on MONDAY, the 5th day of December, 1898, at the hour of 5:30 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

F. METTMANN, Secretary.

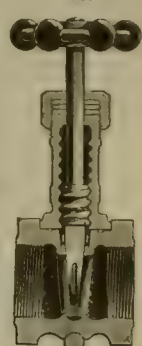
Office—237 Twelfth street, San Francisco, California.

Lunkenheimer's "Clip" Gate Valve.

Single Disc
DOUBLE SEATED.

Made with Screw Ends from 1" to 6",
Flange Ends 2" to 6" sizes.

BEST IN QUALITY.
LOWEST IN PRICE.
THE ENGINEERS' FAVORITE.



These Valves are made of cast iron and all wearing parts of gun metal. They are superior to the common cheap brass valves with which the market is flooded.

WHY?

BECAUSE they possess all the advantages of a cast iron pipe fitting (Elbow, Tee, Coupling, Union, etc.) namely—are heavy and rigid—not injured by expansion and contraction or rough handling in pipe fitting. TAKE PRESSURE FROM EITHER END. Body and hub are held together by a steel clip, consequently always easily taken apart. Joint between body and hub made permanent by an imbedded seamless oval copper wire washer. If you desire the BEST, STRONGEST and MOST DURABLE valve for general purposes on all ordinary pressures, use this valve. IT IS A STANDARD FITTING OF GREAT APPEARANCE and FULLY WARRANTED TO SATISFY. Made also in All Iron for Cyanide Plants. Try them and be convinced. Specify them and order through your dealer. Our Catalogue of superior Steam Specialties FREE for the asking.

THE LUNKENHEIMER CO., Cincinnati, Ohio, U. S. A.,
SOLE MANUFACTURERS,
26 Cortlandt St., NEW YORK. + BRANCHES: + 35 Great Dover St., LONDON, S. E.

Weber
Hoists.

6 to
100 H. P.



Cost to Run, 1c per hour per H. P.

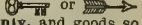
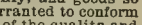
All Latest Improvements.
Get Catalogue.

WEBER GAS ENGINE CO.,
430 S. W. Boulevard, Kansas City, Mo.

UNFAIR COMPETITION.

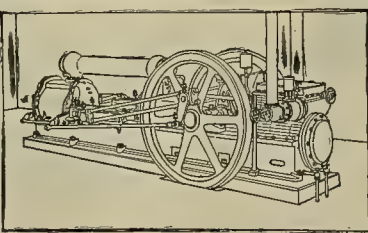
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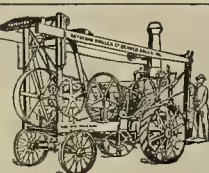
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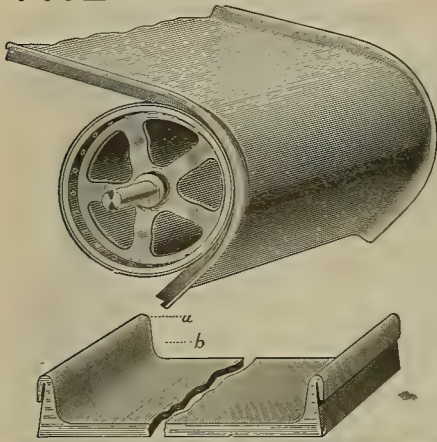
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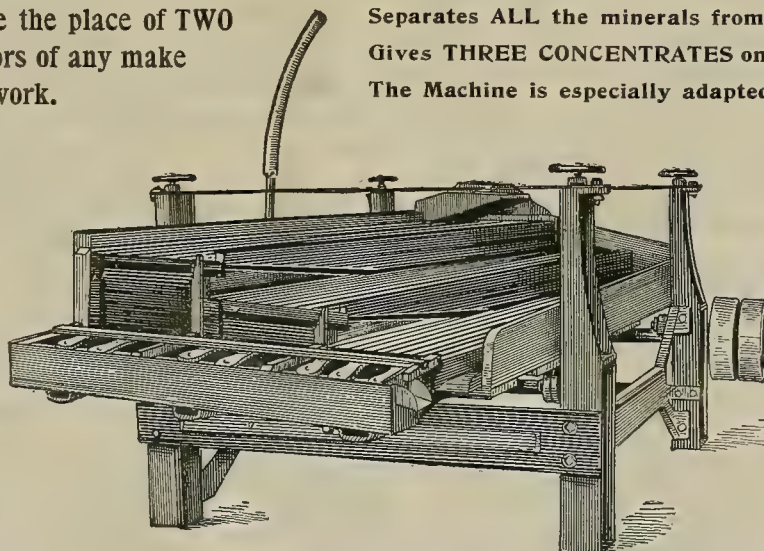
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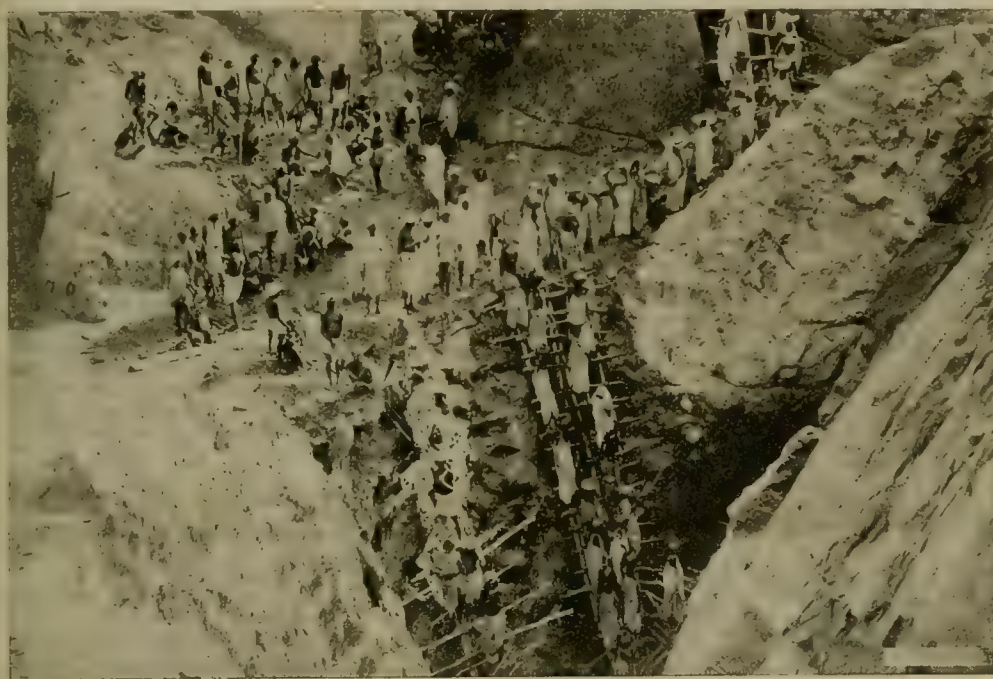
Mining and Marketing Mica.

In the construction of electrical machinery and other industries, the use of mica is increasing. Like

is placed over the mouth of each pit, upon which a man sits, awaiting the signal from below to haul up the basket containing the mica and refuse dug from the pit by a rude pick. On arrival at the surface

thrown in another heap. The tests as to whether the mica is good for anything, or whether, as the natives say, "it is alive," are its firmness, specific gravity, and the power of reflecting the countenance free of contortions. The latter test shows the perfect parallelism of its individual plates and consequent likelihood to split well. The heavier the mineral and the more perfect the reflection, the more valuable is the mineral considered. All the plates not standing the necessary test are of a soft and flimsy nature, without any of the brilliant sparkle of the better sort, and is called by the natives "dead mica."

When the vein of mica-bearing quartz, lying between rocks of different formation, has been found, little "nigger-heads"—small lumps of crumbling mica mixed with slate and other rock—are plentiful. The rock is examined by a native miner, a blast is made, the rock and debris are cleared away, and, ordinarily, appears a block of mica, a ragged corner showing black and glittering in the white quartz in which it is imbedded. With his fingers the miner brushes away the dirt and small stones which partly cover it. Its thickness is carefully noted, its position in the rock is slowly and patiently discussed, no one is in a hurry, and many a speculation is indulged in as to its size and quality. A hole is quickly drilled, and all eagerly crowd around, as one of the men with his pick pulls away the broken stone—a good-sized block, and if solid and of perfect cleavage, will be worth many dollars. The excitement is not allayed, and will not be until the block is split open and they know how it looks on the inside. It is considered bad to split open a block at the mine and contrary to all rules, for there is danger that the fine, polished faces will be scratched and a sheet—thin, indeed, but valuable—will have to be taken off



SCENE AT A MICA MINE IN INDIA, SHOWING LABORERS AT WORK.

other mineral products, its development in the United States is retarded by the ability to import it cheaper than it can be locally produced. Mica is found in California, Idaho and other States, the chief supply, so far as this country is concerned, being from New Hampshire and North Carolina. Its commercial value, especially for electric purposes, lies in the size of the sheets, and for this reason, as well as the cheapness of production, the bulk of the world's mica is brought from India. Behar mica from Hazaribagh, Gaya and Monghyr, in India, was exported last year to the amount of 2,000,000 pounds, of which the greater part was exported from Calcutta, chiefly to Great Britain and America.

Herewith are presented two engravings graphically portraying the general appearance of an East India mica mine and manner of preparation. These engravings are from photographs "taken on the spot." As will be seen the method of mining is primitive. The wild hill tribes ascend to the top of a selected hill and sink a series of pits the whole way down the profile of the hill, about 3 feet in diameter each, a few feet apart. These pits are not continued vertically downwards, but in a zigzag shape, but not so much out of a vertical line that a basket containing the mineral can not be hauled up from the bottom of the pit. The zigzag shape of the shaft is formed by sinking the shaft, first inclining to the left a few feet and then to the right, the head of each cut or notch forming a landing place or step. The projecting of salient angles of the notches form a flight of steps from the top to the bottom of the pit, which seldom reaches to a greater depth than 40 feet, when, as darkness interferes with the workman's progress, the pit is forsaken and another begun a few feet farther down the hill. A slight framework of faggots, cut from neighboring trees,

the good and bad materials are separated. The earth and rubbish are shot down the precipitous side of the hill, and the good mica, in ragged masses



NATIVES TRIMMING MICA IN AN INDIAN MINING VILLAGE.

about 1½ feet in length, 6 inches broad and 3 inches in thickness, after having its ragged edges trimmed off with a reaping-hook looking instrument, is placed by itself in a heap, and the poor or softer kind

and thrown away. The plates of mica are generally brought to the miners' village, and there, after being slightly trimmed with grass-cutting knives (which are not particularly adapted to the purpose,

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San Francisco, November 26, 1898.

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but are probably the only ones the people are able to purchase), are sorted into different heaps, according to quality and size. The quality depends on the mineral being in a perfectly unaltered condition, its transparency and freedom from cloudiness caused by internal foreign matter, the absence of minor cleavages which render it liable to split into ribbons and triangles and the planeness of its fissile surfaces.

Under the present system of working, the blocks of mica raised from the mine are cleaned of all extraneous matter, such as quartz and feldspar, in the stripping room; and when split, either for convenience of size or for the removal of material included along the cleavage planes, the sheets are sent to be "scribed" and afterwards cut with a pair of shears into rectangular shapes along the scribing. Sheets, tin, zinc or iron are used as patterns in scribing.

The mines are near the interior and are almost inaccessible. The Abruker mine produces the finest mica, both for lamination and color. That mine has been sunk about 200 feet, following the dip of the vein. As elsewhere, no machinery of any kind, except drills and hammers, is used in the mining operations. The refuse and the mica are placed in baskets, which hold about ten pounds, and are passed from hand to hand by women who stand in line on ladders. When the top is reached the baskets are dumped and returned down the ladder in the same manner, but by another line of women. Water is taken out by jugs. There is reason to believe that there has not been any change in this method of operation for many hundred years, except that more care is taken to protect the miners.

As in this country and Canada, mica occurs in small plates in many of the crystalline and metamorphic rocks of India, but the large crystals of commercial value occur associated with felspar and quartz, forming an excessively coarse-grained granite, or pegmatite, and frequently intruded into older granites, or into metamorphic rocks. The felspar, which is often orthoclase, but sometimes oligoclase, occurs in large crystals, while the quartz, which was the last formed mineral in the group, occurs in large crystalline masses, but without crystalline outlines. It was moulded around the pre-existing mica and felspar crystals, and frequently are found striated surfaces in the shafts, which are in reality the casts in quartz of mica-bundles. That these intrusions have been affected by subsequent earth movements seems undoubted, since the mica sheets are so frequently crumpled; but, at the same time, it does not seem likely that these movements could have been of very great magnitude, otherwise the delicate sheets of mica would have been still more distorted; neither the very flexible mica nor the friable felspar could resist any serious earth movements.

The Miners' Convention.

The seventh annual convention of the California State Miners' Association met in San Francisco this week. It was called to order on the 21st inst. by President Neff, who read a review of the record of the Association, and made pleasant reference to the future. Secretary Sonntag and Treasurer Hendy made their annual reports, which showed that at the beginning of the year there remained unexpended in the treasury \$777.09; during the year receipts were \$2322.50, expenses \$1450.06, leaving \$1649.53 on hand to date and all bills paid.

There was much enthusiasm among the 570 delegates and an earnest of hearty co-operation. The usual committees were appointed and the chairmen of the several standing committees reported progress during the year. On the 22nd inst. the Committee on Resolutions reported recommending the appointment of a committee of five to consider the question of storage of water; the creation of a committee of seven to arrange for appropriate representation of the mineral industries of California at the Paris Exposition in 1900; again urging the passage by Congress of an Act creating the Department of Mines and Mining, the Secretary to be a member of the Cabinet; requesting the co-operation of the Association with the State Mineralogist in the preparation of county maps, etc.; thanking President Neff for his services; referring to the Committee on Legislation the report of the Mineral Lands Committee; urging the Speaker of the House of Representatives and the House Committee on Rules to set a day at the coming short session of Congress for the consideration of H. R. 3655, and asking the next California Legislature to pass a similar resolution. The report was adopted as read. Several speeches were made, and the Committee on Debris Dams made the following report:

Mr. President.—The Committee on Debris Dams respectfully submit the following report:

Since the adjournment of the convention of 1897, considerable progress has been made by the various officials whose duties involve action under the mining bill of 1893, providing for the building of restraining barriers and the resumption of hydraulic mining. Soon after the committee was appointed, a communication addressed to Senator George C. Perkins and Congressmen De Vries and Hilborn bearing date of January 7, 1898, emanating from General John M. Wilson, Chief of Engineers, U. S. A., was received; and as it involved matters of great interest, a special meeting was held to consider its contents.

After reciting the history of mining legislation, both national and State, Gen. Wilson gave the assurance that "the Debris Commission are pushing their surveys and researches as rapidly as is consistent with the thorough investigation necessary for a full and careful consideration of this most important and complicated problem," and that he would "impress upon the Debris Commission the importance of advancing the work assigned to them by law as rapidly as is consistent with its importance."

Reference was also made to the peculiar wording of the Act of Congress of June 3, 1896, which authorized the Treasurer of the United States to receive from the State of California any and all sums of money that have been, or may be hereafter, appropriated by this State for the construction of restraining barriers. And in this connection he says: "While it is stated that \$250,000 has been appropriated by the State of California, it is not known that such sum has been deposited with the Treasurer of the United States, or made available in accordance with the terms of the law."

As this seemed to be one cause of delay, the committee submitted a reply, setting forth the provisions of our Constitution and of the law passed at the last session of the Legislature, in which it was clearly shown that California had done all it could to make the appropriation available, leaving with the Federal authorities the choice of time for drawing the same by commencing the building of the much-desired dams.

The California delegation took up the subject immediately and caused the passage of a law which removed all impediments and made it practicable for the United States to then proceed with work with every assurance that the cost thereof would be promptly shared by our State to the extent of the sum mentioned.

Following this and in accordance with the assurances we have referred to, surveys and investigations were commenced and were actively in progress, when the late war with Spain called the officers engaged therein to other and for the time more important duties.

The cessation of hostilities brought about a resumption of the researches of the Commission. This morning your committee in a body, accompanied by the distinguished Congressman from the Second Dis-

trict, Hon. Marion De Vries, called upon Major W. H. Heuer of the California Debris Commission, for the purpose of discussing the situation, as far as it was consistent for him to do so. We found Major Heuer disposed to assist the committee to the extent that circumstances permitted.

Work is now under way which, it is hoped, will be completed in time to present an early report to Congress.

So far as outlined, surveys have shown that there is at the Narrows on the Yuba river, one of the proposed sites for a restraining dam, a varying depth of from 50 to 80 feet from the present bed of the river.

The present appropriation would construct the foundation and probably raise the dam about 90 feet above the bed of the stream.

We are informed that a project is now under investigation contemplating a ditch and tunnel 50 feet in width for diverting the water from the Yuba river at this proposed dam and carrying same to Reed creek, about twelve miles distant, at which place there exists capacity for the impounding of a vast amount of debris, running into hundreds of millions of cubic yards. The feasibility of this project has not as yet been demonstrated.

From all the committee can gather, an additional appropriation will certainly be needed, either for the construction of a dam higher than 90 feet, as above indicated, or for the proposed ditch and tunnel and restraining barriers on Reed creek.

In our judgment this amount cannot now be fixed at less than \$500,000. This, of course, it must be understood, is not based on official information.

At this time the Committee cannot state, even approximately, the date of the transmission of the report of the California Debris Commission to the Chief of Engineers, for action. Several causes have unfortunately caused unavoidable delay. The war has already been suggested as one; the other is found in the change of the personnel of the Commission lately made by the transfer of Col. Suter to Boston, and the assignment of Col. Mansfield for duty on this coast and as a member of said Commission.

We feel, however, that the utmost haste consistent with a proper consideration of the work to be done, is being made by the Commission. Hasty work often delays progress, and as often defeats the object sought to be attained.

That the Department and the Commission appreciate the necessity for action is apparent; and that progress has been, and is being made, is certain.

Patience and a continuation of the efforts made up to the present should be our aim for the future.

We are pleased to note the existing good feeling among miners and those interested in the industry, as well as the confidence they possess in the ability of the Commission to deal with the difficult problems committed to its charge for solution.

This feeling should be supplemented by an endeavor to remove all possible difficulties that may arise. One that now occurs to us as a result of our conference is that of vested rights in the streams and lands where the proposed dams are to be located.

Action should be taken by this Association to bring about an understanding with all the owners of such rights, and such steps as may be necessary should be inaugurated at the next session of the Legislature.

We also recommend that efforts be made both in Congress and in California to secure the additional amount hereinbefore named.

The report was adopted.

During the session addresses were delivered by the Mayor of San Francisco, the Governor of the State and other distinguished men. On the afternoon of the 22d officers were elected as follows: President, Jacob H. Neff of Placer; vice-president, W. C. Ralston of San Francisco; treasurer, Samuel J. Hendy of San Francisco; secretary, E. H. Benjamin of Alameda. The last-named office was the only one for which there were two candidates, there being a good-humored contest between the adherents of Mr. Benjamin and Mr. Turner of Nevada. The vote stood: Benjamin, 320; Turner, 249; and on motion the former's election was made unanimous.

The State Mineralogist's proffer of the free use for the Association's secretary of a room in the new quarters of the State Mining Bureau in the Market Street Ferry Building was accepted with thanks. After the usual complimentary resolutions, presentations, etc., and the appointment by the respective counties of their membership on the State Executive Committee, the convention adjourned.

The work of the California State Miners' Association goes on through the year, through the executive committee, the special and standing committees and the officers, and the annual sessions of the convention are mainly to hear reports, note necessities, make mutual suggestions and determine collectively upon the general outline of needed work for the coming year.

Concentrates.

CALIFORNIA miners welcome the rain.

COLORADO calls Gilpin Co. "the Cornwall of North America." In the Gillen placers near Elizabethtown, N. M., last week a \$100 gold nugget was found.

TWENTY-FIVE tons antimonial ore from Marysville, Utah, arrived in San Francisco this week for reduction.

THE War Eagle mine at Roseland, B. C., marketed in the past year \$700,000 worth of ore and paid \$151,500 in dividends.

THE deepest vertical shaft in Montana is the Green Mountain at Butte. It is 2100 feet, and is being driven still deeper.

THE Smuggler-Union mine of Telluride, Colo., took the prize at the Omaha Exposition for the best display of a free gold specimen.

ELECTRICIANS in general know of but three ways of producing a current—connection, electrolytic conduction, and metallic conduction.

NEARLY every mine in Marshal, Savage and Gold King basins, San Miguel county, Colo., are connected with Telluride by telephone.

THE Rio Grande ore sampler at Cripple Creek has installed electricity, the first sampler introducing it, from the Colo. Electric Power Co.

At Halley, Idaho, local mining men estimate that J. L. Packard, in developing the Tip Top mine, will have spent \$300,000 before getting any returns.

By the falling of a 4000-pound rock on the 700 level of the Strong mine at Victor, Colo., this week, O. C. Wood was crushed to almost instant death.

GENERALLY speaking, a mill test is more for the purpose of determining the best way to work the ore, while the assay is to determine the value of the ore.

THE statement in the daily press this week that agents of the Rothschilds had bonded a portion of the Mariposa grant is denied by those in best position to know.

THE Meldrum tunnel at Telluride, Colo., being driven from both sides of the mountain, is making 10 to 15 feet every twenty-four hours. Air drills are in use.

WINTER posts, thirty miles apart have been established by the police from Lake Bennett to Dawson, N. W. T. Dog trains will travel between them and carry mail.

THE output per miner in the different coal fields of Prussia in 1897 were as follows: Upper Silesia, 353 tons; Lower Silesia, 220 tons; Ruhr, 282 tons; Saar, 241 tons.

OLD miners say that it is practically impossible to prospect in the Yukon region during May and June, owing to the swarms of mosquitoes that harass one day and night.

A PUMP is being placed in the Butte & Boston mine at Butte said to be the largest in Montana. The water cylinders are 17 in. diameter, 21 in. stroke, and the weight is 70,000 pounds.

THE use in public for the benefit of others of an invention, the success of which is previously demonstrated, made more than two years before the application, bars the grant of a patent.

THE new three-compartment Diamond shaft of the Anaconda, Montana, Co. is to go 2000 feet deep, and a third monster hoisting engine is now being built in San Francisco therefor.

THE Creede, Colo., *Candle* says that the mines of that camp are mostly worked on the leasing system and are all successful; under former management they were run in debt and passed into receiver's hands.

THE British American Corporation has acquired the 205,000 shares of the allied Turner interests in the Le Roi M. Co. of Roseland, B. C., at \$7.25 a share, paying \$1 in cash, \$2.62½ in thirty days, and the balance July 1, '99.

WHEN a river forks into two or more branches, some miners say that the source of the gold is often found in the right hand branch. Another theory, not uncommon, is that the spots upon which the sun shines before noon are richest in gold.

THE largest tin mine in the world is situated on Sulo Brani, an island in the bay of Singapore. It turns out monthly 1200 tons of tin—more than the product of Cornwall, and more than that of Australia. The ore comes from Selangor and Perak in Malacca.

OUR "candid opinion" regarding Tesla's claim as set forth in last week's issue, and on page 530 of this issue, is that while such fanciful hypothesis fascinates the mind, yet rigid ruling of scientific analysis precludes permanent place for so romantic an idea.

"FORCE" may be defined as action between two or more bodies causing, or tending to cause, rest or motion: "work" is the combination of force and motion: "power" the speed of doing work. A "machine" is a device that will transmit and modify motion and force.

THE museum of the California State Mining Bureau on Fourth street, San Francisco, is open daily, (Sundays excepted), free to all from 10 A. M. to 5 P. M. The museum is an exposition of the mineral wealth not only of California, but of the Pacific coast generally.

THE Denver, Colo., *Republican* says that the mixture for preventing fumes in mining powder which has been patented by R. Crowe of Georgetown, Colo., consists of 50 per cent unbolts wheat flour, 25 per cent common salt finely ground, and 25 per cent pulverized bicarbonate of soda.

THE amount of dividends paid incorporated mining companies in the United States and British Columbia for the first ten months of '98, is \$17,685,150, which probably represents about one-third the total amount of dividends for mining properties in those countries for that time.

THE production of German coal in six years has increased 30 per cent; coke 50 per cent, and fuel 80 per cent. In the Ruhr basin the coal output in 1897 was 48,424,000 tons; number of miners 176,101; output per miner 275 tons. The output of coke was 6,872,000 tons, and of patent fuel 944,000 tons.

TOTAL credence can not be given technical books on mining, so far as data or details of mining operations are concerned in connection with present working; for, however accurate or reliable they may have been at the time of their preparation, the great advance in economic methods rapidly makes such works obsolete.

THE Salt Lake *Tribune* says that G. S. Peyton was the first to master the ores at the Mercur, Utah, mine, and laid the



W. C. RALSTON, VICE-PRESIDENT CALIFORNIA STATE MINERS' ASSOCIATION.

foundation for the introduction of the cyanide process in Utah, and, with the knowledge that many years of experience have brought him, promises to show even further reductions in the cost of treating a ton of Mercur ore.

REPORTS from Tacoma, Washington, are that the Rothschilds (as usual) and D. O. Mills will reorganize the Tacoma Smelter & Refining Co. and increase the capacity of the plant to four times its present size, the work to begin shortly. It is further stated that the smelter will be controlled by the Bunker Hill and Sullivan mine of Wardner, Idaho, and the Alaska-Treadwell and Alaska-Mexican mines of Alaska.

RECENT discoveries of free-milling gold ore in the Buffalo Hump and Thunder Mountain districts in northern Idaho have caused a stampede of miners from Florence, Marcus, Elk City, Lewiston and adjacent districts. These discoveries have been made along the old trail leading to the Florence and Marcus diggings, over which many miners and prospectors passed during the excitement of '62.

A NEW compound of aluminum and zinc, called "alzone," is said to possess some excellent qualities. The tensile strength of the material is from 24,000 to 25,000 pounds per square inch. It is rigid, and possesses very little ductility. It may serve as a substitute for cast brass in nearly every instance where cast brass is serviceable, but cannot take the place of soft brasses, since it possesses little ductility.

THE eight Lake Superior producing copper mines in Houghton Co., Mich., are Calumet & Hecla, Quincy, Osceola, Tamarack, Wolverine, Centennial, Franklin and Atlantic; in these there are 9266 shareholders. The aggregate market value of these eight mines is about \$85,000,000; to date the total dividend disbursements amount to \$73,782,000, with the present rate of distribution about \$5,500,000 per annum.

ABOUT as good a record as any in shaft sinking was made last July by F. C. Roberts and E. H. Garthwaite, two California miners, at the Nigel Deep mine in Heidelberg district, S. A. R., driving a 14x7 shaft from 946 to 1206 feet depth—260 feet—in thirty-one days from July 1 to July 31 inclusive. The vertical depth of the shaft at the latter date was 975 feet. After leaving the incline the rock was hoisted up 700 feet vertically.

IT is the opinion of some who have studied the subject practically that the idea generally accepted that because an ore deposit has been formed on what may be called a "true fissure-vein," it necessarily has an indefinite extension in depth, is in the nature of a fallacy, and that the extension in depth of ore in a fissure is as likely to terminate within a measurable distance as the extent of ore deposition on what are generally called "blanket deposits."

THE Banner mine at Oroville, Cal., is said to be the deepest mine in the State, taking sea level as the base. The bottoming of the contemplated 3500-foot shaft on the Kennedy mine at Jackson, Cal., will be 1500 feet below the sea level. "Concentrates" believes, however, that Supt. Gassaway at the Magalia mine, Butte Co., has gone deeper than, so far, any miner in the State, a portion of his workings now being nearly 4000 feet below the surface.

THE recent sale of Russian platinum mines to French purchasers was on the basis of productiveness; estimating a ton of platinum from \$798,250 to \$957,900, a mine yearly yielding 360 lbs. was considered worth from \$123,750 to \$154,500; a mine with an annual output of 625 lbs. was valued at from \$309,000 to \$386,250. During '97 a platinum group in the Urals yielded about six tons. Of Russia's seven platinum deposits, five are now under French ownership.

Industrielle Nachrichten says that boring for brine at Darnstedt, in Saxony, has been resumed after an interval of two years. The bore hole was begun in 1890, and has attained a depth of 3280 feet. It yields thirty-three litres per minute of brine, containing 27 per cent of salt. Boring operations are to be continued until the bed of rock salt, from which the brine must be derived, is encountered. The cost of the bore hole has already amounted to £5000.

The world production of nickel in 1889 and 1896 is given as follows:

| | 1889, Tons. | 1896, Tons. |
|-------------------------------|----------------|----------------|
| Sweden and Norway..... | 89 | 20 |
| Germany..... | 282 | 822 |
| United States and Canada..... | 409 | 1700 |
| New Caledonia..... | 1050 | 1950 |
| Totals..... | 1830 | 4492 |

COPPER mines which a few years ago were practically aban-

doned as being too poor and expensive to operate at a profit, are now yielding good returns to their owners. Instead of operating on a small scale with the rich ore-streaks in a vein, it is now found much more profitable to work the whole vein, notwithstanding the fact that the average yield of copper throughout a deposit so worked may not yield over 3 or 4 per cent., and even (in the case of the Atlantic mine at Lake Superior,) does not reach 1½ per cent. The average present cost of producing copper is under nine cents a pound, and many of the larger mines are able to furnish it at a cost of less than 6 cents. It is to-day quoted at 13 cents.

THE former government ruling admitting patent on groups of mining claims, on one of which \$500 worth of work or improvements had been done, was superseded on Dec. 17, '97, by a new ruling from the Secretary of the Interior and the Commissioner of the General Land Office making it necessary to have \$500 work done for each claim before patent could issue. Subsequently the operation of that latter ruling was suspended, upon numerous requests from miners everywhere, to go into effect July 1, '98. Since that date it is necessary to make satisfactory showing that for each claim in a group for which patent is asked, \$500 in work or improvements has been expended, though, as before, all the work may have been done on one claim for the joint improvement or development of the specified group.

QUESTIONS of fact regarding general mining law are cheerfully answered, but it is obviously impossible to correctly or satisfactorily solve special problems herein involving ownership and property rights in individual cases. In such cases arbitration or expert legal advice is suggested. In the case of the Altona Q. M. Co. vs. Integral Q. M. Co., 114 Cal., 100, Aug. 20, '96, which is similar to the instance regarding which query is made, the Supreme Court of California held that where a mine is idle the services of a watchman in looking after the property and taking care of the same may constitute work upon the claim sufficient to hold it, if such care was necessary to preserve tunnels, buildings or any structure erected to work the mine. But if there was only the naked claim to be looked after and a watchman was placed there merely to warn prospectors and thus prevent a relocation, it would not be labor upon the mine in the sense of the statute.

WHEN a casting cools off, its uneven shrinking sets up internal strains which are finally balanced against each other, so that the casting will, after that, retain its form. The interior portion of a lathe-bed, for instance, may, when the bed has cooled, want to shrink more than the previously cooled upper and lower edges will allow it to do, and the different portions of the casting will be all the while trying to stretch or to compress each other, and the final shape which the casting will take if left to itself is that in which the different portions are balanced. The fight between them is, however, not settled as soon as the casting is cooled by any means, but it continues for a long time afterward and dies very gradually, the form of the casting continuing to change slightly for a long while, in some cases for months. The molecules composing the iron are simply settling into their final places and it takes them a long while to do it.

THE U. S. Geological Survey at Washington, D. C., desires it said that the geologic folios now being issued (and which have been editorially noticed herein) are sold at 25 cents each, remittance of that exact amount to be made by money order payable to the Director of the U. S. Geological Survey, or by currency. Postage stamps, checks or drafts will not be accepted. The folios should be ordered by number. No. 1 is the Livingston, Montana, folio; No. 3, Placerville, Cal.; 5, Sacramento, Cal.; 9, Anthracite-Crested Butte, Colo., (the price of this folio is 50 cents); 11, Jackson, Cal.; 15, Lassen Peak, Cal.; 17, Marysville, Cal.; 18, Smartsville, Cal.; 24, Three Forks, Mont., (50 cents); 29, Nevada City, Cal., (50 cents); 30, Yellowstone National Park, Wyo., (75 cents); 31, Pyramid Peak, Cal. The following more recent issues are unnumbered in the circular: Bidwell Bar, Cal., folio; Boise, Idaho; Butte, special, Mont., (50 cents); Downieville, Cal.; Pueblo, Col.; Sonora, Cal.; Telluride, Colo.; Tenmile Dist., Colo.; Truckee, Cal. All communications should be addressed: The Director, U. S. Geological Survey, Washington, D. C.

In pamphlet form has been issued the recent reports of superintendents of Comstock, Nev., mines to the Comstock Pumping Association, the expert testimony on which the Association largely based their project. In the pamphlet is an excellent illustration of the Evans hydraulic elevator, and a brief description of the plan by which it is proposed to unwater the old bonanza lode to a point 500 feet below the present water level. The brief business proposition of the Risdon Iron Works of San Francisco was a pleasure and a surprise in cost to the Pumping Association, which had secured pledges of \$100,000 as a preliminary. The Risdon Iron Works offered to essay the work for \$30,000, contingent upon success, and are going ahead, incidentally receiving considerable advertising therefrom, as the proposed drainage has attracted considerable attention and there is naturally curiosity regarding the apparatus with which it is proposed to do the work. The pamphlet gives a good deal of interesting data as to the condition of the Comstock, from men well qualified to write concerning it.

A GOOD test for oil is to place single drops of different oils in line upon a piece of plate glass about 2 feet to 2 feet 6 inches long, one end being raised about 6 to 8 inches to form an inclined plane. This test should be conducted in a room where there is little or no dust. The drops of oil start from the top of the inclined plane upon a race with each other. The first day sperm oil will be found in the rear, but after a time it will overtake the others, and be found in motion even after some others have dried up. An oil having a light body runs quickly and dries quickly, but an oil that has both a body and a free flow will readily be detected by this test. An oil may have a good body and yet tend to gum badly, which quality will also be easily detected on the glass. A test for the presence of acids is to put small quantities of oil in copper dishes, which are easily made by depressing bits of sheet copper with round-faced hammers. If acid is present, it will attack the copper and produce verdigris. As a result of experiments carefully made and extending over a year, it was found that iron was least affected by seal oil, and most by olive oil. Mineral lubricating oil has no action on zinc and copper, acts least on brass and most on lead. Lard oil acts least on tin and most on copper. Sperm oil acts least on brass and most on zinc.

Some Notes on the Recovery of Gold from Cyanide Solutions.

Written for the MINING AND SCIENTIFIC PRESS by SHERARD COWPER-COLES, Assoc. Inst. M. M., London, Eng.

One of the chief difficulties appertaining to the economical recovery of gold from weak cyanide solutions by electrolysis has been the electrodes.* If several lead anode sheets are cut superimposed, the strips cling together, and have to be carefully spread out one by one, so that the surface may be exposed to the solution. A clean-up is made every seven or eight weeks, when the wood frames carrying the lead strips are withdrawn, the lead strips removed and new substituted, the auriferous lead being ultimately melted down and conveyed to a central works to be cupelled. This method is both crude and expensive; the labor of fitting the strips into the frames is considerable, and the consumption of lead is a considerable item, having been computed by Mr. Von Gernet at the Worcester mine at 1.10 of a penny per ton of ore treated, and by Mr. Williams at the Crown Reef Gold Mining Company at 1.75.

The cathode should fulfill the following conditions: I. The gold should be adherent during the process of decomposition. II. The gold should be capable of being readily stripped after removal from the electrolyzing cell. III. The cathode should be electro-positive to the gold in solution, to ensure the cathode being coated with gold on immersion.

These conditions are fulfilled, I find, by substituting an aluminum cathode for a lead one, advantage being taken of the fact that a loose film of oxide is very rapidly formed on aluminum, the difficulty in soldering and electroplating aluminum for this reason being well known. The substitution of aluminum for lead foil, or strip, enables the gold to be obtained as pure gold, and daily returns to be made of the amount of gold recovered; it also has the additional advantage of reducing the cost of labor and economizing the amount of cyanide of potassium used, as the solution is not contaminated by any base metal such as zinc. The deposition of gold from a cyanide bath on to an aluminum plate proceeds in a uniform manner, but in such a way that the gold is deposited as a metallic sheet, which is easily detachable, when desired, from the aluminum cathode by stripping or peeling, or rubbing, almost as soon as it is formed, and if the aluminum cathode consist of a sheet of the metal fixed to a revolving drum or cylinder, by varying the rate of rotation the film of gold can be brushed or removed from off the cathode continuously, so that the process is an automatic one, resulting in the immediate and continuous recovery of the gold without any subsequent cupellation of the lead as in the older electrolytic process.

The process has therefore in it the elements of economic working coupled with the quick recovery of the valuable gold. In the Siemens-Halske process the lead cathodes remain some weeks in the bath, and the gold, which only then amounts to about one-tenth the weight of the cathode, is only recoverable therefrom after a second further operation of smelting and cupellation. In the Siemens-Halske process lead was chosen as the cathode, as it has the property of allowing the gold to adhere to it. In the aluminum process aluminum is used as the cathode, as it permits of the easy removal of the gold film. In the former process the gold has to be won from the lead by a secondary operation; in the latter the gold is directly obtained in the form of a pure foil without any further expense or trouble. Gold by this process has been successfully extracted from cyanide solutions containing only 0.01 per cent of cyanide of potassium and 2½ dwts. of gold to the ton of solution. The best results are obtained when the solution is raised to a temperature of about 100° F. It is also found advantageous to use a greater current density with the necessary increased voltage when the aluminum plates have been freshly placed in the solution, so as to ensure their being covered with a film of gold as quickly as possible, otherwise there is a tendency for aluminum hydrate to be formed. In about ten hours an extraction of 95 per cent was obtained by the use of aluminum cathodes, the amount of gold in solution before electrolysis being 2½ dwts. to the ton of solution and the strength of cyanide 0.01 per cent and the rate of flow about 15 gallons per 100 hours for every cubic foot of electrolyzing cell, or 3 square feet of cathode service. Gold has been deposited on aluminum cathodes from solutions containing only 0.0075 per cent of cyanide of potassium, the current density per square foot being 0.03 and the E. M. F. at the poles of the generator 6 volts.

The following are the results obtained from gold cyanide solutions of varying strengths with aluminum cathodes and iron anodes:

First Experiment.—A cyanide solution containing 3.2 grams 2 dwts. gold per gallon and 22.71 grams per gallon of potassium cyanide, or 0.5 per cent solution, was electrolyzed. The aluminum cathode had an area of half a square foot, and two similar-sized iron plates

formed the anodes, placed 1½ inches from the cathode, the amperage being 1.50 and the voltage 1.40 at the terminals of the electrolyzing cell. The gold began at once to deposit on the aluminum cathode as a bright coherent coating, and the deposition was allowed to continue for fifteen minutes, when the amperage was found to be 2.0 and the voltage 3.40. The layer of gold could be completely and easily detached by rubbing gently with a piece of india rubber tubing fixed on a glass rod. A fresh cathode was then inserted.

| | P. M. | Amperes, per sq. ft. | Volts. |
|------------------------|-------|----------------------|--------|
| Time of immersion..... | 1:05 | 3.10 | 4.40 |
| Taken out..... | 1:20 | 3.20 | 4.60 |

The gold was removed from this cathode, and a fresh one inserted without changing the conditions.

| | P. M. | Amperes, per sq. ft. | Volts. |
|----------------|-------|----------------------|--------|
| Taken out..... | 1:50 | 2.60 | 4.70 |

As gold still continued to be deposited, the experiment was continued.

| | P. M. | Amperes, per sq. ft. | Volts. |
|------------------------|-------|----------------------|--------|
| Time of immersion..... | 2:20 | 2.80 | 4.70 |
| Taken out..... | 2:55 | 2.60 | 4.80 |
| Time of immersion..... | 3:00 | 2.30 | 4.60 |
| Taken out..... | 4:00 | 2.20 | 4.90 |
| Time of immersion..... | 4:15 | 2.60 | 4.90 |
| Taken out..... | 5:15 | 2.00 | 4.90 |

The whole quantity of gold recovered in these six experiments was well washed to remove traces of potassium cyanide and then weighed.

| | Grams. | Per cent. |
|-----------------|--------|-----------|
| Gold added..... | 2.200 | 100 |
| Gold found..... | 2.7108 | 84.70 |

It will thus be seen that 84.70 per cent of the total gold was recovered from the solution in 3 hours 35 minutes, using an average amperage of 2.51 per plate, or a current density of 5.02 amperes, and an average voltage of 4.63.

Second Experiment.—In this experiment a weaker solution of potassium cyanide, containing 11.35 grams per gallon = 0.25 per cent solution, was employed. The percentage of gold was nearly doubled, viz., 91 grains = 5.94 grams = 3.80 dwts. per gallon.

The experiment was divided into two portions, the yield of gold at each stage being determined:

| | Amps. | per sq. ft. | Volts. |
|------------------------|------------|-------------|--------|
| First Stage— | | | |
| Time of immersion..... | 11:15 a.m. | 3.00 | 4.75 |
| Taken out..... | 1:05 p.m. | 2.00 | 5.10 |
| Second Stage— | | | |
| Time of immersion..... | 1:20 p.m. | 2.10 | 4.90 |
| Taken out..... | 3:40 p.m. | 2.00 | 4.80 |

The experiment had to be discontinued at this stage, owing to a short circuit taking place within the cell. The gold recovered:

| | |
|------------------------------------|------------------------------|
| First stage, in 1 hr. 50 min..... | 3.005 grams = 50.59 per cent |
| Second stage, in 1 hr. 20 min..... | 0.875 gram = 14.73 per cent |

A total quantity of gold amounting to 65.32 per cent was, therefore, recovered in 4 hours and 10 minutes, although it will be noted that the greater part of the gold was deposited in the first two hours.

Third Experiment.—A solution containing 6 dwts. of gold per gallon and 32.71 grams of potassium cyanide, being a 0.5 per cent solution, was employed. The gold was deposited in three stages, and weighed separately, as follows:

| | P. M. | Amps. | per sq. ft. | Volts. |
|---|-------|-------|-------------|--------|
| First Stage— | | | | |
| Time of immersion..... | 5:30 | 6.25 | 4.30 | |
| Taken out..... | 6:00 | 5.20 | 4.10 | |
| Gold deposited, 2.930 grams = 32.02 per cent. | | | | |
| Second Stage— | | | | |
| Time of immersion..... | 6:12 | 4.80 | 4.10 | |
| Taken out..... | 6:45 | 4.20 | 4.30 | |
| Gold deposited, 1.340 grams = 14.68 per cent. | | | | |
| Third Stage— | | | | |
| Time of immersion..... | 6:55 | 2.20 | 2.30 | |
| Taken out..... | 8:45 | 2.10 | 2.30 | |
| Gold deposited, 2.085 grams = 22.46 per cent. | | | | |

Thus 69.13 per cent of gold was recovered in 3 hours 33 minutes, and the greater part was also deposited in the first half, viz., 32.02 per cent.

The experiments demonstrate that the process affords a quick method for depositing gold from its cyanide solutions, and also show that it is easy to remove the film of metallic gold from the aluminum cathode by mechanical means.

In another experiment some gold tailings were carefully assayed, and found to yield a button of gold equivalent to 1.4 gram gold per 1000 kilograms, or, approximately, 1 dwts. per ton.

The quantity of tailings used for the experiment was 90 lbs. This quantity was placed in a suitable vat and treated by the well known methods for extracting the gold by means of a cyanide solution. The tailings were first leached with a weak caustic soda solution containing 4 ozs. caustic per ton of water, and after its removal, a cyanide solution containing 0.5 per cent KCN was added. This solution was allowed to leach the tailings for several hours, and was then drawn off into an electrolytic vat. The tailings were then leached dry for some hours, in order to ensure a complete solution of the gold, and the double cyanide so formed was leached out with a weak cyanide solution containing 0.18 per cent KCN. After this solution had been drawn off into the electrolytic tank, the last traces of the gold solution were washed into the vat with water. The time occupied for the whole operation was 50 hours, so that it represented the same time as is used in actual practice on a commercial scale. The total amount of liquors obtained in this way and submitted

to electrolysis amounted to about 50 litres, or about 11 gallons, or about half the weight of the tailings treated.

From the above assay the theoretical quantity of gold which should be extracted from the above weight of tailings is 0.056 gram, or one-thirtieth of a dwts. On submitting the solution to electrolysis a current of 0.29–0.31 ampere was employed, at a pressure of between six and seven volts. As the area of the aluminum cathode was approximately one square foot, the current density corresponds to the amperes. The electrolysis was allowed to proceed for seven hours, and at the end of that time the gold was seen covering the whole of the cathode as a very bright golden deposit of extreme thinness. Notwithstanding the thinness of the film it was found possible to detach it mechanically.

Report of the War Eagle Mine.

Jno. B. Hastings, manager War Eagle mine, Rossland, B. C., reports that from October 1, 1897, to October 1, 1898, the following work was done:

| | |
|---|---------|
| 3,480 feet of tunneling, average cost per foot..... | \$21 15 |
| 451 feet of raising, " " " " " " " " " " | 29 78 |
| 185 feet of sinking, " " " " " " " " " " | 96 25 |
| 4,117 feet total. | |

From driving these headings 2316 tons of ore was produced and shipped.

The work done during the past year added to former headings makes a total of:

| | |
|------------------------------|-------|
| Tunneling, feet..... | 3,304 |
| Raising, " " " " " " " " " " | 851 |
| Sinking, " " " " " " " " " " | 665 |
| Total..... | 4,820 |

This does not include 250 feet of the main work shaft timbered through the stopes from the 250-foot level to the surface.

The smelting conditions were such that regular stoping in the mine and ore shipments were not begun during the year until May. Besides the ore above mentioned, there were produced and shipped from stopes 26,559 dry tons at an average cost per ton of \$3.24; the total shipments for the year aggregate 28,875 tons.

| | |
|----------------------------------|------------|
| Average gross smelter value..... | \$ 20 01 |
| Total smelter's gross value..... | 570,744 23 |

The gross market value per ton of the ore in metals were: Gold, \$18.90; silver, \$1.15; copper, \$3.46½. Total, \$23.52.

The following table gives the total production of the mine. The gross market value is the actual value of the gold at \$20.67 per ounce, silver at New York quotations, and copper at New York price for casting, the difference between this column and "smelter's gross value" being a smelting and marketing charge; the amount is shown under the heading of indirect smelting charge.

PRODUCT OF THE WAR EAGLE MINE, CHARGES AND VALUE PER TON.

| Year. | Net Value. | Direct Smelting Charge. | Smelter's Gross Value. | Smelting Charge Indirect. | Actual Total Smelting Charge. | Gross Market Value. |
|-----------|------------|-------------------------|------------------------|---------------------------|-------------------------------|---------------------|
| 1894..... | \$24 41 | \$12 50 | \$36 91 | \$6 63 | \$19 13 | \$43 54 |
| 1895..... | 29 05 | 10 87 | 39 92 | 7 41 | 18 26 | 47 33 |
| 1896..... | 31 29 | 9 89 | 31 16 | 5 79 | 15 68 | 36 97 |
| 1897..... | 13 35 | 9 08 | 23 31 | 4 33 | 14 29 | 27 64 |
| 1898..... | 12 51 | 7 50 | 20 01 | 3 51 | 11 01 | 23 52 |

CHARGES AND VALUES PER ANNUM.

| Year. | Net Tonnage. | Net Value. | Direct Smelting Charge. | Smelter's Gross Value. |
|------------|--------------|--------------|-------------------------|------------------------|
| 1894..... | 46 93 | \$ 1,145 55 | \$ 586 62 | \$ 1,732 17 |
| 1895..... | 9,980 93 | 289,951 36 | 108,486 32 | 398,437 68 |
| 1896..... | 8,920 29 | 189,944 38 | 88,222 41 | 278,166 79 |
| 1897..... | 7,406 30 | 98,696 19 | 73,752 42 | 172,448 61 |
| 1898..... | 25,523 00 | 356,943 98 | 213,900 25 | 570,744 23 |
| Total..... | 54,877 45 | \$936,791 46 | \$484,948 02 | \$1,421,739 48 |

| Year. | Indirect Smelting Charges. | Total Smelting Charges. | Gross Market Value. |
|------------|----------------------------|-------------------------|---------------------|
| 1894..... | \$ 321 39 | \$ 908 01 | \$ 2,053 56 |
| 1895..... | 73,925 83 | 182,412 15 | 472,363 51 |
| 1896..... | 52,611 07 | 139,833 48 | 329,777 86 |
| 1897..... | 32,034 22 | 105,786 64 | 204,683 83 |
| 1898..... | 99,991 05 | 313,891 30 | 670,735 28 |
| Total..... | \$257,883 56 | \$742,831 58 | \$1,879,613 04 |

SOME valuable tests have been recently made by La Chatelier, of Paris, in connection with the combustion of acetylene and air mixtures. He has found that a mixture containing less than 7.7 per cent of acetylene burned with a yellow flame, the brightness increasing with increased acetylene contents, and the combustion being perfect. A mixture which contained above 7.7 per cent and up to 17.3 per cent of acetylene burned with a blue flame, the products of combustion being, besides water and carbonic acid, carbonic oxide and hydrogen. With contents of 17.3 per cent, a part of the mixture remained unburned and carbon was separated. The separation of 25 per cent took place in the form of a dense black vapor. With increased acetylene up to 57 per cent the mixture remained explosible, explosibility beginning with 2.7 per cent, while a coal gas and air mixture required at least a gas proportion of 8.1 per cent in order to be explosive.

*The cathode is usually lead, and the anode iron, but in Mr. Andred's process he has reversed the order, the anode being peroxidized lead plates, and the cathode iron.

The Refining of Base Lead Bullion Containing Silver, and High in Gold.*

NUMBER IV.

By G. H. BLAKEMORE.

Weight of Crusts.—The following series of figures show what amount of alloy is found in the various crusts, from the zinc added:

FIRST GOLD CRUST.

| Actual Weight of Charge, Tons. | Assay Value Per Ton. | | Weight of Zinc Used, Lbs. | Weight of Crust Skimmed Off, Lbs. | Per Cent of Crust on Charge. |
|--------------------------------|----------------------|--------|---------------------------|-----------------------------------|------------------------------|
| | Au. | Ag. | | | |
| 11.48 | 21.02 | 156.54 | 225 | 2454 | 9.67 |
| 11.259 | 15.88 | 179.03 | 355 | 2702 | 11.16 |
| 11.80 | 22.80 | 145.30 | 221 | 3682 | 13.80 |
| 10.17 | 17.52 | 121.08 | 303 | 2349 | 8.90 |
| 10.308 | 19.86 | 150.92 | 215 | 2442 | 10.54 |
| 10.279 | 20.58 | 146.36 | 212 | 2101 | 9.11 |
| 10.04 | 14.26 | 136.53 | 188 | 2340 | 10.18 |
| 11.008 | 14.54 | 129.92 | 203 | 2475 | 10.29 |
| 10.05 | 12.42 | 132.58 | 176 | 2168 | 9.80 |

FIRST SILVER CRUST.

| Actual Tons in Kettle. | Assay Value. | | Lbs. Zinc Used. | Crust Produced, Lbs. | Percentage of Crust to Charge. |
|------------------------|--------------|--------|-----------------|----------------------|--------------------------------|
| | Au. | Ag. | | | |
| 11.80 | nll. | 67.23 | 210 | 2285 | 8.25 |
| 11.85 | nll. | 64.21 | 217 | 2424 | 9.02 |
| 11.08 | nll. | 65.02 | 228 | 3010 | 11.56 |
| 10.01 | nll. | 56.24 | 175 | 1933 | 8.81 |
| 10.41 | nll. | 61.22 | 200 | 2210 | 9.47 |
| 10.87 | nll. | 100.28 | 284 | 2656 | 10.96 |
| 11.29 | nll. | 34.64 | 165 | 2584 | 10.21 |
| 10.63 | nll. | 75.64 | 231 | 2035 | 8.55 |
| 11.62 | nll. | 63.42 | 223 | 1690 | 6.49 |

First crust obtained when all the silver and gold are taken out together.

| Actual Weight of Lead in Kettle. | Assay Value Per Ton. | | Zinc Used, Lbs. | Crust Obtained, Lbs. | Percentage of Crust to Charge. |
|----------------------------------|----------------------|--------|-----------------|----------------------|--------------------------------|
| | Au. | Ag. | | | |
| 11.01 | 16.52 | 195.48 | 638 | 5056 | 20.5 |
| 10.15 | 15.98 | 151.71 | 533 | 4454 | 19.58 |
| 11.49 | 13.12 | 118.88 | 502 | 4625 | 17.00 |
| 9.78 | 14.00 | 159.90 | 557 | 5170 | 24.95 |
| 11.22 | 15.00 | 141.20 | 540 | 4186 | 16.64 |
| 9.92 | 12.30 | 132.02 | 444 | 4607 | 20.72 |
| 12.01 | 12.25 | 143.03 | 495 | 3894 | 14.47 |
| 11.05 | 24.04 | 246.98 | 667 | 6154 | 24.85 |
| 10.21 | 13.34 | 154.52 | 480 | 4016 | 17.54 |

Sample assays of the first silver crusts have been previously given to show how some gold always remains behind with the silver crust. For this reason, efforts to make a "gold" crust (as distinguished from a "silver" crust) are not advisable in bullion rich in gold. The limit of gold that will pay to separate out of fine silver by parting small quantities, in Australia is about 8 ozs. of gold in every ton of silver, anything under that will not pay to extract, and is therefore lost to the producer. In parting very large quantities of dore, say 12,000 ozs. daily, about 4 ozs. of gold would pay to work for.

The next part of the refinery work is that of

Liquating the Crusts.—In many of the old plants, the liquating of the crusts was done in kettles, built in alongside the desilverizing kettle. There were two of them, one to receive the crust and the other to hold the lead as it separated out from the crust in the first kettle. A glance at such an arrangement will show its faults. As soon as the lead began to separate out from the crust in the first kettle, the dry alloy had to float on top of a bath of molten lead until skimmed off, and it was therefore undergoing all the time it lay there a gradual impoverishment of its gold and silver values, and necessarily enriching the lead below. The want of sense in this is plain, because after having gone to the expense of taking the gold and silver out of the bullion, it was a queer thing to go to some bother in driving a portion of that silver and gold back into the bullion again.

In modern plants the "liquating" or "sweating" or "drying" of the crusts is done in small reverberatory furnaces. The hearth is formed of cast-iron plate, set on a slope, with the edges of the long sides turned up some 4 inches. The plate is cast slightly "V" shape, so that, as the lead separates out, it can run down the sloping bottom and deliver into a kettle separately fired, which stands outside the furnace. The plate is laid on a brisque bottom and has a fall of about 4 inches in its length, the fall being from the fire bridge to the catchment kettle. The size of the furnace, like all the rest of the plant, depends on the work it has to do. A furnace capable of working half-ton charges is quite large enough for a refinery handling about 100 tons of bullion weekly.

After the furnace is charged with the crust to be liquated, the heat is raised to just the melting point of lead, and kept below the point at which the zinc alloy will melt.

In half an hour, lead begins to drip from the delivery spout. The latter is kept heated by a fire built round it to prevent the lead solidifying in the chan-

nel and blocking it. At intervals the crust in the furnace is well turned over to expose fresh surfaces to the heat, and in about two hours the crust is as "dry" as it is advisable to make it. Making the crust too "dry" interferes afterwards in the re-torting operation. As the catchment kettle fills up, the "sweat lead" is baled out into bars and stacked until enough has gathered to make a kettle charge. It is then melted up and desilverized; the crust from this poor lead being too low in silver to liquate, it is therefore returned to the next charge of rich bullion as part of the zinc necessary for its desilverization.

As soon as the charge in the liquating furnace is "dry" enough, it is raked out and let fall over a slanting, perforated plate to break it up into small pieces about marble size. It is then weighed and tipped into the "alloy bin."

The following figures will show how the crust loses in weight on liquating. Each charge was 1120 lbs. and the figures given are the weights of "dry alloy" obtained from each charge:

| Dry Gold Crust Alloy Obtained. | | Dry Silver Crust Alloy Obtained. | |
|--------------------------------|--|----------------------------------|--|
| Lbs. | | Lbs. | |
| 510 | | 487 | |
| 450 | | 484 | |
| 520 | | 560 | |
| 542 | | 480 | |
| 633 | | 422 | |
| 666 | | 348 | |
| 707 | | 504 | |
| 646 | | 519 | |
| 661 | | 524 | |
| 595 | | 404 | |
| 672 | | 448 | |
| 600 | | 323 | |

Slightly more alloy is obtained from gold crusts than silver crusts, and it is particularly advisable not to sweat the gold crusts too much, more so than with silver crusts for the reasons before given.

Assays of the alloy and "sweat lead" obtained from same in the liquation process are as follows:

| Assays from Gold Crust. | | Sweat Lead from Gold Crust. | | Remarks. |
|-------------------------|--------|-----------------------------|------|----------------------------------|
| Ag. | Au. | Ag. | Au. | |
| 1047.66 | 209.45 | 6.92 | tr. | |
| 1105.66 | 329.12 | 17.07 | 4.20 | Overheated in liquation furnace. |
| 1303.58 | 279.61 | 5.78 | tr. | |
| 1570.93 | 311.59 | 6.10 | tr. | |
| 1886.35 | 336.40 | 10.87 | .06 | Overheated. |
| 2083.65 | 322.75 | 17.90 | .20 | |
| 2035.80 | 384.20 | 6.48 | .02 | |
| 1075.40 | 337.30 | 5.04 | tr. | |
| 1470.00 | 211.70 | 22.03 | .02 | |
| 1513.64 | 298.15 | 21.68 | .01 | |
| 1064.10 | 307.25 | 7.22 | .04 | |
| 1439.96 | 149.10 | 7.04 | tr. | |
| 2014.85 | 164.55 | 15.53 | tr. | |

SILVER CRUST ALLOY AND SWEAT LEAD ASSAYS.

| Alloy. | | Sweat Lead. | | Remarks. |
|---------|------|-------------|-----|-------------|
| Ag. | Au. | Ag. | Au. | |
| 2077.61 | 0.25 | 3.98 | tr. | |
| 2010.41 | 0.27 | | | |
| 1765.64 | 0.10 | 11.94 | tr. | |
| 1949.12 | 0.18 | | | |
| 1351.90 | 0.18 | 1.84 | tr. | |
| 2081.37 | 0.25 | 7.10 | tr. | |
| 1505.90 | 0.08 | 2.19 | tr. | |
| 701.04 | 0.10 | | | |
| 1977.79 | tr. | 25.10 | tr. | Overheated. |
| 2005.52 | 0.06 | 41.89 | tr. | Overheated. |
| 2111.10 | 0.10 | 11.49 | tr. | |
| 1614.00 | 0.46 | 15.89 | tr. | Overheated. |

In both the gold crust and the silver crust, several instances have been given of overheating the crust in the liquation furnace to illustrate plainly what the result is. The whole secret in liquation is simply to pay ordinary attention to the fire, and not to let it get so hot as to melt any of the zinc alloy and the assays of the sweat lead must then be low. A glance at the lead in the catchment kettle will always show if the charge has been overheated, because if it has, the peculiar bluish cream of a zinc crust shows on the top of the lead. This should always be skimmed off and returned to the liquating furnace.

The coal consumption is trifling; about 250 lbs. per ton of crust is sufficient to do the work.

(To be Continued.)

Not a "New" Method.

In the issue of the 5th inst., on page 452, appeared an article condensed from a monograph read at the October session of the American Institute of Mining Engineers, at Buffalo, N. Y., by R. E. Chism, entitled "A New Assay for Mercury." Under date of the 9th inst., Mr. A. S. Additor writes from Ashland, Or.:

"In regard to 'new' method of mercury assay, I was much surprised to see it headed 'New.' I have used the exact method there described for several years with the following modifications: Instead of a tin shield to protect water from the heat, I use a piece of asbestos, and I have a die with which I press the piece of thin silver foil into a shape just to fit top of retort; for this I use the same kind of cup

as writer, making a space between the foil and top boat contain the water of about 1.5 millimeters. I use in cooling boat small pieces of ice, and, as soon as melted, replace by another piece. Have always had excellent results, and never knew but what others were using same method. I tried it as an experiment several years ago, and it was so simple that I never thought but what others had tried the same thing. At first I used gold to collect upon, but found that silver answered just as well. In a series of experiments to determine whether silver was as adaptable to the use as gold, I found that there was about $\frac{1}{10}$ of 1% in favor of the gold."

One of the World's Gold Fields---The Silver Peak Mines.

Written for the MINING AND SCIENTIFIC PRESS.

These mines, to which attention is being attracted by reason of the enormous developments recently made, are situated in Esmeralda county, Nevada, about forty-five miles southeast of Candelaria, a station on the line of the Carson & Colorado Railroad. The mines were located in 1864 by Seymour and Rienzi Hughes, two California prospectors, who were attracted to the eastern slope of the Sierras at the time of the opening of the mines at Esmeralda (now known as Aurora), and who, not finding an opening in the camp at Esmeralda satisfactory to them, pushed boldly out into the desert to the east, and after hardships innumerable were attracted to the great range now known as the Red mountains, and upon examining the same were rewarded by finding the immense outcrop of gold-bearing quartz which is the distinguishing characteristic of the principal ledges in this group.

After developing the same by a few cuts and testing their ores, they made known their discovery and within a comparatively short time arranged a sale of the property, it going to an Eastern company, some of the principal owners in same being John I. Blair of New Jersey, Samuel J. Tilden and W. B. Ogden.

A small testing mill was built and in 1866 a 30-stamp mill was put in (old style, light stamps). This mill was operated until 1869, at an enormous expense—an indication of the difficulties to be overcome being that freight on the mill first put in, which was hauled by teams from Sacramento, via Placerville, Genoa and down through the desert, was 25 cents per pound. This expensive freight, coupled with the high cost of labor and material of all kinds, the lack of rapid communication, and the desert character of the country, made all costs connected with mining, transporting and milling the ores extremely high, and, although the ore milled some \$16 to \$17 and was opened on the surface in enormous quantities, costs could not be covered and the property was closed down in 1869.

Some of the owners being dissatisfied, Mr. John I. Blair gradually took in the interests of the others, until the property belonged to him entirely, designing to keep it, so we are told, for his boy. Mr. Blair is ninety-six and his boy is over seventy years old. This, however, showing his faith in the value and extent of the property. The property laid idle, practically speaking, until 1881, when, upon the advent of the Carson & Colorado Railroad in the county, the costs were much cheapened. Mr. John Chatovich, an energetic and enterprising man, who had interests in the neighborhood, secured a lease on the property and operated it for a number of years, extracting and milling a considerable amount of good ore. He first introduced the cyanide process in Esmeralda county for the treatment of the ores after amalgamation, and worked up a large body of tailings that had been accumulated.

In 1891, Mr. I. R. Wasson, an experienced miner, was placed in charge of the property by Mr. Blair, and allowed to operate the mines and mill under the express injunction that he must make it pay its way and not call on the home office for any assistance. There having been no development work done, all the mining have been quarrying on the surface, flat broke, and with a mill out of repair and antiquated in design, this was not a very flattering outlook; but by perseverance and hard knocks Mr. Wasson finally got things to going in a small way and took out about 2000 tons of ore which milled \$20 per ton, and from the proceeds paid to Mr. Blair the first dividends he ever recovered from the property.

In 1894 Mr. Wasson bonded the property to other parties, and up to the fall of 1897 considerable work was done, some ore taken out, the property visited by many experts, the usual pulling and hauling indulged in by the operators, a large amount of wind expended, and nothing done.

In the spring of 1898, at the earnest solicitation of Mr. Wasson, Mr. Blair authorized him to drive a crosscut tunnel which had been planned, to tap the ledges 750 feet below the croppings. Work was commenced and has been prosecuted continuously, and on October 1, 1898, the hanging wall was cut and the tunnel continued to crosscut the vein. On October 27th the footwall of the vein was reached, and the vein proven to be 70 feet wide of solid ore,

*Australasian Institute Mining Engineers.

the average value of the ore, aside from the rich streaks and the sulphurets, being about \$15 per ton in gold.

One streak has been cut by tunnel in the vein, showing from 2 to 6 inches wide, that is extremely rich, the quartz being full of free gold worth anywhere from \$1000 per ton upward. The sulphurets run from \$200 to \$600 per ton in gold. The work is being prosecuted as rapidly as possible, to determine the full extent of the parallel veins and their value, but sufficient is now known to demonstrate beyond question that one of the great gold mines of the world has its locus in Esmeralda county, Nevada.

The mineral district in which these mines are situated is about eight miles long and two miles wide, and is largely an altered granite formation, in some instances capped with lime.

The veins, of which there are two principal ones, with innumerable offshoots, spurs and smaller parallel veins, run generally southeasterly and southwesterly, with a northeasterly dip at an angle of about 45 degrees outcropping boldly for about two miles, and on the northern slope of the mountain.

The country rock forming the hanging wall of the north vein has been eroded, leaving the vein exposed, laying on the surface for hundreds of feet.

On the surface the north or Drinkwater vein shows an average width of about 16 feet, the back or Soldier Boy vein shows about 24 feet thick, these veins on the surface being about 80 feet apart.

The quartz is hard but friable, carrying gold and a little silver, the bullion produced being worth about \$15 per oz.; a large percentage of the gold is free. The sulphurets, which run up to 2 and 3%, being worth \$200 to \$600 per ton; no copper present, and occasional spangles of lead.

In addition to the claims held by the Silver Peak Company there are a large number of undeveloped properties and prospects, and some very well developed and opened mines, among these may be mentioned the Mary mine, belonging to John Chatovich, which, with a 5-foot ledge of \$9 to \$20 ore, keeps a 10 stamp mill in constant operation, the ore being hauled about ten miles from mine to mill. At the Leidy & McAfee mine, where they have recently opened by stripping for 300 feet on the surface two parallel veins, each about 12 inches wide, with 10 inches to 12 inches of waste between them, the ore is expected to mill \$200 per ton. Valcalda Bros.' claim is producing a considerable amount of \$40 ore. The O'Hale property has produced considerable, and there are many others.

The production of the district has been about \$1,000,000 in gold, but the introduction of modern methods and appliances will cause a very great increase. Mine timbers are plentiful. Wood is not abundant, but is in considerable supply about twelve miles distant. Water is scarce at the mines, but a plentiful supply for a large mill can be had by piping same about twelve miles from Cave canyon. A large body of fair quality coal is available about fifteen miles from the mines which can be made available for power by generating electricity at the mines with the slack and poor qualities of coal, using "gas producers," and conducting same by wire to the mine—this being to the mind of the writer preferable to the long distance (thirty miles) transmission advocated by some, from Indian creek, using water power, which during some winter months cannot be depended upon on account of cold weather, and would require a very heavy expenditure to put into operation. The enormous amount of ore developed, comparatively good grade, the facilities at hand, insure the immediate and thorough equipment of this property and is assumption of its rank as one of the great gold producers of the world. Undoubtedly the other mines of the district will receive attention as well, and we may look forward to the opening of many valuable mines in this mineral belt, which has been neglected and overlooked so long, and, coupled with the other developments in the county, will put Esmeralda county in the front rank as a gold producer.

Nov. 5th, '98.

S. A. KNAPP.

The Cause of Failures in Mining.

The question is often asked: "What is the most common cause of failure in mining?" The majority of answers probably are: "Want of a good mine on which to work." But one who is a close observer and has observed the methods of mine management in various regions might question whether a better answer would not be: "Want of good mine management." So many instances are remembered where failures can be attributed to this cause alone that the answer is at least worthy of consideration.

Bad management takes such a multitude of shapes that it is almost impossible to describe it; unless it is described in the general term "ignorance of mining." Its constant form is seen in the wasting of ore. A general proof of the facts is found in the hundreds of ore dumps which have been hand sorted over and over at a profit, and there are hundreds yet untouched that will pay handsome returns. There is an old saying that a workman can be known by his chips, and with equal truth it can be said a bad

mine manager can be known by his dumps. One thing that is indispensable in a mine manager is an appreciation of the necessity of thoroughly understanding the nature and value of his ore. He may not be able to understand the ore himself, but if he appreciates its importance he can employ some one who does understand it to take charge of the necessary work.

The world sees the evidence of waste in the dumps that lie on the surface, but there is a still greater source of waste that is hidden from the public in the dark stopes of the mine. Every practical man knows how often the ore is knocked down in the stopes and there partially sorted, and the supposed waste left upon the stulls. If ore sorted by daylight loses much of its value in the waste, what is the loss liable to be in the dark, narrow and cramped stopes? Who that is competent to hand-sort ore gives, in the great majority of instances, any attention to this portion of the work?

As a rule the miner is allowed to have his own sweet will in this labor, and his own sweet will is too often to do that which is easiest, instead of that which is best, even if he knows what is best. This is but one kind of waste, and the commonest one, of bad management, where scores might be mentioned. It is not all mines that require the constant services of an assayer, but a good many more than receive them do require them, and would find them the most valuable of all possible investments.

Tesla's Latest Claim.

NUMBER II.

In last week's issue appeared the first installment of a verbatim statement from Nikola Tesla in his application for a patent. After a detailed recital of the proposed method and device, he says: What I claim is—

1. The improvement in the art of controlling the movements and operation of a vessel or vehicle herein described, which consists in producing waves or disturbances which are conveyed to the vessel by the natural media, actuating thereby suitable apparatus on the vessel and effecting the control of the propelling engine, the steering and other mechanism by the operation of the said apparatus, as set forth.

2. The improvement in the art of controlling the movements and operation of a vessel or vehicle, herein described, which consists in establishing a region of waves or disturbances, and actuating, by their influence exerted at a distance, the devices on such vessel or vehicle, which control the propelling, steering and other mechanism thereon, as set forth.

3. The improvement in the art of controlling the movements and operation of a vessel or vehicle, herein described, which consists in establishing a region of electrical waves or disturbances, and actuating, by their influence exerted at a distance, the devices on said vessel or vehicle, which control the propelling, steering and other mechanism thereon, as set forth.

4. The improvement in the art of controlling the movements and operation of a vessel or vehicle, herein described, which consists in providing on the vessel a circuit controlling the propelling, steering and other mechanism, adjusting or rendering such circuit sensitive to waves or disturbances of a definite character, establishing a region of such waves or disturbances, and rendering by their means the controlling circuit active or inactive, as set forth.

5. The combination with a source of electrical waves or disturbances of a moving vessel or vehicle, and mechanism thereon for propelling, steering or operating the same, and a controlling apparatus adapted to be actuated by the influence of the said waves or disturbances at a distance from the source, as set forth.

6. The combination with a source of electrical waves or disturbances of a moving vessel or vehicle, mechanism for propelling, steering or operating the same, a circuit and means therein for controlling said mechanism and means for rendering said circuit active or inactive through the influence of the said waves or disturbances exerted at a distance from the source, as set forth.

7. The combination with a source of electrical waves or disturbances and means for starting and stopping the same of a vessel or vehicle, propelling and steering mechanism carried thereby, a circuit containing or connected with means for controlling the operation of said mechanism and adjusted or rendered sensitive to the waves or disturbances of the source, as set forth.

8. The combination with a source of electrical waves or disturbances and means for starting and stopping the operation of the same, of a vessel or vehicle, propelling and steering mechanism carried thereby, local circuits controlling said mechanisms, a circuit sensitive to the waves or disturbances of the source and means therein adapted to control the said local circuits, as and for the purpose set forth.

9. The sensitive device herein described comprising in construction a receptacle containing a material such as particles of oxidized metal forming a part of the circuit, and means for turning the same end for end when the material has been rendered

sensitive by the passage through it of an electric discharge, as set forth.

10. The sensitive device herein described, comprising in combination a receptacle containing a material such as particles of oxidized metal forming a part of an electric circuit, an electro-magnet in said circuit and devices controlled thereby for turning the receptacle end for end when said magnet is energized, as set forth.

11. The sensitive device herein described, comprising in combination a receptacle containing a material such as particles of oxidized metal forming part of an electric circuit, a motor for rotating the receptacle, an electro-magnet in circuit with the material and an escapement controlled by said magnet and adapted to permit a half revolution of the receptacle when the said magnet is energized, as set forth.

12. The combination with a movable body or vehicle, of a propelling motor, a steering motor and electrical contacts carried by a moving portion of the steering mechanism, and adapted in certain positions of the latter to interrupt the circuit of the propelling motor, a local circuit and means connected therewith for controlling the steering motor, and a circuit controlling the local circuit and means for rendering said controlling circuit sensitive to the influence of electric waves or disturbances exerted at a distance from their source, as set forth.

13. The combination with the steering motor, a local circuit for directing current through the same in opposite directions, a controlling circuit rendered sensitive to the influence of electric waves or disturbances exerted at a distance from their source, a motor in circuit with the steering motor, but adapted to run always in the same direction, and a local circuit or circuits controlled by said motor, as set forth.

Uranium.

Uranium is obtained chiefly from the mineral pitchblende, an oxide of uranium, but generally contains small quantities of other metals, as the following results of the analysis of a typical specimen show:

| | Per Cent. |
|-----------------------|-----------|
| Oxide of uranium..... | 79.15 |
| Lead..... | 6.30 |
| Silica..... | 5.30 |
| Iron..... | 3.03 |
| Lime..... | 2.81 |
| Arsenic..... | 1.13 |
| Magnesia..... | 0.46 |
| Bismuth..... | 0.65 |
| Water..... | |
| Selenium..... | |
| Manganese..... | 1.27 |
| Carbon..... | |
| Total..... | 100.00 |

It is now prepared by calcining uranium nitrate in a porcelain crucible until a reddish-colored mixture of the sesquioxide and green oxide (W_2O_3) is formed. The mixed oxides are thoroughly ground with a slight excess of pulverized charcoal and tightly packed in a carbon crucible. On subjecting the charged crucible to an electric current of about 450 amperes and 60 volts, the reduction is completed in a few minutes. The metal thus obtained is not pure, but contains carbon in amounts which vary between 5 per cent and 14 per cent. This carbide has a brilliant fracture and great hardness, and when thrown on a slab of porcelain, or closely pulverized and shaken in a glass flask, exhibits the singular property of discharging copious showers of sparks, resembling those displayed when freshly reduced iron is quickly moved about in air. The fusing point of uranium carbide is very high—much higher than that of platinum—and the alloy will probably be found to possess advantages over platinum for use in pyrometers and similar instruments. Carbide of uranium would make a splendid alloy with steel, and if it could be obtained cheaply it would probably supersede nickel and wolfram in the manufacture of high-class steel.

Pure uranium is a perfectly white, non-magnetic metal which takes a good polish, and can be easily scratched with a file. When subjected to high temperature it is much more volatile than iron. Finely powdered uranium takes fire in an atmosphere of fluorine, and is attacked by chlorine, bromine and iodine at different high temperatures. It is also completely burnt in an atmosphere of oxygen at a temperature of 170° C. At high temperatures uranium directly combines with nitrogen.

An alloy of uranium and a small quantity of silver, copper or lead is used in the manufacture of a yellow glass which arrests chemically active light rays. It is employed in making windows for chemical laboratories and photographic developing rooms, and for bottles and flasks for holding substances sensitive to light. The salts of uranium are largely used in photography and as chemical reagents. Some of them are used in glass painting for making apple-green tints, and in porcelain painting for producing black tints. Recent researches in chemistry and physics have made us familiar with the properties of a number of new or rare metals, but few of them possess so many valuable properties as uranium, and it is to be regretted it is so sparingly and irregularly distributed.

Costs of California Milling and Mining.

The following data were furnished by John Ross, Jr., superintendent of the Wildman and Hector mines at Sutter Creek, Amador county, with mills of thirty and forty stamps respectively, and show what may be accomplished by skillful and careful management in well-equipped properties. It is republished, by request, from the issue of Dec. 26th, '96:

DETAILED AVERAGE COST OF MINING ONE TON OF ORE AT THE WILDMAN MINE, SUTTER CREEK, 1895. JOHN ROSS, JR., SUPERINTENDENT.

| | Cost Per Ton, Cents. | Total Cost for 31,391 Tons. |
|---------------------------|----------------------|-----------------------------|
| Timbers | 16.0 | \$ 5,016.30 |
| Spilling | 4.8 | 1,512.08 |
| Lumber | 2.2 | 687.57 |
| Charcoal | 1.7 | 530.95 |
| Candles | 2.1 | 659.25 |
| Powder | 4.8 | 1,533.65 |
| Fuse | 1.1 | 355.00 |
| Caps | 0.9 | 282.60 |
| Water for power | 9.9 | 3,119.45 |
| Freight | 2.9 | 916.61 |
| Iron | 1.1 | 337.62 |
| Steel | 0.7 | 231.18 |
| Hardware | 2.4 | 765.66 |
| Oil | 0.8 | 249.60 |
| Grease and tar | 0.2 | 67.12 |
| Coal | 0.2 | 78.00 |
| Miscellaneous | 3.4 | 1,067.68 |
| Surveying | 1.3 | 233.37 |
| Power drill machinery | 3.2 | 1,026.50 |
| Wire rope | 0.7 | 232.24 |
| Insurance and taxes | 1.1 | 352.37 |
| Office and assay supplies | 0.5 | 140.61 |
| Pump repairs | 0.7 | 219.89 |
| Superintendence and labor | 140.1 | 44,248.97 |
| Totals | 202.1 | \$83,847.40 |

*The above cost includes all repairs, equipment and diamond drill development and development work, cost of operating rock breaker and delivery of ore in ore bin in mill.

DETAILED COST OF MINING ONE TON OF ORE AT THE WILDMAN MINE, SUTTER CREEK, FOR YEAR ENDING SEPT. 30, 1896. JOHN ROSS, JR., SUPERINTENDENT.

| | Cost Per Ton, Cents. | Total Cost for 31,391 Tons. |
|---------------------------|----------------------|-----------------------------|
| Timbers | 18.6 | \$ 6,356.80 |
| Spilling | 6.1 | 2,031.55 |
| Lumber | 1.9 | 608.48 |
| Charcoal | 1.6 | 562.40 |
| Candles | 2.0 | 656.00 |
| Powder | 5.0 | 1,661.37 |
| Fuse | 0.9 | 291.33 |
| Caps | 0.2 | 62.05 |
| Water for power | 9.8 | 3,237.25 |
| Freight | 1.6 | 528.76 |
| Iron | 1.2 | 408.15 |
| Steel | 1.3 | 433.79 |
| Hardware | 2.8 | 929.31 |
| Oil | 0.8 | 252.01 |
| Grease and tar | 0.1 | 35.30 |
| Coal | 0.2 | 77.11 |
| Miscellaneous | 5.7 | 1,894.13 |
| Power drill machinery | 2.5 | 834.75 |
| Pump repairs | 1.3 | 637.60 |
| Surveying | 0.6 | 212.50 |
| Taxes | 0.8 | 247.50 |
| Water pipe | 0.2 | 59.05 |
| Insurance | 0.4 | 128.77 |
| Wire rope | 1.2 | 392.70 |
| Superintendence and labor | 149.4 | 50,068.82 |
| Totals | 216.8 | \$87,260.38 |

*The above cost includes all repairs, equipment and development work, cost of operating rock breaker and delivery of ore to mill; also cost of operating and repairs on pump.

DETAILED AVERAGE COST OF MINING ONE TON OF ORE AT THE HECTOR MINE, SUTTER CREEK, FOR THE YEAR ENDING SEPT. 30, 1896. JOHN ROSS JR., SUPERINTENDENT.

| | Cost per Ton, Cents. | Total Cost for 41,846 Tons. |
|---------------------------|----------------------|-----------------------------|
| Timbers | 15.1 | \$ 6,340.05 |
| Spilling | 3.6 | 1,476.42 |
| Lumber | 0.8 | 338.38 |
| Charcoal | 0.9 | 379.83 |
| Candles | 1.6 | 670.70 |
| Powder | 4.0 | 1,703.40 |
| Fuse | 0.8 | 284.87 |
| Caps | 0.2 | 68.30 |
| Water for Power | 5.6 | 2,331.45 |
| Freight | 1.1 | 443.05 |
| Iron | 1.2 | 488.18 |
| Steel | 1.0 | 409.47 |
| Hardware | 2.2 | 915.45 |
| Oil | 0.5 | 238.34 |
| Grease and Tar | 0.1 | 42.56 |
| Coal | 0.2 | 75.68 |
| Miscellaneous | 3.0 | 1,241.40 |
| Power Drill Machinery | 1.7 | 746.09 |
| Surveying | 0.5 | 210.00 |
| Cement | 0.1 | 15.00 |
| Insurance | 0.1 | 32.12 |
| Taxes | 0.4 | 166.88 |
| Superintendence and Labor | 110.0 | 46,065.73 |
| Totals | 154.6 | \$64,715.15 |

The above cost includes all repairs, equipment and diamond drill work development, cost of operating rock breaker and delivery of ore at mill; also of hoisting 49,738 skips or 89,524 tons of water.

DETAILED COST OF MILLING ONE TON OF ORE AT THE WILDMAN MINE, SUTTER CREEK, 1895. JOHN ROSS JR., SUPERINTENDENT.

| | Cost per Ton, Cents. | Total Cost for 31,391 Tons. |
|----------------------|----------------------|-----------------------------|
| Shoes | 1.9 | \$ 614.25 |
| Dies | 1.5 | 475.65 |
| Screens | 0.4 | 124.74 |
| Quicksilver | 0.6 | 184.65 |
| Wood | 0.3 | 104.28 |
| Hardware | 0.4 | 136.83 |
| Belting | 1.1 | 338.16 |
| Water for Power | 9.4 | 2,964.30 |
| Freight | 2.1 | 659.25 |
| Lumber | 0.2 | 10.04 |
| Oil | 1.5 | 15.00 |
| Grease and Tar | 0.3 | 5.35 |
| Cyanide of Potassium | 0.6 | 95.35 |
| Miscellaneous | 0.8 | 191.83 |
| Assay Supplies | 0.2 | 87.02 |
| Office Supplies | 0.2 | 53.60 |
| Express on Bullion | 0.5 | 166.27 |
| Hauling Sulphurets | 1.6 | 498.32 |

| | | |
|---------------------------|------|----------|
| Insurance | 0.4 | 128.13 |
| Taxes | 0.7 | 224.25 |
| Superintendence and Labor | 16.1 | 5,087.07 |

Totals..... 36.4 \$11,525.04

The above cost includes all costs and equipment.

DETAILED COST OF MILLING ONE TON OF ORE AT THE WILDMAN MINE AT SUTTER CREEK, YEAR ENDING SEPT. 30, 1896. JOHN ROSS, JR., SUPERINTENDENT.

| | Cost per Ton, Cents. | Total Cost for 31,391 Tons. |
|---------------------------|----------------------|-----------------------------|
| Shoes | 1.8 | \$ 628.80 |
| Dies | 1.1 | 350.60 |
| Screens | 0.3 | 108.39 |
| Quicksilver | 0.7 | 240.71 |
| Wood | 0.2 | 75.37 |
| Hardware, Iron and Steel | 1.3 | 435.15 |
| Belting (Concentrator) | 0.6 | 199.48 |
| Water for Power | 0.5 | 3,188.70 |
| Freight | 0.6 | 72.53 |
| Cyanide of Potassium | 0.6 | 81.00 |
| Oil | 0.6 | 14.85 |
| Grease | 0.7 | 5.06 |
| Miscellaneous | 0.7 | 223.53 |
| Lumber | 0.8 | 262.83 |
| Assay Supplies | 0.5 | 152.04 |
| Office Supplies | 0.3 | 105.20 |
| Express on Bullion | 0.6 | 183.14 |
| Hauling Sulphurets | 2.0 | 702.92 |
| Taxes | 0.8 | 247.50 |
| Insurance | 0.2 | 59.38 |
| Silver-plated Plates | 0.7 | 214.02 |
| Water Pipe and Connection | 2.1 | 718.40 |
| Superintendence and Labor | 16.0 | 5,898.06 |
| Totals | 40.8 | \$13,699.96 |

These costs include all repairs and equipment.

DETAILED COST OF MILLING ONE TON OF ORE AT THE HECTOR MINE AT SUTTER CREEK FOR THE YEAR ENDING SEPT. 30, 1896. JOHN ROSS, JR., SUPERINTENDENT.

| | Cost per Ton, Cents. | Total Cost for 41,771 Tons. |
|----------------------------|----------------------|-----------------------------|
| Shoes | 1.8 | \$ 749.71 |
| Dies | 1.6 | 681.31 |
| Screens | 0.4 | 177.57 |
| Quicksilver | 0.7 | 283.33 |
| Hardware | 0.8 | 317.65 |
| Water for Power | 7.8 | 3,252.60 |
| Freight | 0.8 | 346.66 |
| Cyanide of Potassium | 0.2 | 73.50 |
| Wood | 0.2 | 28.50 |
| Charcoal, Iron and Steel | 0.2 | 30.20 |
| Oil | 0.2 | 21.75 |
| Grease | 0.2 | 5.88 |
| Lumber | 0.2 | 10.50 |
| Miscellaneous | 0.2 | 462.58 |
| Assay Supplies | 0.4 | 152.40 |
| Office Supplies | 0.2 | 105.19 |
| Express Charges on Bullion | 0.2 | 93.21 |
| Hauling Sulphurets | 2.2 | 933.32 |
| Taxes | 0.5 | 196.86 |
| Insurance | 0.4 | 118.76 |
| Plates | 0.2 | 86.49 |
| Superintendence and Labor | 12.3 | 5,151.62 |
| Totals | 31.8 | \$13,290.73 |

Personal.

C. R. SMITH is Supt. App mine, Quartz, Cal. S. JONES becomes Supt. Badger mine, Mercur, Utah.

A. V. OLIVER will be Supt. Little Hope mine, Oroville, Cal.

C. BROWN has been appointed Supt. Sunbeam mine, Tintic, Utah.

W. M. NESBIT has been appointed Supt. Bullion-Beck Tunnel Co., Eureka, Utah.

H. A. COHEN, Mercur, Utah, has resigned as Gen. Mgr. of Capt. DeLamar's mining interests.

A. P. BRAYTON JR., of the Pelton Water Wheel Company returned from Japan of the steamer Doric.

D. B. HUNT, Supt. Milkmaid mine, French Gulch, Cal., has returned from San Francisco to Redding, Cal.

H. VISCHER of the U. S. Debris Commission is inspecting restraining dams in Sierra and Plumas counties, Cal.

P. G. GOW, Pres. Jumper M. Co., Stent, Cal., has returned to San Francisco from a visit to his properties.

G. STAYTON has resigned as Supt. Republican mine, Jacksonville, Cal. He will be succeeded by A. M. McDonald.

H. A. KELLAR has returned from a professional visit to South America, and will shortly open an office in San Francisco.

W. A. BALLARD, business manager of the Colliery Engineer Publishing Co., of Scranton, Pa., is touring the coast, and is at present in San Francisco.

R. CHILCOTT, Treas. Black Butte Q. S. M. Co., Cottage Grove, Or., is in New York to arrange for the sale of the output of the mine, which is said to amount to \$30,000 a month.

Heroism Recognized.

On the afternoon of the first day of the convention in San Francisco of the California State Miners' Association, on the 21st inst., Chas. G. Yale took the platform and read the following:

WHEREAS, At the time of the recent disastrous fire in the compressor house at the mouth of the tunnel of the Eureka drift mine, on the Forest Hill divide, Placer county, Cal., upon finding that the buildings would be destroyed, Felix Chappellet Jr., superintendent of the mine, knowing that four men were in what might be a dangerous position, ran for 2500 feet through the tunnel and up a 300-foot upraise to where the men were at work, bringing them out through the smoke and flame in safety; be it

Resolved, That our fellow member, Felix Chappellet Sr., already noted as among our most skillful drift miners, be congratulated upon having a son who "is a chip of the old block," and, though only a young man of 21, possessing the bravery to do a noble action with self-sacrifice and promptness.

Resolved, That the miners of California, in convention assembled, recognize the hero-

ism of this young native son of California, and of a distinguished sire, and desire to congratulate him upon so bravely doing his duty to the men under his charge.

Amid multitudinous cheering, a motion to pass the resolution "by a rising vote" was responded to by the 600 delegates springing to their feet.

Coast Industrial Notes.

—The Sacramento, Cal., S. P. car shops will be rebuilt there.

—A Port Angeles, Wash., firm has secured an order for 500,000 cedar shingles from Honolulu, U. S. A.

—Snow in the mountains and rain in the valleys during the week have been general in California.

—The Baldwin Hotel, San Francisco, was destroyed by fire on the 23d inst., loss \$1,500,000, insurance \$100,000.

—But one bid was received by the Seattle, Wash., Board of Public Works to build the proposed \$1,200,000 water supply system.

—The Puget Sound Dredging Co., Seattle, Wash., has purchased the entire plant and all patent rights there of the Bowers Dredging Co.

—The surveyors of the Vancouver, Victoria & Eastern Railway have located the line through Midway, B. C., and are continuing the survey up Boundary creek.

—The railroad grade from Kingman, Ariz., to the White Hills is being cross-sectioned by surveyors preparatory to grading. The road may be extended from White Hills to Temple Bar, another twenty-five miles.

—The Great Northern railway is surveying a line from Trail to Sayward, B. C. It is proposed to run a branch line from the Nelson road to the Trail smelter to carry ores from the Salmon River and Ymir districts, competing with the C. P. R. E. It is also proposed by the Great Northern to put a steamer on the Columbia river between Northport, Waneta, Sayward, Trail and Waterloo, to carry ores from any point on the river to either of the two smelters.

—In the central and western portions of the Los Angeles, Cal., oil fields something over forty new wells have been put down. While they are not all producing, some, among the deeper ones, are producing more than sufficient to pay expenses. The production in October was about 2300 barrels a day. If to the value of the oil, at current prices, be added the amount expended for wages, hauling and other expenses, the oil industry of the Los Angeles field represents at the present time a business of \$110,000 a month, or \$1,250,000 a year.

—The Belgian consul at Shanghai points out that the indispensable intermediary (or, as he is called in England, a "middleman") between the European and Chinese traders, is the "compradore," whose name is derived from the Spanish *comprador*—i. e., buyer. The earliest foreigners who came to settle in China for purposes of trade carried on business on the principle of exchange only, receiving merchandise in return for that which they brought with them, and the interior of China being closed to foreigners, they were obliged to have recourse to intermediaries to procure what they required. Though close competition has been created among these newcomers—all workers—a keen, constant struggle, in which the old wealthy firms have succumbed. The role of "compradore" has thus been modified; he continues, as before, to hold all the business in his hands, both in buying and selling markets; but to these professions he has added an important one—that of money lender. It may be asked why this costly and ruinous middleman is not suppressed, and it may be answered, because it is impossible, and because a firm that had no "compradore" would do no business. These middlemen have been incorporated for a long time; their corporation is the richest and most important in China, and any person wishing to do business with a foreign firm must deal first with the "compradores." If a trader tries to trade direct, he is annoyed in so many ways that he hastens to return to what are called "old customs"; and China, it should be remembered, is an essentially conservative country, where an established custom has the force of law.

Commercial Paragraphs.

The General Electric Company has established a sales office in the Templeton Building, Salt Lake City, Utah. It is in charge of Mr. H. E. Chubbuck.

The Jeffrey Manufacturing Company of Columbus, Ohio, have recently taken up the manufacture of the Columbian separator screen and bolter, and advise us that they have erected an experimental machine at their works for the testing of such material as may be sent them for that purpose. Parties interested in the screening or separating of cement, cement clinker, ores, phosphate rock, marble, fertilizer materials, bone ash, plaster paris, sand, coal, earth, clay, etc., can secure further data and prices by addressing the manufacturers.

The Pelton Water Wheel Company report recent shipments as follows: One 15-foot compressor wheel for the Gaston Ridge Mining Co., Nevada Co.; one 9-foot pump wheel for the Empire mine, Grass Valley, Cal.; three wheels for the Peyton mine, Calaveras Co.; four wheels for the Republic mine, Washington; one wheel plant for the South Bend Electric Co., Washington; seven wheels for various mines in British Columbia; four wheels for mines in Mexico; five wheels for India and Strait Settlements; three wheels for the Lyndhurst Gold Fields, Ltd., Australia.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 15, 1898.

- 614,364—VEHICLE CANOPY—A. S. Burnham, Wildomar, Cal.
- 614,361—FUEL COMPRESSOR—E. S. Cobb, S. F.
- 614,368—VENTILATOR—G. F. Cramer, Portland, Ore.
- 614,422—EYEGLASS FRAME—C. C. Davis, Los Angeles, Cal.
- 614,296—OIL BURNER—E. W. Dunn, San Jose, Cal.
- 614,375—ROCKING HORSE—R. Eberhard, Los Angeles, Cal.
- 614,167—FRUIT PICKING SHEARS—J. Gardella, Oroville, Cal.
- 614,103—COIN CONTROLLED APPARATUS—Hammond & Weegmann, S. F.
- 614,252—SHEET METAL CUTTER—L. Mayhew, New Whatum, Wash.
- 614,211—SLIDABLE HINGED WINDOW—Wm. McCall, S. F.
- 614,262—SLIDABLE HINGED WINDOW—Wm. McCall, S. F.
- 614,178—RAISIN SEEDER—W. M. McConaughay, Fresno, Cal.
- 614,341—DARK LANTERN—R. M. G. Phillips, Los Angeles, Cal.
- 614,144—ROOF FRAMING TOOL—G. C. Thompson, S. F.
- 614,193—THILL COUPLING—M. C. White, Los Angeles, Cal.
- 614,194—OIL BURNER—D. G. Wilgus, Los Angeles, Cal.
- 614,156—WRENCH—J. F. Woodford, Browns Valley, Cal.
- 29,685—DESIGN, GUITAR BODY—J. Hagberg, Tacoma, Wash.
- 29,683—DESIGN, RAILWAY TIE—A. J. West, Aberdeen, Wash.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special notice:

OIL BURNER.—E. W. Dunn, San Jose, Cal. No. 614,296. Dated Nov. 15, 1898. This invention relates to improvements in apparatus for burning oil and is especially designed for the burning of petroleum or equivalent oils in connection with stoves and heating apparatus of that class. It consists essentially of a perforated burner plate having an undulating surface and surrounding rim, the perforations being made so as to discharge through the highest points of the surface which are conical in shape, and through these openings air and steam and oil are delivered. Below the burner plate is a chamber with a perforated distributing pipe. A combustion chamber is situated above the burner plate, with means through which the products of combustion are allowed to escape. By reason of the conical elevation on the burner plate the oil flows downward from over the cones by gravitation and is distributed over the plate, and the mixture of air, steam and oil is thus made which produces a very satisfactory combustion. Various valves and dampers control the flame and heat at will.

SLIDABLE HINGED WINDOW.—Wm. McCall, San Francisco, Cal. Assigned to the McCall Sliding Hinge Window Co. of same place. No. 614,211-212. Dated Nov. 15, 1898. This invention relates to improvements in windows and is especially applicable to the hinging of the sashes to slidable strips upon which they are carried, the strips being vertically movable in grooves or channels between the stops and parting strips. The cords or counter-balance weights are connected with these strips, and means are provided for locking the strips to the sashes or disengaging them therefrom and locking them to the casing so that when the sash is disengaged from its moving side so as to turn about the hinges upon the opposite side, the strips will be prevented from being carried up by the counter-weight and will remain in position until the sash has again closed and interlocked with the strip when the weight of the sash will be equally divided between the two strips and the counterweight.

Recently Declared Mining Dividends.

- Mammoth, Utah, \$20,000; Nov. 25.
- Gold Coin, Colorado, \$10,000; Nov. 35.
- Republic, Washington, \$30,000; Nov. 25.
- Victor, Colorado, 15 cents per share and 85 cents per share extra, \$100,000; payable Dec. 1.
- Deer Trail M. Co. No. 2, Washington, 1/4 cent per share, \$2500; Nov. 25.

Recent Mining Incorporations.

- Bonita G. M. Co., San Francisco; capital stock, \$100,000; subscribed, \$10; W. Angus, G. L. Bresse, G. E. Crothers, T. G. Crothers, C. S. Neal.
- East Belt G. M. Co., San Francisco; capital stock, \$250,000; subscribed, \$5; C. S. Young, E. P. Barrett, J. Moss, H. S. Allen, G. Beaudet.
- Del Monte G. M. Co., San Francisco; capital stock, \$1,000,000; subscribed, \$2500; J. Fassler, J. T. Sullivan, J. Looney, G. O. Briter, W. J. Gleason.
- Holler M. & M. Co.; capital stock, \$50,000; subscribed, \$50; J. Holler, W. Hoffschneider, J. Winterburn, E. M. Wilson, A. Hoffschneider.
- Middle Fork Con. M. Co., San Francisco; capital stock \$250,000; subscribed \$50; S. Waterhouse, E. W. Waterhouse, J. A. Marsh, H. Waterhouse, E. L. Cutting.
- Golovin Bay M. Co.; capital stock \$200,000; subscribed \$25; D. A. Macdonald, E. B. Cutler, C. F. Humphrey, C. F. Hing, S. L. Barstow.

Black Diamonds.

Black diamonds are found principally in the province of Bahia, in Brazil. They are found also in South Africa, in the Kimberley district. In Brazil, the whole of the district from the Rio Abaete above stream, to Pirapora below, is being successfully mined for the mineral known as carbonado, "bort," or the black diamond. The rivers Abaete, Borrachudo, Indaia, Somno, and many smaller streams, have produced the ore; they intersect the diamond region that extends in the direction of Bagagem, in Minas Geraes, Villa Franca, in Sao Paulo, to the Rio Tibagy, in Parana. The diamond working is pursued in the rudest and simplest form. Laborers from among the natives are employed to dive in the waters of the rivers, and fill with small scoops from the gravel of the beds the pails and buckets that are lowered down from canoes by ropes; the prizes are sometimes few and rare, as might be expected from such an uncouth system. Yet it must pay, otherwise the work would not be continued in a country where cent per cent per annum is not considered more than a fair profit. The "diamond formation" is the name given in Brazil to the various minerals that are found accompanying the genuine diamond where it exists in the beds or shores of rivers. The curious substance called "bort" by the English of this region, "boort" and "diamant concretione" by the French, that is to say, having no cleavage, and by the Brazilians "carbonado" or black diamond, was formerly valueless. In 1849, it became worth from one to two francs per carat, and now a good specimen is worth as much as some species of the real gem.

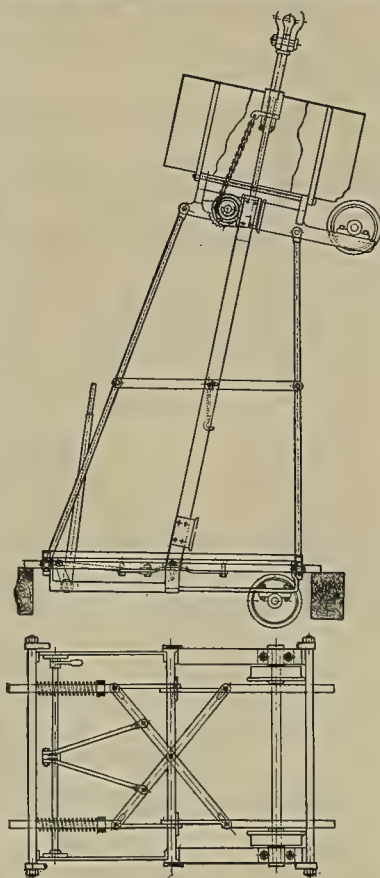
The "carbonado" is supposed to be the connecting link between carbon and the diamond; the hardness is that of the true gem, and its specific gravity ranges from 3.012 to 3.600. It is a granular amorphous mass appearing under the microscope distinctly crystalline, in fact, an aggregate of granules or lamellæ of diamond analogous to a grit of quartzose sand. In some specimens are cellular cavities like pumice, empty or full of sand, and geodes lined with small regular crystals of colorless diamond. It is black and lusterless, and when black it leaves a residue of clay and other substances. This carbonado accompanies the true diamond in sand and in cascalho; it appears in angular and rounded and irregular lumps, being often as large as a walnut. It is well known by its great weight, by its diamond-like coldness in the hand, and by its sharp peculiar sound when bits of it are scratched or rubbed together. The miners sometimes steep it in vinegar, to augment the weight, and it so resembles a piece of common magnetic or pyritic iron ore that without care the best judges are deceived. The "bort" or "carbonado," however, has no attractive power. It is tried by striking it between two copper coins, and if it breaks or does not dint the metal, it is held valueless. The principal use to which the black diamond is put is for diamond cutting. It is pounded and ground to a powder, and used for diamond cutting and diamond drills.

It is stated that the diamantine formations in these regions in Brazil have as yet been but merely scratched, and the works of the laborers have been compared with those of beavers. The rivers have not been turned from their course, and the deep pools above and below the rapids, where the great deposits must collect, have not yet been explored, even with the diving helmet. It is said that the next generation will work with thousands of arms, directed by men whose experience in mechanics and hydraulics will enable them to economize labor. Carbonado is found also in the bank formations of the rivers. Privileges or grants of portions of streams may be obtained from owners, or from the Government, for diamond washing, for reasonable sums of gold. There are rigid laws in Brazil against washing the streams without these grants, though, in spite of the restrictions,

much valuable mineral is taken out of streams and sand hills in unfrequented regions without the preliminary obtaining of a grant.

Gray's Cage Chairs.

These chairs, which have been placed in the Hope, Leiter and other mines, are adapted either for vertical or inclined shafts. The illustration shows



GRAY'S CAGE CHAIRS.

them as used for an inclined shaft. The improvement over ordinary usage consists in having one set of chairs attached to the cage, instead of a set of chairs for each shaft level. The chairs are thrown out by means of a lever, so as to rest upon wall plates at the several levels, and when the lever is out of operation springs draw in the cages so as to clear the wall plates. These chairs are not only economical, substituting one set of mechanism for many, but furnish the convenience and security of operation from the cage.

They are the patented invention of Alex Gray, Butte, Montana, and are manufactured and sold by Fraser & Chalmers, Chicago, Illinois.

Softening Water for Steam Boilers.

F. G. Ansell gives his experience in softening hard water for his boilers as follows:

I had a small plant put in for my present boilers about ten years ago, capable of softening 2000 gallons an hour; it can be started and stopped instantaneously, is very little trouble, and gives most excellent results. In fact, it has saved fuel enough to pay for itself many times over, and by using it I can be quite sure of keeping the inside of the boiler free from "scale." The apparatus is very simple. I have part of an old boiler, with the furnace removed, stood on end. It is 18 feet high and 8 feet in diameter. In the middle of it is a vertical tube, about 10 inches diameter, going to within about 15 inches of the bottom. The hard water is led by a pipe to the top of this 10-inch tube, and so is a smaller pipe conveying lime water, and the two streams mix as they fall to the bottom of the 10-inch tube, and when at the bottom the water spreads out across the 8-foot cylindrical tank, and so rises gradually to the exit tubes, whence it flows into the heating tank, where it is heated by exhaust steam from the engines. The

lime water is made by putting quicklime into some water and stirring, by which it is made to appear somewhat like milk, and the quantity required is regulated according to the natural hardness of the water to be softened.

This is, of course, determined by the analyst. I have many times analyzed the water before and after softening by this process, and find that the total amount of lime is reduced from 10 grains per gallon to 1.4, the carbonate of lime from 15 grains per gallon to nothing, the total quantity of magnesia from 2.05 grains to 0.5 grain per gallon, and the total solids from 30 to 10 grains per gallon before it reaches the heating apparatus. This result I consider very satisfactory, and I find that the boilers can be kept quite clean if the stoker will blow off frequently enough to prevent the water in the boiler from becoming too concentrated. Of course, if this is neglected, any sulphate of lime naturally in the water will be deposited on the inside of the boiler, and so will a small percentage of magnesia.

If the above-mentioned details are properly attended to, then there is absolutely no chipping off of scale to do; but a slight difficulty may arise with regard to the frequency of blowing off in the case of waters containing sulphate of lime. However, there are two ways of obviating this, viz: Put a little carbonate of soda into the heating apparatus, or (in fact, I might say in some cases, and also put) the day before it is proposed to draw the fires and stop the boiler, about 1 cwt. of the soda crystals to dissolve in some of the feed water, and pump it into the boiler a little at a time. The solution should be allowed to stay in the boiling water of the boiler up to its working level for about twenty-four hours, where it will attack any scale it may find there, and make its removal quite easy. It is advisable to add this solution of soda a little at a time, in case the stoker should not be quite certain as to the state of the water in the boiler, because if it should be loaded with mineral matter, then the addition of soda in any but small quantity would most likely cause "priming." The great advantage of this process is that it adds nothing to the mineral matter dissolved in the water; but, on the contrary, actually removes a good amount, as all those who use the process know. The removal is effected by opening a valve in the bottom of the

and, of course, it is also a little extra expense. All feed water should be let into the boiler close to the level of the surface, and it is a good plan to make a series of small jets, so that the surface may be well disturbed, and so break up any scum which may have accumulated upon it; but I do not think there is any fear of scum if the water is properly softened and cleaned before it enters the boiler. Hot feed water may easily be pumped into a boiler, just as cold may, provided the hot water is delivered to the pump a foot or two above the receiving valves; but, of course, owing to the extreme tension of the vapor of hot water, no suction is possible. If the feed water can be heated by any waste heat, so much the better, as, of course, it means a saving of fuel. A second means should always be provided for getting the feed water in—e. g., two donkey pumps, or a donkey pump and also an injector. Injectors can be had to work with the feed water up to a considerable heat, and donkey pumps will throw water very nearly or quite boiling.

"Link-Belt" Steam Weigh Box and Shaking Screens.

The accompanying cut is a partial view of the steel tippie building at the No. 1 shaft of the Spring Valley Coal Co., Spring Valley, Ill., and shows what is probably the most perfect arrangement at present in use for weighing and screening bituminous coal at a mine. It consists of a steam-operated weigh box and a pair of shaking screens. The shaking screens are arranged to make four different sizes of coal, delivering them either severally or in various combinations to cars on the four tracks shown. As the lump coal at this mine is very largely loaded into box cars on the outer track, a special apron has been fitted to the end of the screen in such a way that it can be quickly and easily removed from or entered into a box car, or adjusted to load an open car. To do this only requires as long as is required in the case of a box car to enter the reciprocating box car loader used at this place, or, in the case of the open car, to bring the car into position under the apron. The entire apparatus has a capacity for weighing and screening four pit cars per minute, and was invented, built and erected in run-



STEEL TIPPLE BUILDING AT NO. 1 SHAFT OF SPRING VALLEY COAL CO. Showing "Link-Belt" Steam Weigh Box and "Link-Belt" Shaking Screens; Capacity, 2000 Tons in Eight Hours.

18x8 feet cylindrical tank mentioned above, which is made of such a size that the mixture of water to be softened and lime water when spread over its bottom will rise more slowly than the sediment falls, and so the feed water for the boiler is run off the top quite clear. The sediment should be run out about once a week, and does not take many minutes. I much prefer not to add soda if it can be avoided, because it is impossible to remove it from the water when it is once put in,

ning order by the Link Belt Machinery Co. of Chicago.

A visit to this mine is well worth the time of any coal operator, as the entire equipment, including screening and loading arrangements, the steel tippie buildings, hoisting engines, Cappell fans, shaft bottom and in fact everything about the place, is of the very best that can be obtained, and, as stated before, constitutes what, as a whole, is probably the most complete thing of its kind in the bituminous field.

Mining Summary.

ARIZONA.

The Buena Vista mines at the Senator camp will resume operations this month.

J. T. Douglie of Prescott has bought the Mormon Elder mine and a half interest in the Turnbaugh. The Mormon Elder was bonded by Douglie last May for \$10,000 and the Turnbaugh for \$20,000. He has run 1200 feet of tunnel and has stripped and faced the lodes in different places on the Sultan 7000 feet and on the Wyandotte 300 feet.

Enterprise: In the Placitas country three mills have recently begun milling ores.

Star: The Arizona school of mines at Tucson has received through Prof. Blake thirty tons of crude wolframite ore from the Dragoon mountains for concentration, preparatory to shipment to Philadelphia. Several shipments of a few tons of hand-sorted ore have already been made, but the bulk of the production requires crushing and concentration to free it of the quartz gangue.

Arizona: D. Brown has bonded three mines in the Graham for one year at \$100,000 to the Spenezuma Co.

Globe: Burns & Co. are taking out copper ore from one of their claims near Globe. They have arranged with the Buffalo smelter for all the ore which averages 45 per cent.

Oasis: In the Altar district work has resumed on the San Manuel mine, the property of J. B. Hagglin. It is developed to a depth of 200 feet, showing low grade ore in large quantities. It is said to be the intention to devote a year to developments, and should they justify it a 50-stamp mill will be erected.

Yuma Sentinel: Senator Dorsey has a force of men at work on the Del Monte group of mines near Harrisburg, preparing to erect a 40-stamp mill. The mill is designed to handle a particular class of ore. Mr. Dorsey is progressing with his Placacho property, and when the Del Monte mill is started he will turn his attention to the California side of the river.

—L. C. Moreland, who discovered the Bay Horse gold mine in Mesquite district, has begun work on the Cash Entry mine in the same district.

Prescott Courier: The Swindler mine in Yavapai county, which was a gold mine, is turning out to be a copper property. Three eight-hour shifts are at work. A carload of concentrates from the Crowned King were shipped from Mayer last week.

Phoenix Republican: In the northern part of Maricopa county are a number of small mining camps which are becoming of importance. Occasionally one is given life by eastern capital. Some of these camps are over the line in Yavapai county, and the King Solomon group is one. A year ago this camp was enjoying a Rip Van Winkle sleep, but today there is a demand there for miners and the camp is forging ahead. Among those doing development work are Gilbert & Rowe, who are sinking a 75-foot shaft and another 100 feet on the Hamlin group for Colorado capitalists. On the McIntosh group a Colorado company is sinking a shaft. The above two groups are copper and gold with a little silver. M. Gamage is well under way on his long tunnel.

Mohave County Miner: In running the tunnel on the Green Lennet mine, a small vein of good ore was cut.

Graham Guardian: Qualey Bros. shipped two carloads of high grade ore from the Lone Star district. The London Exploration Co., will erect machinery at the Ray mine near Red Rock.

Tucson Star: The Canon del Oro gold mines in development are holding out well in the ore.

Yuma Sun: The Daisy Dolores near Tyson's Wells is being developed and a large body of ore has been found. The lowest assays are \$10. Much of the ore will bear shipping. C. Davies on the Union mine near Phoenix has fifteen men employed.

CALIFORNIA.

Amador.

Jackson Republican: The Argonaut mine has paid in dividends up to October 26th \$180,000, and has money in the treasury. Work continues as usual and there is no lack of water yet. Sinking continues at the Zeila mine. At the Anita the regular force is engaged in sinking. At the Onaida mine a large mill will be built by the Onaida Co. The Kennedy is using steam for hoisting and if the dry weather continues will be obliged to run the mill by steam. Everything appears encouraging at the Lincoln mine, Sutter Creek. Water is giving trouble at the Amelia mine, but work is going ahead rapidly. Good rock is coming out of the Valparaiso mine near Jackson. Preparations are making at the South Spring Hill mine, Amador City, to renew operations in a short time.

Jackson Dispatch: The Union Con. G. M. Co. has applied to be declared insolvent. The mining property of the corporation comprises the Wieland, Alma, and Jackson Gate mines near Jackson. The company has no title to the property, but has been working under a lease. It possesses some personal property, the value of which will not exceed a few hundred dollars. The liabilities amount to upward of \$25,000 and are distributed among many creditors.

Sutter Creek Record: J. H. Grady, E. B. De Golia and J. D. Richardson of Oakland were at Sutter Creek last week to look into the affairs of the Central Eureka mine and consult with Supt. Thomas. The affairs of the Central Eureka are being straightened out and everything will soon be running again. The new directors are determined to conduct the affairs on a business basis.

Butte.

At Forbestown 120 men are employed in the Goldbank mill and mine.

At the Banner mine, near Oroville, the 2000 feet of pipe line from the bulkhead to the

mine is completed. The pressure will give a strong force for electric purposes. This pipe was riveted by air pressure.

Oroville Mercury: W. Strang brought to Oroville a gold brick valued at \$750, the result of forty-five tons of rock from his ledge at Hengy. In Granite Basin work is progressing in the mines of the district and ore bins are full awaiting water to begin crushing. See & Jolly are taking out ore at their mine and four men are at work at the Hall mine preparing to start the mill, and F. Early is crushing ore for F. W. Benjamin. Sharp & Quimby at Yankee Hill will soon begin washing their gravel stored during the summer.

Oroville Register: Fifty men are working on the tunnel to convey the waters of Cherokee ditch to the Banner mine. Power drills are in use. Rutherford & Stevenson sold a quartz claim near Wyandotte, and the new owners will at once begin work on the property.

Oroville Register: The dredger on the Gray place near Oroville is almost completed. There are twenty-five Chinamen at work in the river mine near Big Bend. They have had a favorable summer and fall for working.

A. B. Chambers & Co. near Merrimac are building a 5-stamp prospect mill. If the ore pays as well as they think they will build a large mill. On the Little Hope mine near Oroville the company after prospecting the ledge is building a 10-stamp mill which will be running Jan. 1.

Calaveras.

San Andreas Citizen: Work has begun on the stamp mill of the Ford mine near San Andreas. The Lively mill will soon be in operation again. Work is progressing on the California Exploration Co.'s mine, the Thorpe, at Fourth Crossing. The Yellow Aster gold mine near West Point is being developed by the new owners, Morgan & Co. They propose building a mill. At the Paragon mine last week a vein $4\frac{1}{2}$ feet wide was encountered in the 400-foot tunnel. The Empire mill is grinding rock from the Machu mine.

Jackson Ledger: The 40-stamp mill at the Gwin mine is to be enlarged. Forty stamps are to be added.

El Dorado.

(Special Correspondence).—The Crown Point M. Co. near Diamond Springs have reached 375 feet in their shaft and 400 feet in tunnel. The shaft is in ore at the 350 level, where a 4-foot body of high grade galena was cut. The company is running a drift on this ledge. They are operating the hoist by steam and employ eighteen men.

The Marguerite, in the same mining district, is being developed by a company of Indiana capitalists. Their work is thorough. Last week they struck an ore body in the shaft, and are taking out a good grade of ore.

At the Larkin on the 400 level a 12-foot ore body has been cut that is of high grade value. On the Griffith the Juniper M. Co. are nearly ready to start their new 20-stamp mill, which will be run by electricity. There is a large quantity of ore on the dump that is of good value.

The Ribbon Rock mine in the same neighborhood is being developed by a Salt Lake City company. They are driving two tunnels, in one of which an ore body of 12 feet width has been crossed. The two tunnels will aggregate over 200 feet. At the Selby mine a company has begun to unwater the property. All the properties heretofore mentioned are squarely on the mother lode.

The Gold Bug mine, also on the mother lode, in Placerville, is sinking a shaft; they have struck rich ore in the old tunnel through which the mine had been operated. The company has secured additional ground for dumping facilities and are about to put in a steam hoist.

The Atlantic mine has recently been acquired by a company who have resumed work on the property, which had been abandoned for many years, and the indications in the new work are of an encouraging nature.

The Gopher Boulder at Kelsey is preparing to resume work and start its 40-stamp mill.

The Church M. Co. near El Dorado has again resumed operations and is running its 10-stamp mill on a small vein of rich ore.

On the Hill Ranch mine sinking will be resumed shortly. They have been crushing a fair grade of ore.

The successful operation of the foregoing mines is doing much to bring into prominence the favorable opportunities of the old Empire county, which has long waited for capital to prove its value as a mining section on the mother lode.

At the Clark mine near Placerville a good grade of cement gravel is being crushed in a 10-stamp mill. There are 108 acres in this property.

Placerville, Nov. 21st, '98.

Inyo.

Independence Independent: P. Reddy of San Francisco has bought the N. S. Thompson mine at Darwin for \$5000. The property is between the Defiance and Independence mines, both of which belong to Mr. Reddy. The central property has a long tunnel through which all the ground can be worked, and it will make low-grade ores profitable.

Kern.

The Comet mine, on the Greenhorn, has been sold by W. W. Stockton to San Francisco people for \$3000 cash. The new proprietors will erect a mill and push the work of extracting ore.

A strike is reported in the Talc mine near Woody of a body of high grade ore. The mining industry is thriving in the Smith district. The Big Horn Co. is putting in a 2-stamp mill to be run by water power and it will soon do its own work in addition to custom milling. The camp has good prospects of being a steady gold producer. There are about twenty-five men in the camp.

Randsburg Miner: The Trilby tunnel at Randsburg is encountering new ledges. The

last strike is 530 feet from the entrance. About \$10,000 was quarried from the surface of this property. This new ledge is 3 feet wide; it ran \$50 per ton on top; 800 feet below it mills from \$150 to \$200 per ton. Forty feet of ore is exposed and the walls are not found. The whole will mill \$30 per ton. The pump is in place at the Yellow Aster Water Works, and tests will be made as soon as the 100,000-gallon tanks can be riveted together at the mill. The pipe line is all covered, and a week will see water flowing down Rand mountain.

The Red Dog mill at Johannesburg is running ten stamps on ore from the Butte mine.

Lake.

Calistogan: The Sulphur Bank quicksilver mine near Lower Lake started up last week with a full crew. It has been shut down over a year. The property is owned by the Sulphur Banks Q. S. M. Co., 306 California St., San Francisco.

Nevada.

(Special Correspondence).—The Brunswick M. Co., which some time ago introduced electric power to run the mill, when obliged to stop its pumps because of water failure for power, last week put in electricity to operate the pumps. The change was made in less than four days, and, in consequence, work continues at the mine in all departments.

Grass Valley, Nov. 22nd, '98.

The South Yuba Water Co. bought 640 acres of land last week covering the upper end of Summit valley for reservoir sites, on which the company will build a reservoir to hold upwards of 200,000 inches of water, which, with other contemplated improvements, will increase their total storage capacity to over 1,000,000 miners' inches of water. By this improvement the people of Nevada county will be insured against any more water famines.

Grass Valley Union: The contest for possession of the Reddick gravel mine near Nevada City is on trial in the Superior Court. Should the plaintiffs win the case, the company will either have to pay them \$10,000 or abandon their claim, which at present is paying well. The mine is working forty-six men, but will soon suspend operations unless rains bring a water supply.

Nevada City Transcript: The new 20-stamp mill at the Con. St. Gothard mine near Columbia, is running smoothly this week. The mine has a large amount of ore on the dump. S. Smith of San Francisco is sinking a shaft on the Bismarck & Gladstone, near Nevada City.

Grass Valley Tidings: The miners at the Empire will remain unemployed until the rains send sufficient water to run the mill. A steam plant was put in operation for hoisting, but as the mill cannot be operated no rock will be hoisted.

Nevada City Herald: Developing operations have been in progress at the La Suerte mine for several months and the mill will start as soon as water can be obtained.

Grass Valley Union: W. L. Wallace is erecting a 2-stamp mill on the Bulldozer mine near Graniteville and expects to have it running next week.

Placer.

The tunnel of the Blue Canyon M. Co. near Shady Run is in 1150 feet.

Auburn Herald: At the Gold Blossom mine at Auburn sinking and drifting continues. The Hathaway is still running, but must close down soon if the dry season continues. C. A. Reed is putting up a 5-stamp mill and will start up as soon as he can get water.

Colfax Sentinel: A strike has recently been made by the Gold Run Gravel Co., Limited, near Gold Run. The old tunnel at the lower end of the mine has been extended 600 feet and struck a body of gravel said to be rich. The drift in the new ground has been extended up the channel 300 feet. The width of the channel is 150 feet, and the gravel is 5 feet deep. When water can be had for power the 10-stamp mill will run steadily to crush the gravel. Ten men are employed. Col. J. E. Doolittle is superintendent. The holdings of the company comprise 12,000 feet of channel, which is tapped at the lower end.

Riverside.

It is locally reported that the tailings from the Santa Rosa mine, near Percis, are giving returns of \$1500 a month. The stamp mill at the Eureka mine, owned by Thomas & Wheeler, has begun crushing ore. F. Hibble has discovered quartz near Winchester. Shultz & Knapp have struck gold and silver bearing ore near San Jacinto.

San Bernardino.

The Index M. Co. will develop the Iron Mask, One Horn and Index mines near San Bernardino.

San Diego.

The Helvetia mine near Ramona has a large force at work. The pumps are working day and night.

Shasta.

Redding Free Press: The New Brunswick mine near French Gulch found high grade ore in the lower tunnel, but were compelled to stop work for lack of air, which will be remedied soon. Wright Bros. have leased five claims owned by Fitzpatrick & Co., known as the Safe Deposit group, on Flat creek, and have begun work. In the Milkmaid mine, near French Gulch, work will not be resumed until spring. J. H. Roberts of Harrison Gulch is sinking a shaft on the White Oak mine near Salt creek. Sixty flasks of quicksilver from the Altona mine at Cinnabar were shipped via Redding last week.

Redding Free Press: The transfer to Eastern capitalists of a large copper property near Redding is all but effected. Development has been going on for some time, and it is understood that the result is favorable. When the transfer is made a smelter will be built. Shasta's copper belt is being exploited at six different points. Favorable tests have been made in the Stillwater district that will probably result in bringing into the county a Ger-

man company which will operate on a scale not inferior to that of the Mountain Copper Co. Shasta Courier: Mining developments continue from Shurtleff Hill in Shasta to the Mt. Shasta mine on Clear creek, and to Paige's on Boulder creek, with more men employed than has been the case in the history of the county.

Sierra.

Downieville Enterprise: York & Sons have made another strike in their mine near Downieville. There are ten carloads of high grade ore ready to crush and about 100 tons in all ready for the mill, awaiting water. Five carloads of provisions and machinery arrived at the Gold Bluff mine last week.

Quincy Independent: The La Porte Gravel M. Co. near La Porte has finished a dam 40 feet wide and 200 feet long to restrain tailings. S. Chapman of Chicago is Pres. of this company, which is making preparation to begin work at the coming of water.

Slackton.

McCaw & Co. are getting their quartz mill in place near Fort Jones, to begin crushing as soon as possible. They have a ledge 30 feet wide.

Yreka Journal: McCaw & Co. of the Patterson creek quartz mine, near Fort Jones, have a large ledge that is said to yield \$35 per ton. The company received two carloads of machinery last week; the mortar beds weigh 6800 pounds. The Greenhorn blue gravel mine is paying and worked day and night. The water is pumped from the shafts and drifts to keep the sluices supplied. The Pacific mine, Klamath river, has ceased for the winter. The McConnell & Quine mine has been paying fairly well and will be worked until the storms compel it to cease.

Yreka Journal: The managers of the Pacific mine, Klamath river, continue testing the ground near bedrock. The other claims along the river will be worked until the storms drive the men out. A. Frazier, opening up the old Golden Eagle mine, Scott Valley, has sunk a shaft 120 feet deep. The prospects are encouraging.

Trinity.

Redding Free Press: A. Van Ness, at Doeblinville, is running his arrastra day and night. Alverson & Brown at Crooked Bend are taking out gold on the Woods gravel claim. A New York company, represented by S. H. Rice, has bought 16,000 acres in the Horseshoe Bend of Eel river, in the southwest portion of the county, for \$350,000. The first installment was made on the 15th inst. A deposit of copper-bearing ore, 1200 feet long by 70 feet wide, has been discovered on the property. Tests of the ore have returned values ranging from 9 to 18 per cent copper, \$5 to \$10 per ton gold and \$3 to \$10 silver. Opening up the body of copper ore will begin immediately and a considerable force put to work.

Weaverville Journal: The company having an option of purchase on the Mountain Boomer mine at New River are driving their work. They have found the ledge in the upper tunnel and indications are good in the lower tunnel. At Poker Bar the construction of the Postlethwaite dredger, costing upwards of \$40,000, has been in successful operation. It requires but two men to look after every detail of its work, and the amount of deposit it handles in a day is large. Four miles of the stream are controlled. As a result of this company's venture the possibilities of Trinity river on this score have attracted attention and two other companies, it is said, are investigating along these lines.

Tulahoma.

(Special Correspondence).—At the property of the Jubilee M. Co. a discovery has been made of a vein 30 inches wide carrying lead and arsenical sulphurets, mixed with black carbonate of iron. Assays run from \$1200 to \$2000 per ton. Free gold is interspersed all through the quartz, yielding \$300 to \$500 per ton. The vein is in diorite-schistose and quartzite. This property contains five claims. One is a 400-foot, low-level crosscut tunnel. It is known as the old Hazel Dell.

Sonora, Nov. 21st, '98.

Jamestown Magnet: At the Densmore mine, near Columbia, fifty-three men are employed. Fischer & Co., operating the property, are putting up two 2-stamp mills. Anderson & Co. are running a tunnel on the Royal claim. Van der Werdt & Co. are running a tunnel on their property. In the Hope mine, Conlin & Ferguson have struck the vein. The force at the Dutch mine at Quartz is being increased again. They are drifting on the ninth level in the ore body. The shaft is down 900 feet. The Dutch Co. will soon be using coal exclusively for fuel. On the Booker ranch, near Sonora, Dean & Stevenson, who have the property bonded, are sinking a shaft. On the Dunton ranch they are taking out high-grade ore. The Alameda mine, near Jamestown, is operated by Chicago men. Three years have been spent in development, operating with compressors and power drills. A depth of 950 feet has been reached, six levels opened and over 2000 feet of drifts, crosscuts and tunnels run. Dams were constructed below the mill; and while the water from the Norwegian mine while repairing its pipe line was running, over half a million gallons were impounded. The first dam catches the tailings and the second impounds the water, which is raised vertically 207 feet through a pipe line 650 feet long by a steam pump. The mine furnishes sufficient water to replace that lost through evaporation and seepage and keeps the amount impounded up to the original stock of 500,000 gallons.

Yuba.

Marysville Appeal: A force is at work in the Boa quartz mine, near Timbuctoo, sinking the shaft that was abandoned because of water. Fair quality of quartz is found.

COLORADO.

CLEAR CREEK COUNTY.

At Georgetown, in the Corry City mine, a

mill run of seven tons of ore gave returns of 391 ounces in silver to the ton.—At Idaho Springs, J. Owen, who has been operating the Gum Tree mine for three years, received \$57,000 in cash for that property, which includes four claims. New York people were the purchasers in the name of the Gum Tree G. M. & M. Co.

At the American Sisters mine, at Idaho Springs, shipments made by leasers amount to two or three carloads, and run about 150 ozs. silver and \$5 or \$6 gold per ton.

EAGLE COUNTY.

The total tonnage of ore shipments from the Battle Mountain district, near Red Cliff, since January is 10,850.

EL PASO COUNTY.

The Minnie Bell at Victor has taken \$10,000 from the shoot recently encountered.

The Raven Co.'s properties at Victor are producing 150 tons weekly; the ore is all shipped; it carries from 1½ to 4 ounces gold per ton.

Sinking has been resumed to the 600-foot level on the Gold Coin, Cripple Creek. The ore is of better grade than September and the output for October will exceed that of the previous month.—The Zenobia shipped the end of October twelve tons of \$300 ore and fifteen tons of \$50 ore.—The Horner-Black lease on the Clara D. claim of the Lexington G. M. Co. at Victor, shipped in October \$6000 worth of ore, taken out in development work. On this the company receives 25 per cent royalty.—The Portland mine, employing 225 men and operating nineteen drills, is putting in a new compressor and increasing the drilling capacity to forty-five drills.

Victor Record: A one-fourth interest in the Boyd lease on the Morning Glory, near Victor, was sold for \$2500. The workings are shipping steadily.—The lessees of the Ironclad are furnishing Brodie Reduction Works 700 tons of ore monthly. The ore will go about one ounce to the ton.

FREMONT COUNTY.

A good strike is reported from the Clyde mine, near Wilbur. Assays run from \$10 to \$200 per ton. The mine is developed by a 300-foot tunnel at a depth of 160 feet.

GILPIN COUNTY.

At Central City, last week's pay day at the mines the sum disbursed was nearly \$150,000, representing a month's pay.

LAKE COUNTY.

The output of Leadville for October foots up 56,000 tons of ore of all grades.

Leadville Miner: The Hooker pump in the Bohn shaft at Leadville is throwing water. This makes five pumps working, making a total of 3,600,000 gallons running down the sluiceways every twenty-four hours from the basin mines.—The Iron Silver M. Co. have expended upwards of \$20,000 in unwatering the Moyer workings. At present the water is below the third level. Shipments are about fifty tons daily from this shaft, which will be increased. So far 1500 tons of clean iron sulphides have been sold to the Colorado smelter since the water has been taken out.—The Katy ore chute, which has been discovered at the 550-foot level of the Dollie B., shows up good. Plenty of exploration work is kept ahead. This work is done with air drills. The operators lost \$40,000 by being twice drowned out, and, taking advantage of past experience, are prepared to handle any flow they may encounter. Much of this ore deposit is of good grade, while plenty of mill material is showing up. Shipments run sixty tons daily.

Leadville Miner: The Moline M. & D. Co., owners of the William Wallace mine, are shipping fifty tons of oxide iron ore daily to the smelters. This property has a shaft 900 feet deep.

Leadville Miner: There never was such a demand for ore teams as in the past forty days. The ore bins on all the heavy shippers have been full constantly. The demand for more teams arises from the increased output from five old shippers and five new producers, the Fanny Rawlings, Moyer, Louisville and A. Y. and Minnie. There are thirty-six four-horse teams hauling from the Ibbex alone, making fifty-four loads of ore daily from this producer.

Leadville Reporter: Near Leadville, in the Sugar Loaf district, the Gunnison mine is shipping thirty-five tons a day of good grade ore.

Leadville Miner: The Twin Lakes Placer Co., which owns 4000 acres of placer ground in this county, has closed operations for this season. A vast amount of prospecting has been done in the last year, which has demonstrated that the gravel will average 58 cents per cubic yard. Large revolving cranes operated by water power are used to handle the boulders, and the gravel is knocked down by giants, four of which have been put in for next season. From a clean-up on some prospect work \$2600 was obtained. This property has been idle for many years, but a consolidation of the various interests has made it practicable to work it in a systematic manner.—The Yak tunnel will drain and develop land on Breese hill to a depth of 800 to 1200 feet.

—The Ibbex output is above 300 tons daily of iron sulphides and silicious gold quartz. The pay-roll carries 500 names.—F. F. Harrington, Mgr. Black Iron mine near Leadville, is shipping 10,000 tons of iron ore. Eight cars was the output last week.—The Sunnyside mine is making a five-ton shipment to the Parker stamp mill at Granite. In case this run is satisfactory, they will put in a stamp and concentrating mill.—The Gunnison mine is shipping twenty tons daily of high-grade silver ore.

MINERAL COUNTY.

Creede Candle: The output of the Commodore mine at Creede is limited to the number of cars the D. & R. G. can furnish it, and the ore blocked out will insure the present output for five years. Under this company's management deep mining will be demonstrated in

this section.—The Creede Co-operative Leasing Co. are running their mill day and night and shipping high grade concentrates.

PARK COUNTY.

The Hock Hocking mine at Alma is shipping a carload of ore a day, and the Orphan Boy is shipping twenty cars a month.

SAN JUAN COUNTY.

The Gold King mine mine at Silverton, is shipping three carloads of concentrates daily.

At Silverton the Gold King is shipping three carloads of concentrates daily.—The Florence is in a large body of pay ore.—At the Excelsior, comprising eleven claims, Butler & Carver opened a body of galena, about 4 feet wide, returning 60 per cent in lead.

SAN MIGUEL COUNTY.

From Ophir ten to twenty cars of crude ore and concentrates are shipped every week. This is mostly a silver product.

The Trout mill is turning out a good product from the Silver Chief mine and has a full supply of ore for the winter.

Extensive development work is progressing on the Keystone placer claim, near Telluride. Two pumps, with a reputed capacity of 1400 and 2400 gallons a minute, respectively, have been installed in a plant being sunk to bedrock of San Miguel river. The gravel is said to average 50 cents a yard in sinking.

Telluride Examiner: Development is progressing in the Shoemaker mine at Ophir. During the season an average of ten tons of ore per day has been shipped and the values have maintained good figures.—Suffolk leasers are sending down fair products from the different properties in control of the Suffolk Co. The ore plates from \$15 to \$100 per ton.

At Telluride the Euclid Avenue mine has been sold to Denver and San Francisco people for \$75,000. The company has been incorporated as the Euclid Avenue G. M. Co., and preparation is being made to push work on the property without delay. A bucket tramway 2000 feet long will connect the mine with the mill.—At the Silver Pick mine 165 men are employed.

IDAHO.

Near Mount Idaho a strike has been made. It is claimed the ledge is 90 feet wide and is as rich as the Buffalo Hump. Only meager details are known, but it is said there has been a great stampede from Florence to the new discovery.

At Sunset, W. A. Clark will run a tunnel 2500 feet in length, in which distance it should cut between eight and twelve ledges.

At Kendrick, the Mascot M. & M. Co. is taking in a new stamp mill. The last mill run yielded \$18 per ton.—The Democrat mine, near Kendrick, has a tunnel 900 feet; the ore averages \$6 per ton. The placing of a 10-stamp mill is contemplated. J. Dunn is Mgr.

Cleat & Co. have bonded the Alaska mine, near Pierce, and put a mill on the property. They have a 10-inch body of ore which averages 20 per ton.—The Eureka Pacific Co., operating on Beeds creek, have several hundred acres of placer ground. A test run recently gave good results.—The American Placer M. Co., on Oro Fino, has completed a big ditch and flume. The company is putting in three giants. This property is said to have prospected from 50 cents to \$2.50 per yard.

In the Seven Devils copper district they have mined many thousand tons of ore and have a 75-ton smelter. The ore carries 14 per cent copper and runs as high as 93.5 per cent. A railroad is to be built to a point on Snake river, to start from Nagel, on the Short Line, two miles west of Huntington.

Idaho City World: The Golden Fleece mine at Centerville has a ledge from 3 to 4 feet wide and all good ore.—Gerard & Co. has a ledge from 2 to 7 feet wide of good ore and a chute 800 feet long.—The California Co. has let a contract for running a 400-foot tunnel on one claim, and building a hoist on the other.—The Twin Springs has thirty men enlarging the Lambing ditch.

Hailey Times: The Atlanta G. & S. Mines, in liquidation, has transferred to the Atlanta G. & S. Con. Mines the Atlanta No. 1, No. 2, No. 3, No. 4 and No. 5 mines; also the McMahon water right and ditch, the Baxter tunnel; also the New York, Magnet and Fifth Discovery lodes; all being the property sold by the late V. S. Anderson to the first named company of London, England.

Idaho City World: Woodburn & Anderson, at Grimes' Pass, have been crushing good ore from the Bruiser and Pheasant claims. The Bruiser ledge is 7 feet wide and all pay ore. The Pheasant vein is not so large, but the ore yields well.—A. J. Maloy has a good showing in a 300-foot claim—a portion of the old Bruiser location—and is taking out ore.—From Florence a strike of high grade gold ore is reported in the belt between the Buffalo Hump and Thunder mountain. The strike was made on the Morning Star group of a vein reported to be 30 to 90 feet wide.

Lemhi Republican: The carload of ore shipped from the Copper Queen mine, near Lemhi, went \$16 per ton in gold, 5½ ounces in silver and 27 per cent copper.

MONTANA.

The output of the placer mines at Quartz City, Missoula county, after the season's work, aggregates this year \$75,000.

The Empire mine near Livingston has been bonded for \$35,000 to Butte capitalists.

Butte Intermountain: The chief interest in Butte centers in the talk about the movements of the Washoe Copper Co. and the probability that this company will soon resume work on its many properties in this district. During the past year development work was pushed on the Moonlight, its latest acquisition. The Gold Hill was also thoroughly exploited two years ago, but no work upon both the shafts of the Gold Hill has been in progress for more than a year. The belief is entertained in Butte that the company is planning to resume on a large scale next spring, by which a thousand or more men would be given employment. The outlook is

encouraging for Butte and the stability of its mines is assured for many years.—The Keystone at Sylvanite is showing up well. It is understood that a 60-stamp mill will be erected in the spring.

The Butte Intermountain says that nearly 1000 more men are employed in mining operations around Butte this year than during the preceding year, and that this increase is largely due to the development work in progress at the copper properties and the opening of new ore bodies. It is estimated that there are close to 3500 men employed about the mines of the Anaconda Co. alone. The Boston & Montana and Butte & Boston mines show a marked increase in the number of men employed in and about the mines. In all over 7000 men are employed in the district.

Missoulian: The Missoula Placer M. Co. at Quartz reports that this season's work has been successful. The clean-up was large. The pay streak, which averages 40 cents a pan, has been located; and, with the improvements to be made in the spring, a large quantity of the ground can be handled.

NEVADA.

The series of tests to which the ores of the Robust, St. Patrick and Utah mines of Ely have been put have demonstrated that they may be successfully handled by the cyanide process. The mill on the ground will be enlarged and fifty tons a day put through. An officer of the company says that the ores, of which there are large bodies, showed to date an average of \$10 gold per ton and that a profit could be made.

In the Golden Eagle mine in Humboldt county the shaft is all in ore that shows an average of \$15 gold per ton. The strike was made at a depth of 100 feet.—The Dexter mine at Tuscarora shipped a \$4000 gold brick and \$4900 in cyanides last week.—The Eira Co. will begin the sinking of a new shaft shortly.

Ohio people, known as the Cuyahoga M. Co., bought from F. C. Everett three mines in Lyon county for \$12,000. On one of the claims a tunnel has been run 125 feet, which opens up a vein 1 to 4 feet in width. The company will at once overhaul the mill, enlarge it and put in a concentrator. A cyanide plant and hoist will be erected and a shaft sunk 500 feet.

The shipments last week from the Eureka and Hamilton districts were 508,360 pounds. S. F. Godbe of the Nevada M. Co. at Pioche says that they will be able to continue work through the winter.

NEW MEXICO.

An electric light plant is being put in the Confidence mine in the Mogollon district, and the machinery will hereafter be run and the mine lighted by electricity. One hundred and fifty men are employed.

A gold brick shipped from the Bland and the product of one week's run at the Albemarle weighed 101 pounds.

OREGON.

Ashland Record: At Paisley, Lake county, J. W. Howard's quartz assays \$80 per ton and a cyanide test is being made in San Francisco.—The mile ditch has been completed for the Jump-off-Joe M. Co. The company employs twenty men getting ready for the winter run.—The J. C. Lewis placer mine at Leland is in operation with twenty men. He will operate two mines this season. The Steam Beer mine is ready for operations, the water in the big ditch having come through last week.—E. A. Smith is having a test carload of ore crushed in the Ashland mill from his Uncle Sam mine near Gold Hill.—C. D. Crane of the Oro Fino mine, Jump-off-Joe, had two carloads of ore crushed in the Ashland mill this week.

Jacksonville Times: Booth & Clark have put a carload of hydraulic pipe on their property in Grave Creek district.—G. E. Morse of San Francisco and M. Cooper are visiting the Swayne M. Co.'s property on Big Applegate, in which they are largely interested. The enterprise promises well.

Seattle Times: The Black Butte mine near Cottage Grove is turning out quicksilver at the rate of \$30,000 per month. The output will average a ton a day for the year round, and the smelter has a mountain of cinnabar ore to draw on. A smelter costing \$66,000 was erected during the summer and commenced operations October 10. The Black Butte Co. is composed of J. Gamble, Capt. Chilcott, J. E. Chilberg, W. Hastings and J. Behrman.

Baker City Democrat: The 10-stamp mill at the Badger mine, Susanville, is in operation with satisfactory results.—On the Bull of the Woods mine there is an 8-stamp mill run by water power. The company has forty-two men employed. A shipment of sixteen tons returned \$1741 net.—Worsham Bros. who own a claim near Malheur, have bought a 3-stamp mill and will also do custom work. D. Bruner will furnish 100 tons from his mine and pay \$4 per ton for working. The Last Chance and Red Oxide owners are, also, getting out ore for immediate reduction.—At the Richmond mines near Sumpter, the third ledge has been struck, and work is being rushed.

Grant's Pass Journal: M. McWilliams is opening the Beswick & Potter mine, near Grant's Pass, and has considerable ore on the dump.—Dr. De Bar, Jacksonville, has over forty tons of ore out, and as soon as there is sufficient water the mill will be started.—J. J. Martin, Supt. Seattle M. Co., in Watkins district, is getting ready for the winter's run.—The Lance M. Co. started the pumping plant on their extensive placer ground last week.—The Golden Key M. Co., which has bonded the Braden mine and other properties near Gold Hill, will soon begin work.

Canyon City News: In the Granite district Eastern people are bonding properties with a view to developing them.—Sinking shafts in the river near John Day continue. Pumping and hoisting machinery have been placed.

—La Bellevue mill has closed for the winter. The mine, however, will continue development. The management contemplates enlarging the capacity of the mill in early spring.

SOUTH DAKOTA.

The Portland mine, Bold mountain, resumed operations under the new organization of the company, and Supt. Chapman has put forty men to work. The Portland is about the oldest mine in the Bold Mountain belt and was located in '77.

UTAH.

With the starting up of the Cigale plant, West Dip, the district not including the Chloride Point plant, will have seven mills in operation.

In the 300 level of the Eva group, in Diamond, comprising six claims, an 8-foot vein of mineral has been cut into that is of good value. There is also a small vein of fine galena in the same strike. From one claim also silver ores of good values have been extracted.—The Daisy at Mercur shipped another batch of auro-cyanides, the second in ten days. About 112 tons a day are produced.

—The Star Consolidated has been added to Tintic's big properties. Samples from the new strike show 50 per cent copper; the amount of gold has not yet been determined.—The Dewey mill at Bingham made a successful run on Winnamuck ores.—The Massachusetts mine at Park City in a tunnel 600 feet struck a good body of smelter ore.

In the Orient mine at West Tintic 18 inches of ore has been uncovered, which assays on an average 27 per cent lead, from twenty-four to thirty ounces silver and \$3 to \$6 in gold. The zone has been prospected on a crosscut 60 feet to the north and 40 feet south, and it is said that there is no sign of a wall yet.—The Bingham tunnel has passed the 1000-foot station and is driving to connect with the mines along its course.—With the second furnace in operation at the Hanauer smelter the plant has a capacity of 200 tons of ore daily.

—The Ajax of Mammoth shipped another 100-ton lot of high-grade copper and gold ore last week.—In the Uncle Sam and Humburg mines at Eureka in July the earnings amounted to \$12,638 and for August \$8238. For September they reached \$19,640, while in October the fell back to \$11,729, with \$4316 thus far in November. The expense of producing these amounts is between \$8000 and \$9000 per month.—In the ore and bullion market at Salt Lake City the settlements reached \$162,685 for the week ending Nov. 19.—The transfer of the Showell placer near Bingham having been made to the Dalton & Lark, prospecting will begin in a few days.

At Provo, St. V. Le Sieur sold W. H. Smith and J. E. Price of Denver, Colo., the Castle Peak gilsonite group of mines for \$50,000. The mines are in Wasatch county. Smith & Price will erect a steam hoist on the property at once and make other improvements needed to increase the output. They are said to have a contract for 500 tons of gilsonite monthly, which goes to Bremen, Germany.

At Park City the Ontario Silver M. Co., R. C. Chambers Supt., has been granted a 25-year franchise to operate an electric plant and to furnish light, heat and power to the pub ic.

At Mercur, the Overland mill is grinding ore. An electric hoist will be put on the mine, as the steam hoist is hoisting only ninety tons of ore per day, which is crushed in four hours. The company has begun leaching and tanks are filled with pulp.

Shipments from the Tintic district for last week were sixty-three carloads of ore, fourteen cars of concentrates and thirty bars of bullion.—The pumps at the old Honorable mine in Stockton were started. The mine was abandoned when the water was encountered, several years ago.—From new ground in the Sacramento at Mercur, samples of ore afford a general average of \$149 gold per ton.—Work has resumed on the Silver King mine at Stockton.—Work on the Badger locations at Mercur has resumed. The ground was productive of some good values two years ago.—At Mercur, Bunch & Cummings are running a drift on the vein in the Eagle at a depth of 200 feet. The vein is 12 feet thick and carries values of \$4 per ton.—The Shamrock at Stockton, on which work has resumed, at a depth of 450 feet, last week broke into a body of galena from which the raising of ore has begun.

Eureka Republican: The R. G. W. tunnel at Silver City, is in 200 feet and has cut a vein of good quartz.—Work has resumed on the Annie Con. property under the management of G. Bridges.—Ore shipments from Park City last week amounted to 1,541,610 pounds.—Silver City shipments for the week were forty-eight carloads of ore.—At Eureka in the Centennial Eureka, a new strike is recorded.—In the Commercial mine a good body of ore has been uncovered.—At Park City a new chute of ore has been disclosed in the Valeo.—The Red Wing of Bingham has made a good ore strike.—Good ore has been broken into in the Hercules of Lion hill.—A new ore body has been uncovered in the Northern Light at Bingham.—A consignment of auro-cyanides from the Wilson Leaching Co.'s mill, weighing 600 pounds, has been marketed.—From the Geyser-Marion at Mercur a consignment of 500 pounds of auro-cyanides reached the sampler, and the Old Jordan & Galena of Bingham shipped 122 pounds.

WASHINGTON.

At Republic the Gold Leaf Co. are making about 4 feet a day. The tunnel is in 245 feet.—The Republic is drifting north and south on the 400 level.—A tunnel has been started on the Jim Blaine ground to cut the Princess Maude ledge at a depth of 150 feet. It will be 250 feet long and be completed in eighty days.—J. W. McCann & Co. have begun work on the Victory claim with two shifts.

The Cougar M. Co., near Meyers Falls, has resumed on a tunnel to crosscut the ledge at a depth of 200 feet.—Work has started on the Lone Pine, at Republic camp, on the tun-

nel that is in 150 feet, where it cut the ledge. Crosscutting showed 14 feet of ore.—The Gold Basin M. & I. Co., at Gold Basin, is working on six claims, which are making a good showing.

The Puget Sound Reduction Co., Everett, Wash., last week shipped 200,000 pounds of lead to the American Trading Co. at Shanghai, China. The order from the Trading Co. calls for several million pounds of lead.—At the Everett, Wash., refinery last week twenty bricks of gold and silver, containing 1100 ounces to the brick, were run off at one draw.

In the Republic No. 2 the tunnel is in 130 feet and getting ore that assays \$17 a ton. The tunnel will give a depth between 400 and 500 feet in 200 feet additional.

FOREIGN.

BRITISH COLUMBIA.

J. T. Richards of Santa Barbara, Cal., for the St. Anthony's M. Co., bought the holdings of the Omineca Con. M. Co., on Germansen creek, Omineca. The property includes twenty-five bench and creek claims, 6000 miners' inches of water, four miles of ditching and some timber-cutting privileges. Hydraulic machinery will be secured at once and preparations made for early spring work.

From Greenwood it is reported "miners in the Knob Hill mine have crosscut the ledge, and demonstrated that the ore body is 134 feet wide. The ore will average \$20 per ton, chiefly in copper."

From Greenwood it is reported that the miners in the Knob Hill mine have crosscut the ledge and it is 134 feet wide. The ore will average \$20 per ton, chiefly in copper.

Rossland Miner: The Le Roi last week distributed \$27,000 among its 300 employees. The incidental expenses for running the mine during the month were about \$7000 more.—

The new chute of ore in the 500-foot level of the Le Roi has widened to 11 feet. The management will follow the chute from the 600-foot level up.—The War Eagle Con. M. & D. Co., Rossland, in the report for the year ending Oct. 1 shows that 416 feet of development work was done. Shipments were not commenced until May, but from that time until October 1, the total output of the mine was 28,528 dry tons of an average gross market value of \$23.52. The total gross market value of the shipments was \$670,735.28. The total smelting charges were \$313,891.80 and the net value of it was \$356,843.98. The total value of the ore now in sight, consisting of 100,000 tons of an average value of \$17 per ton, is estimated at \$1,700,000. A year ago the reserve amounted to only \$1,105,000. Since then there has been shipped from the property ore to the total value of \$670,735.28. Despite these shipments the reserve has increased 55 per cent. The management has been able to treat ore carrying \$4.12 less value than in the previous year by increased tonnage and reduced smelter charges.

Rossland Miner: The first payment on the bond of \$20,000 on the Big Chief, East Kootenay, was made on the 1st inst. Seven men are developing the property. The ledge is 5 feet in width.—At Palmer's Bar, a company is said to have secured a twenty-years' lease of two miles of ground, and has taken up 500 inches of water, and that a \$25,000 hydraulic plant will be placed in the coming season.

The Porto Rico mine at Ymir is developed by three tunnels of an aggregate length of 1050 feet. The ore is free milling and will concentrate about 10 to 1, with values that will average \$40 per ton. The vein is 22 inches in width. The mine is equipped with a 5-drill compressor, a 10-stamp mill with a crushing capacity of thirty tons per day, and an aerial tramway half a mile in length from the mine to the millsite.—The ore shipments of the Slocan district for ten months ending Oct. 31 were 27,000 tons.

Ymir Miner: The Salmo Con. G. M. & D. Co.'s group of claims near Ymir have two shafts sunk on the lode. There are five ledges running parallel throughout the group from 12 to 40 feet wide. The vein carries gold, silver and lead, assays from which have yielded from \$24 to \$61.33. The average assay is \$30.

Rossland Miner: In spite of the depreciation of the price of silver, the long haul to the U. S. smelter, and the high U. S. import tariff on ores containing lead, the greatest dividend paying mine in British Columbia is the Payne, a galena proposition in the Slocan. For nearly two years past the Payne mine has shipped an average of fifty-eight tons of its valuable ore daily. After deducting freight, duty and smelter charges, this nets the owners over \$80 a ton, or \$460 per day. There are now about 125 men employed at the mine, and it is a liberal average to allow \$4 each per day for total expenses, or \$500 for the entire force. Thus it is seen that the mine is paying a profit of \$4140 daily, including holidays and Sundays. As the output is well known by many to be running from \$1600 to \$1800 tons, month in and month out, the above figures are none too high. Taking the daily net income as a basis, the mine yields a profit of nearly \$125,000 monthly, or \$1,250,000 annually.

Rossland Miner: The ore shipments from the mines at Rossland from Jan. 1 to Nov. 1, 1898, were 108,048 tons. The ore shipments for seven days to Nov. 12 were 4635 tons.

CHINA.

Hitherto the development of China's mineral resources has been studiously discouraged and opposed by the authorities. The first thing required is permission to the people to avail themselves freely of their untouched wealth underground. The absurdity of the present situation in this regard is fairly illustrated by the fact that steamboats at Ichang, 1000 miles inland on the Yangtse river, are compelled to burn costly imported Japanese coal, although Ichang is situated on the borders of one of the richest coal fields in the world. The coal deposits of that region are so remarkable as to arrest the attention of

casual travelers, but the Government will not allow them to be worked. If these mines, with the incidental iron ores and petroleum springs, were permitted to be exploited, there would be such a trade that the available steamers and junks would hardly be able to carry it all. A gold mining company was organized in 1886 in the province of Szechuan by a Chinaman named Tong, who studied mining in the United States. He got the sanction of the Viceroy to buy machinery, but the people petitioned the latter officer to stop the work. Samples of gold from the mines had been shown to the Viceroy, and the petition was not granted. Szechuan has a population nearly equal to that of France, and an area about as great.

Shantung is described as one vast mining field. Gold, silver, copper, iron, lead, coal and even diamonds are found. The gold mines have been worked by California miners, but they had to abandon the task, owing to the obstructiveness of the native officials, ten years ago. It is expected that, with the advent of the locomotive, in the near future, great activity will be shown in exploiting gold, coal and other minerals. Were the province under any other rule it would be one of the greatest mining sections in the world. It has a population of 29,000,000.

MEXICO.

Two Republics: The mines of the Penoles M. & S. Co. are near Mapin, Durango, and the smelters are five miles from the mines, connected by railroad. The present company has been in operation seven years and has made a success. There are about three miles of old and new shafts and drifts. The ore is not of a very high grade. About 2000 meters south of the hoisting machinery there is another extensive ore body 50 feet in width. The workings have reached a depth of 2000 feet and large bodies of ore are found. The Spaniards worked these mines 150 years ago, and had no other means of hoisting the ore save on the backs of peons.—At Chihuahua a large smelting plant is soon to be erected, and from the Santa Eulalia mines, a few miles from the city, the facilities for transporting ore to Chihuahua are being improved. The new smelter will have a capacity of 2000 tons daily.

Nogales Oasis: Near Matape, Sonora, the Sonora M. & D. Co. have opened in their Money-maker mine a 2-foot ledge of free milling gold ore which goes \$210 per ton. They ship to a mill ten miles distant.—Unwatering the Ahogado mine by J. Wanless & Co. is progressing. The old workings are partly accessible. As soon as bottom is reached the drifts and levels will be cleaned out and extensive development work begun.—At Pilares, Sonora, the Le Roy Co. is operating on an extensive scale. The company has 500 tons of ore running from 600 to 3000 ounces, for shipment.—The mines at Pilares are owned by F. H. Garcia, a part of which is 4500 acres leased to King & Newman of El Paso. The latter are working on fifty places on the leased ground and are taking out tons of rich ore every day. The ore running less than 600 ounces is put on the dump, where there are 100 tons of it. There is a wagon road being constructed from Pilares to Casas Grandes and when completed the lower grade ore can be shipped to El Paso.

THE PHILIPPINES.

With the celerity that characterizes all U. S. government productions, the national government has issued from Washington, D. C., a memorandum on the mineral resources of the Philippines, being advance sheets of the forthcoming report of Geo. F. Becker, who was recently sent by Director Walcott of the U. S. Geological Survey to examine and report thereon. A portion of the report is as follows: Gold is found at a vast number of localities in the archipelago, from northern Luzon to central Mindanao. In most cases the gold is detrital, and is found either in existing water courses or in stream deposits now deserted by the current. These last are called "aluviones" by the Spaniards. It is said that in Mindanao some of the gravels are in an elevated position and adapted to hydraulic mining. There are no data at hand which indicate decisively the value of any of the placers. They are washed by natives, largely with coconut shells for pans, though the batea is also in use.

In the province of Abra, at the northern end of Luzon, there are placers, and the gravel of the river Abra is auriferous. In Lepanto there are gold quartz veins as well as gravels. Gold is obtained in this province close to the copper mines. In Benguet the gravels of the river Agno carry gold. There is also gold in the province of Bontoc and in Nueva Ecija. The most important of the auriferous provinces is Camarines Norte. Here the townships of Mambulao, Paracale and Labo are especially well known as gold-producing localities. Mr. Drasche, a well-known German geologist, says that there were 700 natives at work on the rich quartz veins of this place at the time of his visit about twenty-five years ago. At Paracale there are parallel quartz veins in granite, one of which is 20 feet in width and contains a chute in which the ore is said to assay thirty-eight ounces of gold to the ton. One may suspect that this assay hardly represented an average sample. Besides the localities mentioned, many others in this province have been worked by the natives.

The islands of Mindoro, Catanduanes, Sibuyan, Samar, Panay, Cebu and Bohol are reported to contain gold, but no exact data are accessible.

At the south end of the small island of Panay, which is just to the south of Leyte, there are gold quartz veins, one of which has been worked to some extent. It is 6 feet in thickness and has yielded from \$6 to \$7 per ton.

In the island of Mindanao there are two known gold-bearing districts. One of these is in the province of Surigao, where Placer

and other townships show gravels and veins. The second district is in the province of Misamis. Near the settlement of Imponan, on the Gulf of Macajalar, there are said to be many square kilometers of gravels carrying large quantities of gold with which is associated platinum. The product of this district was estimated some years since at 150 ounces per month, all extracted by natives with bateas or coconut shell dishes.

Copper ores are reported from a great number of localities in the Philippines. They are said to occur in the following islands: Luzon (provinces of Lepanto, Benguet and Camarines), Mindoro, Capul, Masbate, Panay (province of Antique), and Mindanao (province of Surigao). Many of these occurrences are probably unimportant. The great island of Mindanao, being practically unexplored, is full of possibilities, but as yet no important copper deposit is known to exist there. An attempt was made to work the deposit in Masbate, but no success seems to have been attained. On the other hand, northern Luzon contains a copper region which is unquestionably valuable. The best known portion of this region lies about Mount Data, a peak given as "2500 meters" in height, lying in latitude 16° 53', longitude 120° 58' east of Greenwich, or 124° 38' east of Madrid. The range of which Data forms one peak trends due north to Cape Lacay-Lacay, and forms a boundary for all the provinces infringing upon it.

Data itself lies in the province of Lepanto. In this range copper ore has been smelted by the natives from time immemorial and before Magellan discovered the Philippines. The process is a complicated one, based on the same principles as the method of smelting sulpho-salts of this metal in Europe and America. It consists in alternate partial roasting and reduction to "matte" and eventually to black copper. It is generally believed that this process must have been introduced from China or Japan. It is practiced only by one peculiar tribe of natives, the Igorrotes, who are remarkable in many ways.

Vague reports and the routes by which copper smelted by natives comes to market indicate that there are copper mines in various portions of the Cordillera Central, but the only deposits which have been examined with any care are those at Mancayan (about five miles west of Mount Data) and two or three other localities within a few miles of Mancayan. The deposits of Mancayan are described as veins of rich ore, reaching 7 meters in width and arranged in groups. Mean assays are said to show over 16 per cent of copper, mainly as tetrahedrite and allied ores. The gangue is quartz. The country rock is described as a large quartzite lens embedded in a great mass of trachyte. An attempt has been made by white men to work these deposits, but with no considerable success. The failure does not seem to have been due to the quality or quantity of ore found.

A lead mine has been partially developed near the town of Cebu, on the island of the same name.

The most important deposit of argentiferous galena is said to be at Torrijos, on the small island of Marinduque (latitude 13° 34'). A metric ton, or 1000 kilograms, is said to contain 96 grams of silver, 6 grams of gold and 565.5 kilograms of lead.

In Camarines, a province of Luzon, lead ores occur, but are worked only for the gold they contain.

There is iron ore in abundance in Luzon, Caraballo, Cebu, Panay, and doubtless in other islands. In Luzon it is found in the provinces of Laguna, Pampanga and Camarines Norte, but principally in Bulacan. The finest deposits are in the last-named province, near a small settlement named Camachin, which lies in latitude 15° 7' and longitude 124° 47' east of Madrid. A small industry exists here, wrought iron being produced in a sort of bloomery and manufactured into plowshares. The process has not been described in detail, so far as I know. It would appear that charcoal pig iron might be produced to some advantage in this region. The lignites of the archipelago are probably unsuitable for iron blast furnaces.

Rumors of the occurrence of quicksilver in Panay and Leyte have failed of verification. Accidental losses of this metal by prospectors or surveyors sometimes lead to reports of the discovery of deposits, and others are not seldom mistaken for impure cinnabar.

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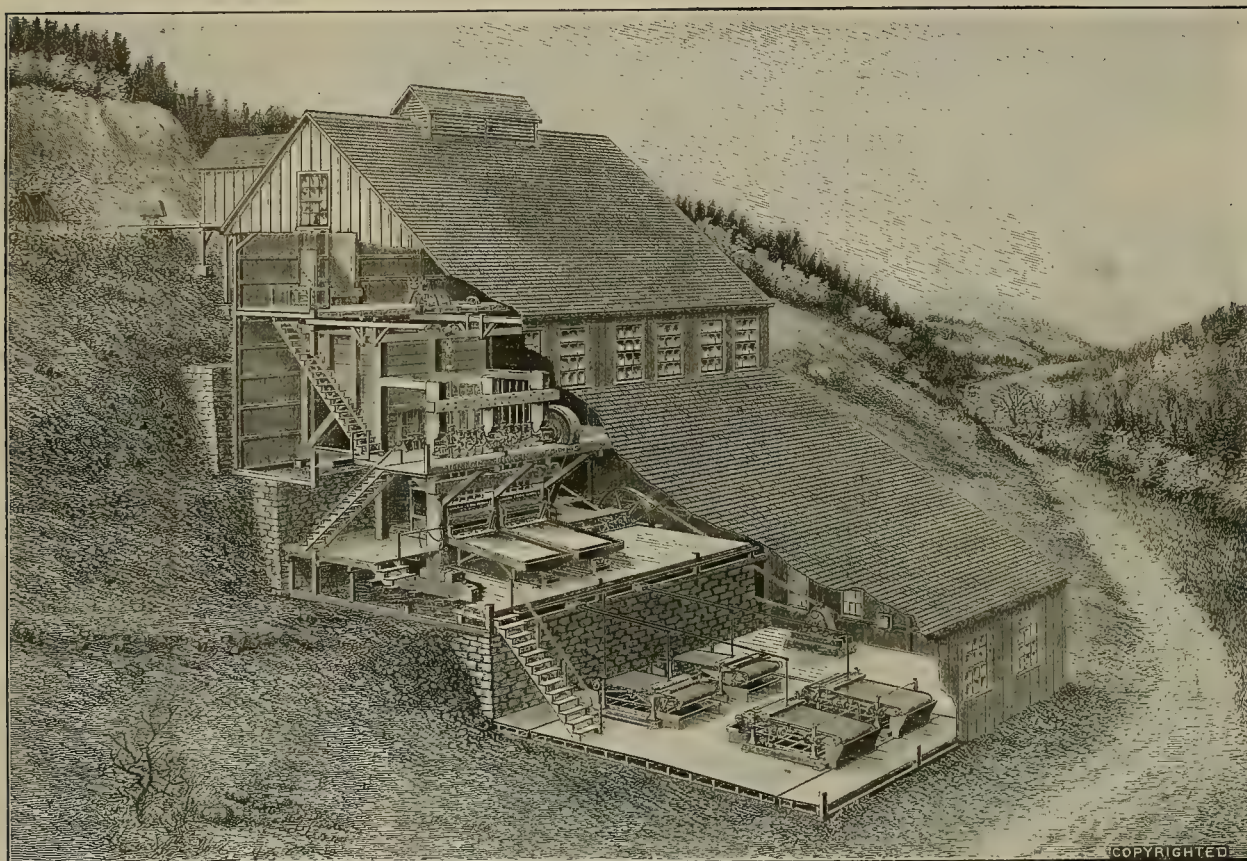
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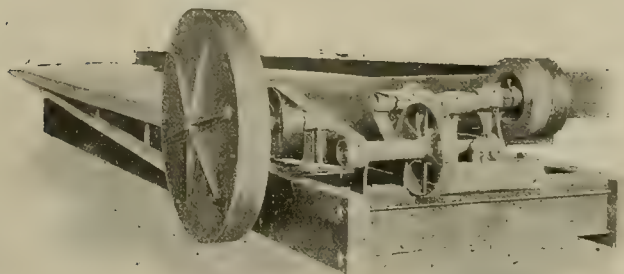
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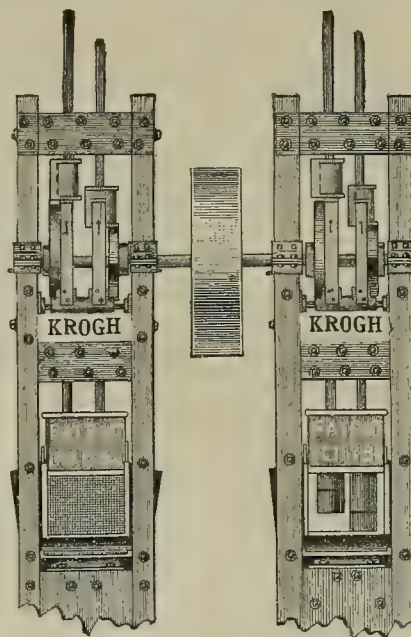
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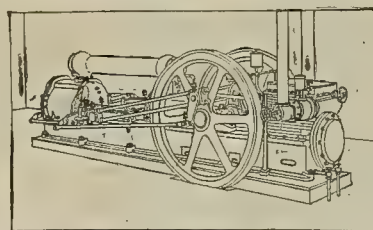
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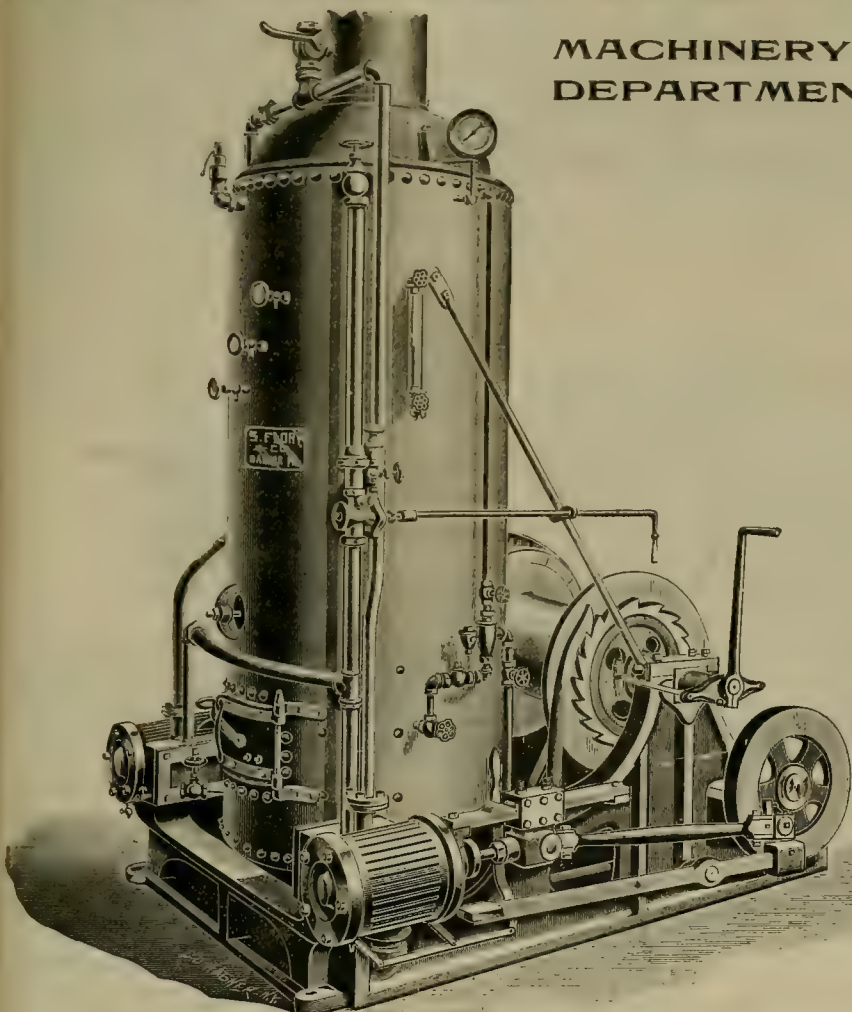
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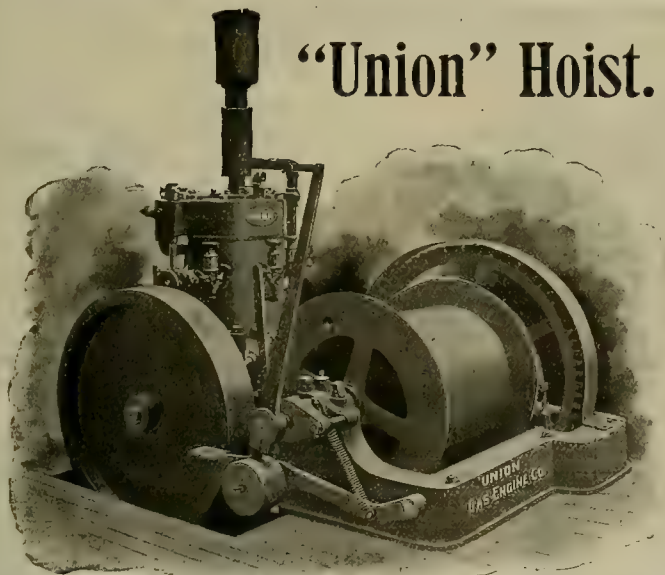
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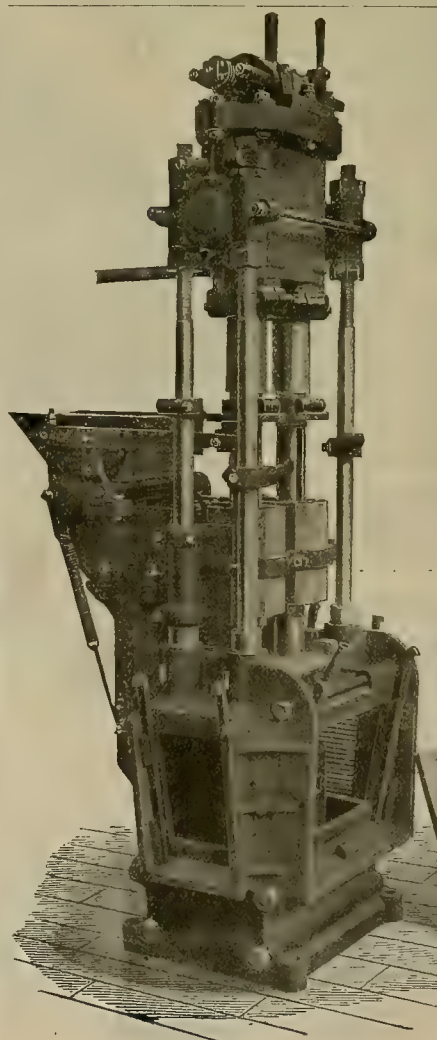
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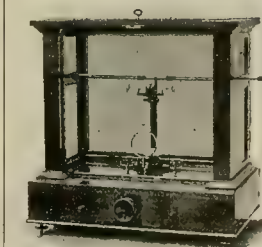
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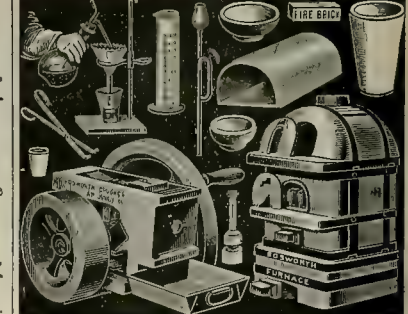


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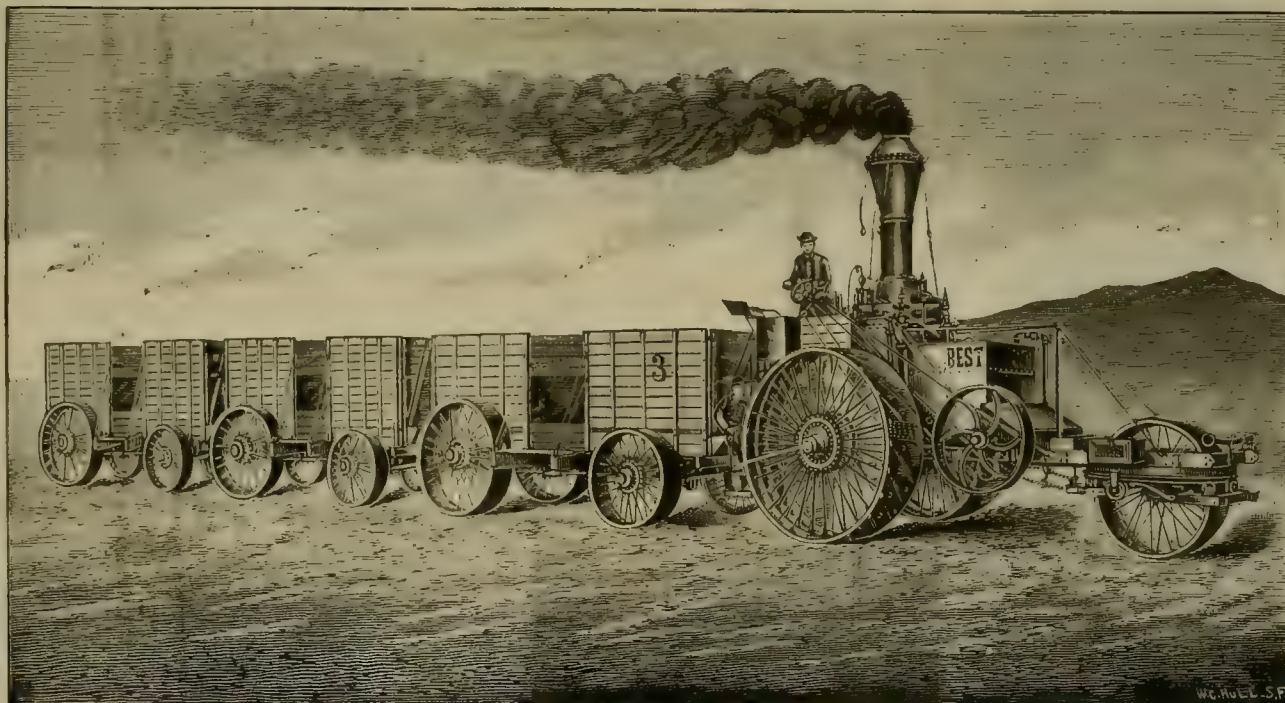
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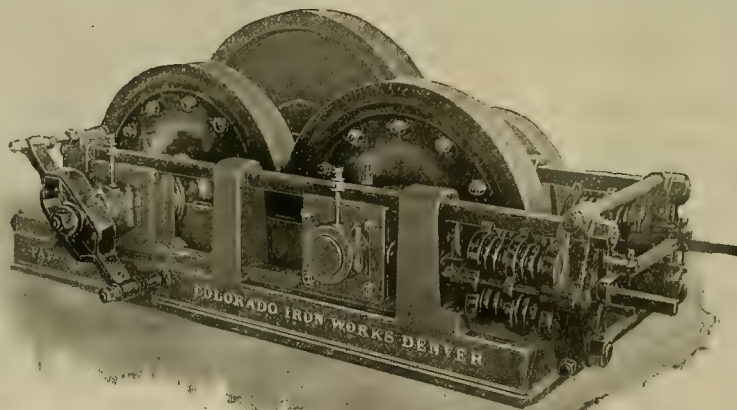
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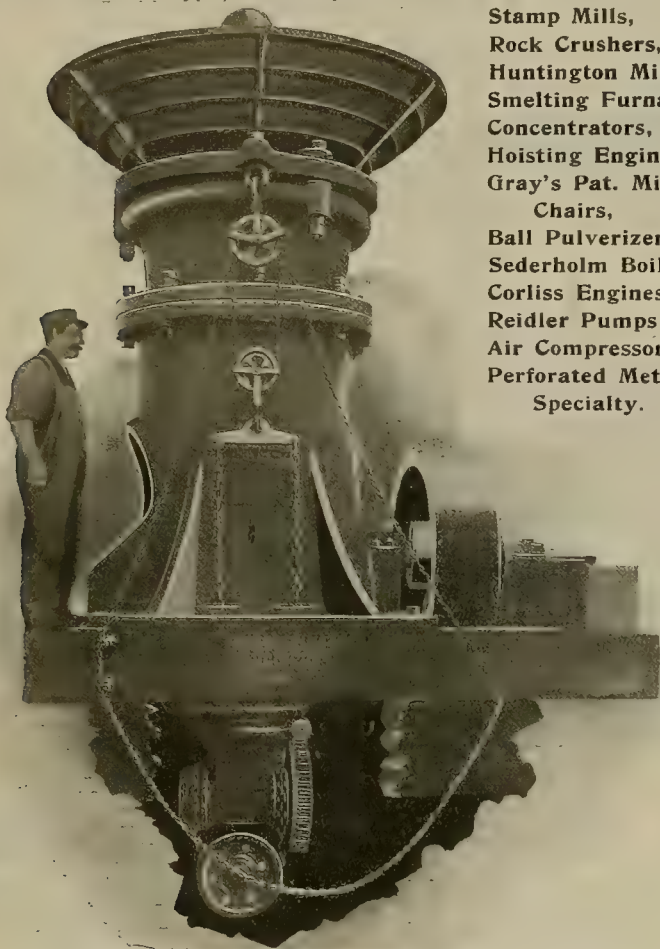
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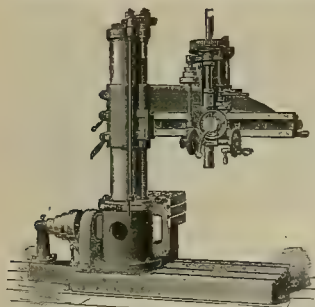
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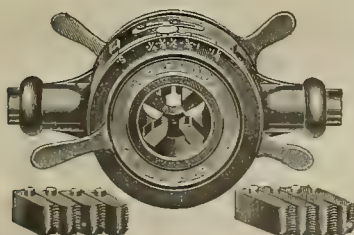
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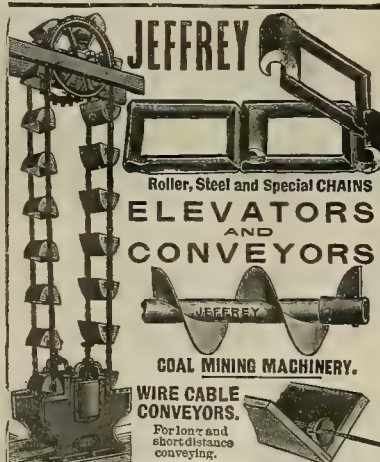
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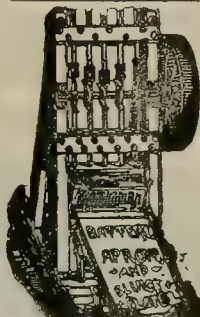


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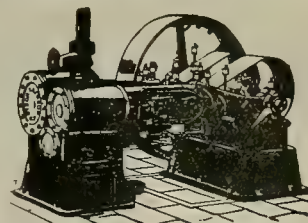
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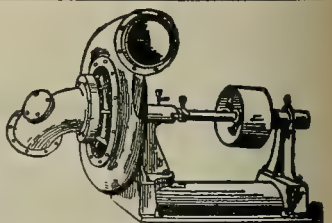
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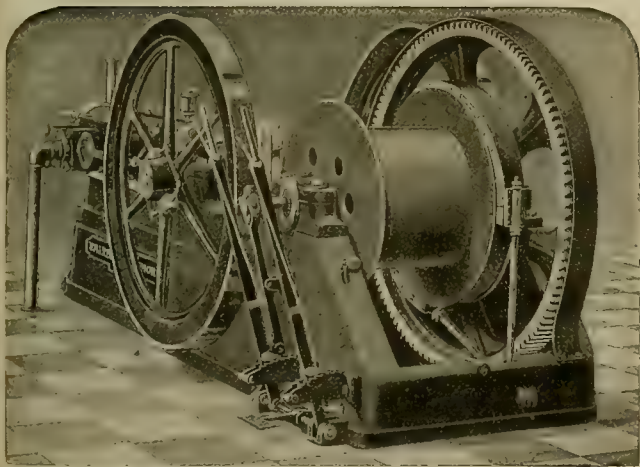
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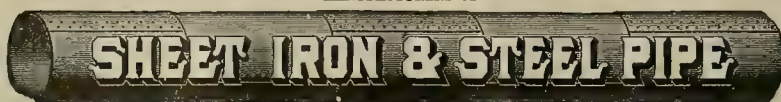
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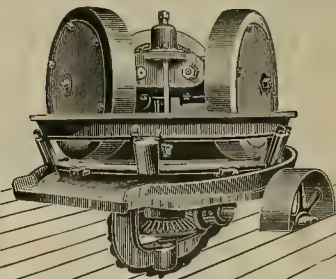
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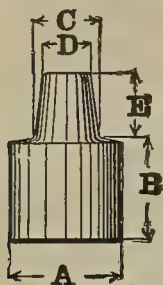
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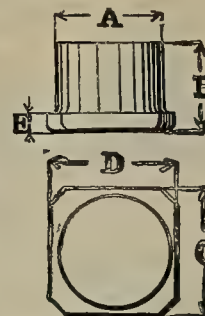
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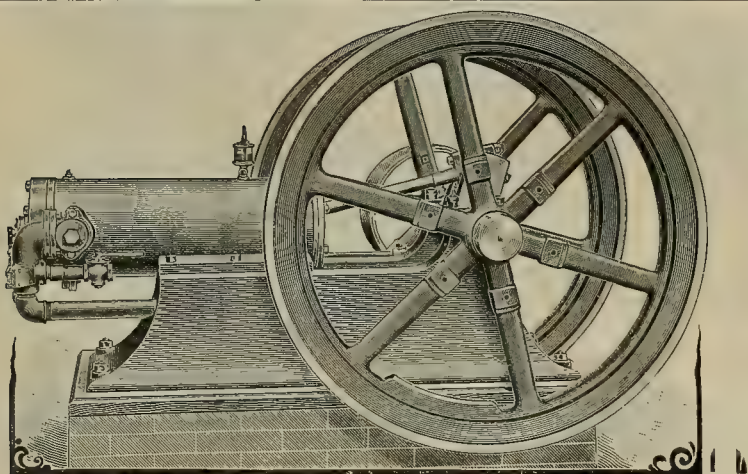
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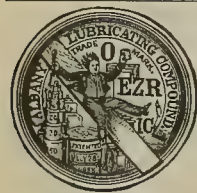
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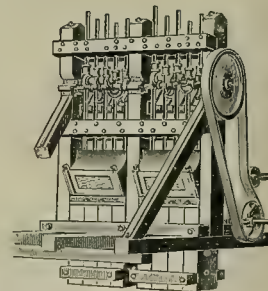
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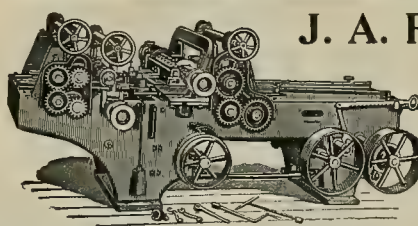
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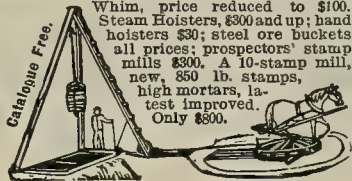
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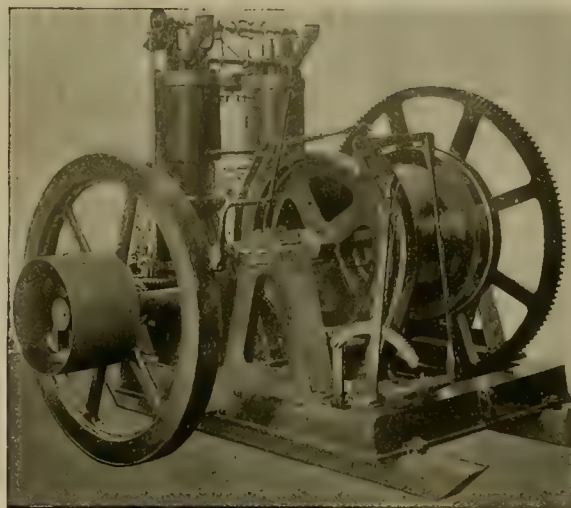
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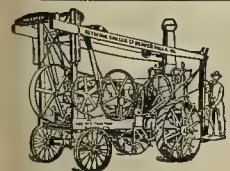
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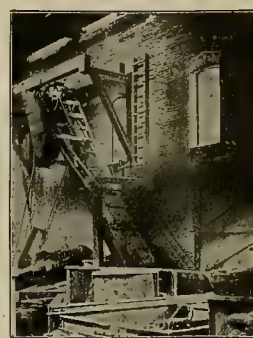


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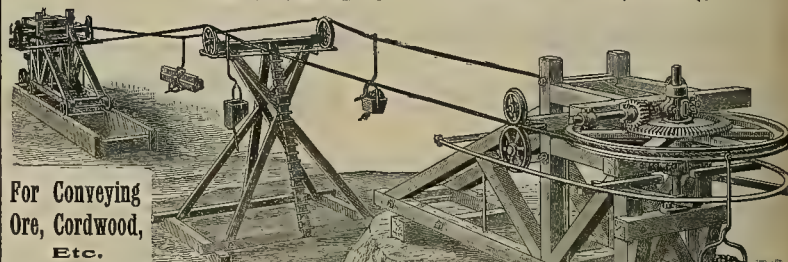
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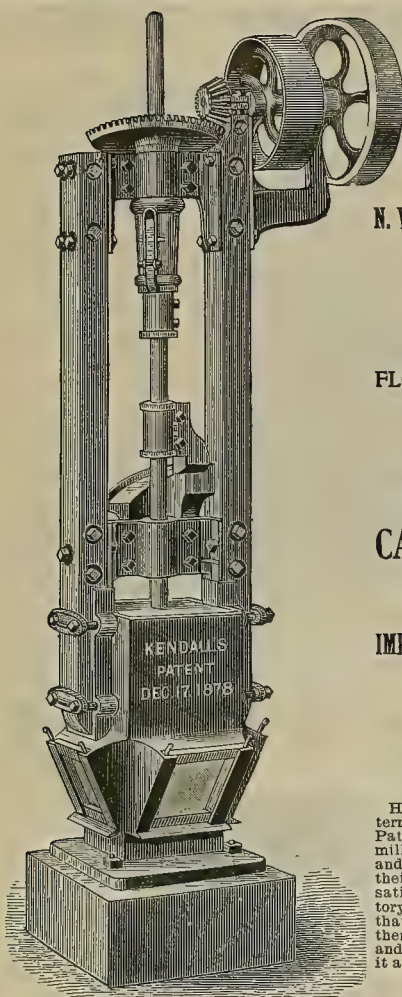
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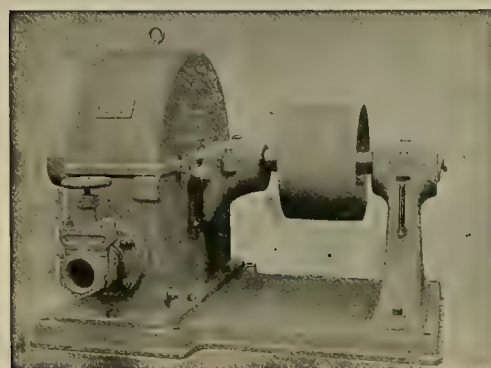
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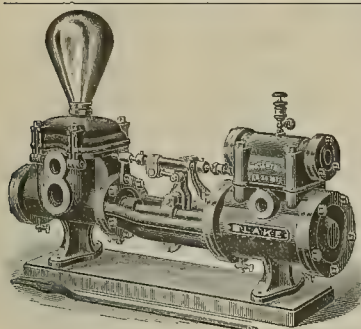
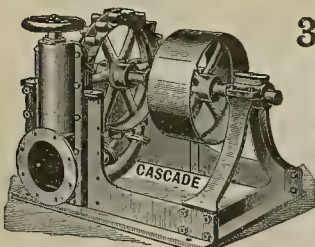
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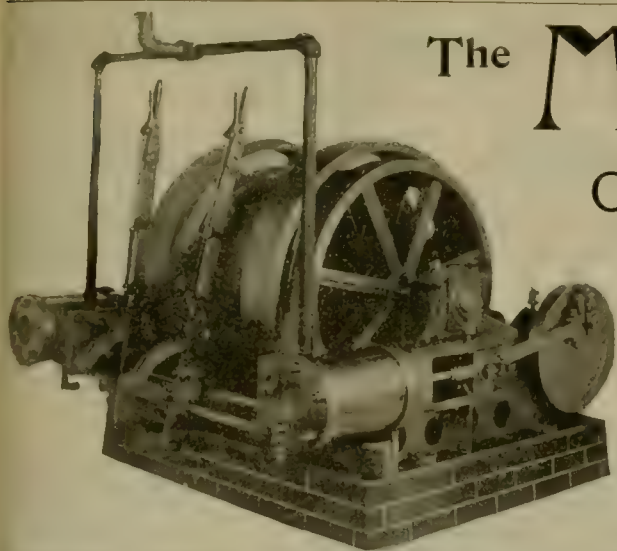
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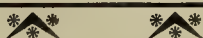
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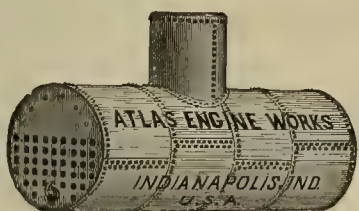
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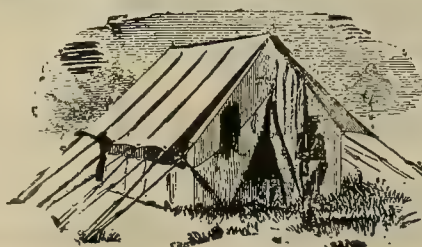
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SPELTER.—½¢@7.

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RABBIT METAL.—10-12-14-16c; best 24c.

QUICKSILVER.—Local, \$42; export, \$37.00 @ \$7.50; carload lots, special rates.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½¢; less than one ton, 17½¢. No. 1* 60%, carload lots, 18½¢; less than one ton, 15½¢. No. 1** 50%, carload lots, 11½¢; less than one ton, 13½¢. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½¢; less than one ton, 11½¢. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 728 kgs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington.....\$3.00 Coos Bay.....\$5.00 Seattle.....6.00 Southfield.....7.50

Cargo lots, Eastern and foreign: WallSEND.....\$ 7.50 Cumberland.....\$ 9.00 Brymbo.....7.50 Cannel.....9.50 Pennsylvania, hd., 14 50 Welsh Anthracite. 12.50 Scotch.....8.00 Rock Springs.....7.60

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.08 per gal.; bbl., \$1.03; pure No. 2, cs., 85c; bbl., 80c; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.06; less than 200 gals., \$1.10; in bbls., 4c per gal. less than case; Baker's Crystal, \$1.26; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 44c; cs., 40c; raw, bbl., 42c; cs., 47c; lots of 5 bbls., 1c less; Lucol, boiled, bbl., 39c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17½¢; Astral, 17½¢; Star, 17½¢; Ecocene, 19½¢; Extra Star, 21½¢; Elaine, 22½¢; Water White, bulk, in tanks, 11½¢; Mineral Seal, iron bbls., 21c; wooden bbls., 23½¢; cs., 28c; Mineral Sperm, 27c; Deodorized Stove Gasoline, bulk, 13c; do.,

cs., 18c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½¢; do., in cs., 16½¢; Lard Oil, Extra Winter Strained, bbl., 56c; cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatsfoot Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs., 60c; Sperm, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31c per lb.; carloads, 29c; in 10-lb. tins 37c; sulphuric acid, 2½¢ per lb. 66° B.; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½¢ per lb.; blue vitriol, 4½¢ per lb.; borax, refined, 5¢@6c per lb.; chloride of potash, 9½¢@10c; roll sulphur, 2½¢; alum, \$1.90@2.00; flour sulphur, French, 2½¢@2½¢; California refined, 1½¢@1½¢; nitric acid, in carboys 8c per lb.; caustic soda, in 10-lb. tins 15c per lb.; Cal. s. soda, bbls., 65c; sks., 60c @ 100 lbs; chloride of lime, spot, 2.10 @ 2.25c; saltpeter, 15c; chloride of potash, 25c; caustic potash, 12c.

CANDLES.—Electric Light Candles—6s, 16 oz., 7½¢; 6s, 14 oz., 6½¢; 6s, 12 oz., 5½¢; 6s, 10 oz., 4½¢; Granite (Mining) Candles—6s, 16 oz., 8½¢; 6s, 14 oz., 7½¢; 6s, 12 oz., 7½¢; 6s, 10 oz., 6½¢. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8c; colored, 9c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.40; cut, \$2.25; 10 to 20d, wire, \$2.45; cut, \$2.30; 8d, wire, \$2.50; cut, \$2.35; 6 and 7d, wire, \$2.60; cut, \$2.45; 4 and 5d, wire, \$2.70; cut, \$2.55; 3d, wire, \$2.85; cut, \$2.70; 2d, wire, \$3.10; cut, \$2.95. In carload lots, 10c per keg less.

CORDAGE.—

14-in. cir. (7-16 dia. and upward).....94 94

12-thread (¾ dia.).....94 94

6 and 9 thread (¼ and 5-16 dia.).....104 104

Bale Rope (3 and 4 strand).....94 94

Bale Rope (2, 6 and 8 strand).....94 104

In quantities not less than 10,000 lbs.

San Francisco Stock Board Sales.

SAN FRANCISCO, Nov. 23, 1898.

9:30 A. M. SESSION.

| | |
|-----------------------------|------------------------------|
| 100 Andes.....09c | 100 Mexican.....28c |
| 100 Belcher.....30c | 400 Potosi.....16c |
| 300 Best & Belcher.....30c | 500 Savage.....21c |
| 400 C. Cal. & Va.....\$1.25 | 520 Sierra Nevada.....\$1.15 |
| 300 Crown Point.....22c | 200 Union Con.....30c |

2:30 P. M. SESSION.

| | |
|-------------------------------|------------------------------|
| 200 Alpha.....04c | 200 Gould & Curry.....17c |
| 300 Belcher.....23c | 100 Hale & Norc's.....\$1.30 |
| 100 Challenge.....18c | 500 Occidental.....63c |
| 500 Chollar.....24c | 200 Ophir.....66c |
| 100 Con. Cal. & Va.....\$1.25 | 100 Union Con.....27c |
| 200 Confidence.....65c | 300 Yellow Jacket.....19c |
| 300 Crown Point.....21c | |

Acetylene Gas.

A handsome new illustrated catalogue will tell you where and by whom the new light is being used, and what the verdict is. Mailed upon application. PACIFIC ACETYLENE GAS CO., 115 New Montgomery St., San Francisco.

Quicksilver

FOR SALE IN LOTS TO SUIT.

Agents for Redington Quicksilver Mine.

REDINGTON & COMPANY, Wholesale Druggists, 23-25-27 Second Street, San Francisco.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from Geo. W. Allen and E. P. Thomas, in the Hangman's Gulch Mine, near Placerville, El Dorado Co., to deposit tailings in Hangman's Ravine; from Sam B. Lusk and J. J. Millar, in the Sampson Mining Claim, in Gold Lake Mining District, Sierra Co., to deposit tailings in a ravine below the mine; from E. Reynolds and F. Carter, in the Morristown Mine, near Port Wine, Sierra Co., to deposit tailings in west branch of Little Canyon Creek; from Geo. D. H. Meyers, in the Myers Placer Mine, near Placerville, El Dorado Co., to deposit tailings in Johnson's North Canyon; and from Frank and Antonio Leveroni, in the Corsica Mine, near Sierra City, Sierra Co., to deposit tailings in old pits, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on November 23, 1898, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from the Wintz Mining & Improvement Co., in its mine near Pleasant Valley, El Dorado Co., to deposit tailings on a flat below the mine; from Joel Bean, in the Cleveland Mine No. 2, near Scales, Sierra Co., to deposit tailings in Rock Creek; from J. B. Jones, in the Haskell Valley Mine, near Buck's Ranch, Plumas Co., to deposit tailings on a flat below the mine; from Thos. Gomez, in the Snowy Side mine, near Buck's Ranch, Plumas Co., to deposit tailings in Willow Creek; from N. H. Frits, in the New York Mine, near Buck's Ranch, Plumas Co., to deposit tailings in Willow Creek; from J. C. Horner, in the Chaplain Mine, near Buck's Ranch, Plumas Co., to deposit tailings in Willow Creek; from Llewellyn A. Hoeflich, in the Rocky Bar Mine, near Nelson Point, Plumas Co., to deposit tailings in worked out pits; and from C. W. Ayers, in the Oriole Gravel Mine, near Jamestown, Tuolumne Co., to deposit tailings on a flat below the mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on December 12, 1898, at 1:30 P. M.

CAPITAL DESIRING TO INVEST IN RICH and Extensive Gold-Bearing Gravel Deposits. Address

JOHN W. GRAY, 923 Linden St., Oakland, Cal.

LIGHTNING WELL MACHY
IS THE STANDARD
STEAM PUMPS, AIR LIFTS,
GASOLINE ENGINES
WRITE FOR CIRCULAR
THE AMERICAN WELL WORKS
AURORA, ILL. - CHICAGO - DALLAS, TEX.

DEWEY, STRONG & CO.
PATENTS
330 MARKET ST. S.F.

Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.

FRESNO, June 25, 1898.

Hercules Gas Engine Works
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gasoline engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LODE
M. & D. CO.,

Per N. W. Moodey, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

WEST COAST OF MEXICO.

WÖHLER, BARTNING Suc's, Mazatlan (Sinaloa), Mex.

Bankers, Importers, Exporters and Commission Merchants.

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AMERICAN ENGINEERING WORKS.

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FOR

MINE CARS



WHEELS AND AXLES COMPLETE, FURNISHED TO MINING COMPANIES, OR BUILDERS OF MINE CARS.

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EDW. N. BREITUNG, Marquette, Mich.
Cable address: Edw. N. Breitung, Marquette, Mich.
McNiel's A B C Universal Commercial. U. S. A.

Mining Man of Experience,

Owner of four gold quartz mines, 3 to 20-foot ledges, about \$10 ore, 20,000 tons of quartz in sight near surface; considerable developments; quartz works by cyanide process; facilities for working quartz first class.

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Will be given to parties who will erect a milling plant of fifty tons daily capacity.

A. P. ANDERSON,

Oriental, Esmeralda County.....NEVADA.

J. D. BETHUNE,

(Late Associate Justice Supreme Court.)

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Mining Law,

PRESCOTT.....ARIZONA.

A Valuable Gold Property for Sale.

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"DEARBORN Vegetable Preparations FOR BOILERS."

Assessment Notices.

MARINA MARSICANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of November, 1898, an assessment (No. 16) of 2 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 24th day of December, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 14th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
Office—217 Sacramento street, San Francisco, California.
CHARLES BYRNE, Secretary.

CONSOLIDATED ST. GOTHARD GOLD MINING COMPANY.—Location of principal place of business, 113 Crocker building, San Francisco, California; location of works, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of November, 1898, an assessment (No. 16) of Ten Cents (10c.) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 113 Crocker building, sixth floor, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 14th day of December, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 30th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. F. HOLLING, Secretary.
Office—113 Crocker building, sixth floor, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of November, 1898, an assessment (No. 85) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of December, 1898, shall be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 30th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
ALFRED K. D. BROW, Secretary.
Office—Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

ARRASTRAVILLE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of November, 1898, an assessment (No. 2) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 213 Jackson St., San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of December, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 12th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. MIDDLETON, Secretary.
Office—213 Jackson street, San Francisco, California.

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The Most Comfortable Way to Travel
ACROSS
THE
CONTINENT.

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THE altitude of the plateaus and mountains crossed renders the trip cool and pleasant after the desert is passed. No matter which way you go the desert must be crossed and there is less of it on the Santa Fe than on other lines. It is a popular mistake to suppose it is a hot line. Close connections are made in Chicago and Kansas City for all Eastern cities.

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JNO. L. TRUSLOW, JNO. J. BYRNE,
Gen. Asst. Pass. Dept. Gen. Pass. Agt.
San Francisco, Cal. Los Angeles, Cal.

DELINQUENT SALE NOTICE.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Riverside County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 16th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------------|-----------|-------------|---------|
| W. H. Bailey, Trustee..... | 260 | 2,000 | \$30 00 |
| W. H. Bailey, Trustee..... | 261 | 2,000 | 30 00 |
| W. H. Bailey, Trustee..... | 262 | 10,000 | 150 00 |
| C. A. Bailey..... | 133 | 1,000 | 15 00 |
| C. A. Bailey..... | 135 | 1,000 | 15 00 |
| C. A. Bailey..... | 136 | 1,000 | 15 00 |
| C. A. Bailey..... | 138 | 500 | 7 50 |
| C. A. Bailey..... | 139 | 2,000 | 30 00 |
| C. A. Bailey..... | 210 | 4,532 | 67 98 |
| R. L. Cheney, Trustee..... | 245 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 246 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 247 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 248 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 249 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 250 | 250 | 3 75 |
| R. L. Cheney, Trustee..... | 251 | 2,500 | 37 50 |
| R. L. Cheney, Trustee..... | 252 | 1,000 | 15 00 |
| W. H. Bailey, Trustee..... | 253 | 2,300 | 34 50 |
| W. H. Bailey, Trustee..... | 259 | 7,300 | 109 50 |
| W. H. Bailey, Jr..... | 147 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 148 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 149 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 150 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 151 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 188 | 2,500 | 37 50 |
| W. H. Bailey, Jr..... | 208 | 4,000 | 60 00 |
| W. H. Bailey, Jr..... | 209 | 532 | 7 98 |

And in accordance with law, and order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 508 Safe Deposit building, San Francisco, California, on TUESDAY, the 1st day of November 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

R. L. CHENEY, Secretary.
Office—Room 508 Safe Deposit building, San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed to THURSDAY, December 1st, 1898, at the same hour and place. By order of the Board of Directors.

J. W. PEW, Secretary.
Office—310 Pine St., Room 15, San Francisco, Cal.

DELINQUENT SALE NOTICE.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 11) levied on the 3d day of October, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------|-----------|-------------|---------|
| Peter Heinrichs..... | 71 | 500 | \$50 00 |
| J. Young..... | 278 | 200 | 20 00 |
| Jos. Rohrer..... | 279 | 50 | 5 00 |
| Kathe. Young..... | 280 | 50 | 5 00 |

And in accordance with law, and an order from the Board of Directors, made on the 3d day of October, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, No. 237 Twelfth street, San Francisco, California, on MONDAY, the 5th day of December, 1898, at the hour of 5:30 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

F. METTMANN, Secretary.
Office—237 Twelfth street, San Francisco, California.

THE MOST DIRECT AND CHEAPEST ROUTE

—TO—

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The Coeur d'Alene,
The Kootenai, } Mining
Districts

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Finds buyers or working capital for meritorious
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Prevent formation of scale in your boilers. Prevent foaming, pitting and leaky joints. Save fuel bills. Will work where others fail. Have but one connection, are simple and strong, visibly feed oil drop by drop. Specify "Lunkenheimer's" Boiler Oil Injector, if you want the best. Satisfaction guaranteed. Made in the following sizes: ½ pt., 1 pt., 1 qt., ½ gal., 1 gal., 1½ gal., 2 gal. Thousands in use and giving entire satisfaction. Supplied by dealers when specified. Catalogue of superior brass and iron steam specialties free for the asking.



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Our German drawing instruments bear only the trade marks or We never stamp our goods with catalogue numbers only, and goods so stamped are therefore not ours. All our goods are fully warranted to conform to the description we give of them in our catalogue and to be of the quality and grade specified. We make some lines of cheaper goods for the jobbing trade, but they differ from our catalogue goods in quality and appearance. These inferior goods are not stamped with any of our trade marks. Our catalogue goods are not furnished to any dealer or agent without our complete stamp as described above, and any claim that we furnish our catalogue goods by special arrangement without our stamp is therefore an attempt to deceive. Our special papers in rolls or sheets

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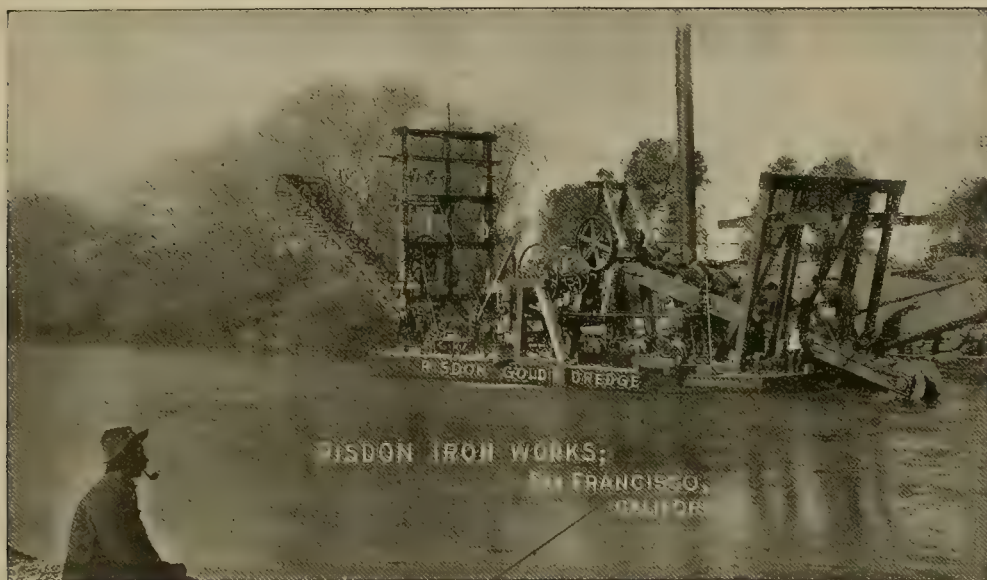
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Delivering Water to the Boiler at 210 degrees F. Thirty Sizes from 5 to 4000 Horse Power. Made of the Best Seamless Drawn Brass or Copper Tube, with Hard Brazed Joints. Unsurpassed for SIMPLICITY, EFFECTIVENESS and RELIABILITY.

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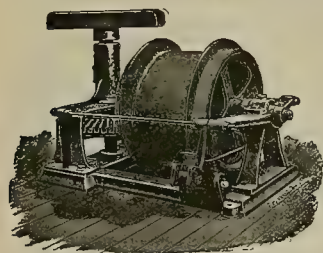
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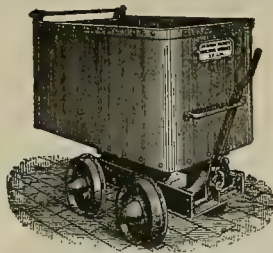
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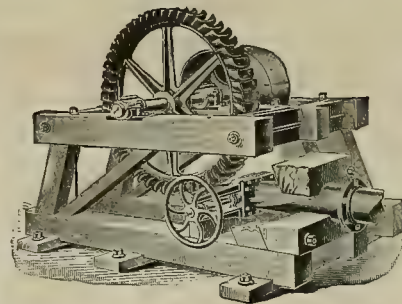
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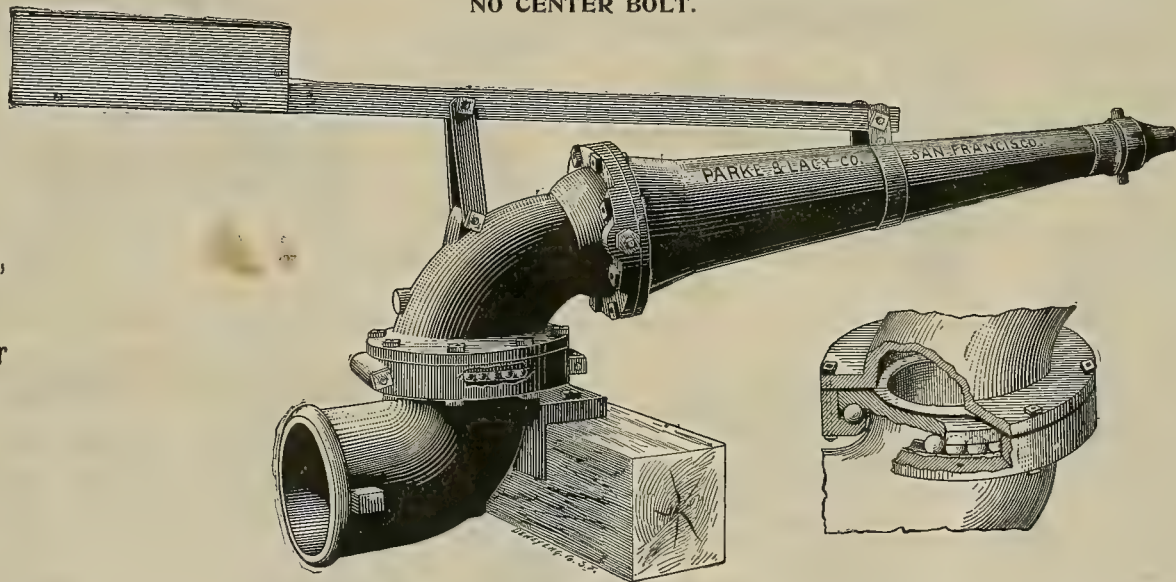
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For the convenience of our readers in the mining counties we print in legal size, 12x36 inches, the Mine Bell Signals and Rules provided for

in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness. 50 Cents a Copy.

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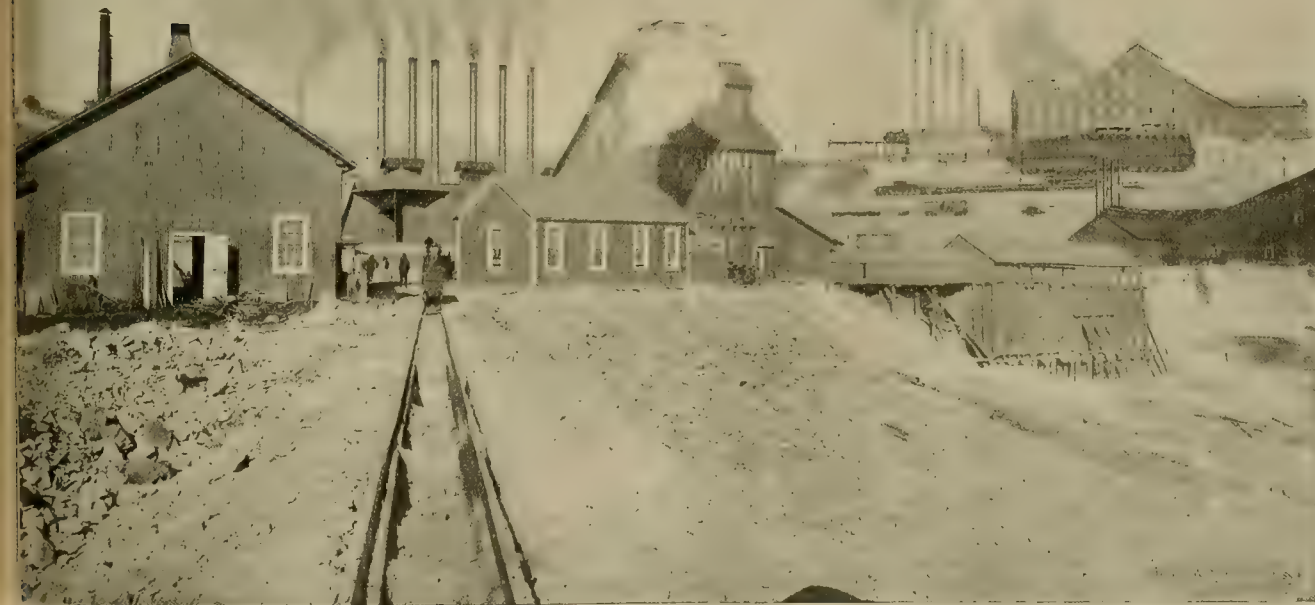
Mine Management.

The minute details given in the issues of the 5th and 26th ult. by two California mine managers, illustrate a phase of the mining business often overlooked by corporate owners—the necessity for exact, specific information of the smallest details of the business. Even in gold mining, with no competition, no business rivalry, an assured market at an established price for the product, there is constant need of rigid economy, attention to little things and a thorough grasp of the most minute detail to insure profit or to guard against possible loss. In every shop, factory, store, or commercial establishment of any kind, it is the little savings that make all the difference between profit and loss. The writer was recently told by the manager of one of the largest department stores in the United States that the cash discounts he secured on large purchases constituted almost entirely the firm's source of possible annual profit. In the big meat-packing establishments of Chicago it is the utilization of every shred of the animal that makes the profit: the sale of meat, alone, would entail a loss. And this brings us to the point that we would make, viz., that in this regard of mine profit or loss, all depends on the manager. If he understands his business he can, ordinarily, make a mine pay: if he doesn't, he can gouge its eyes out and cause assessments and closing down. This does not mean that he must take things out of the hands of the shift boss, or



GREEN MOUNTAIN, GRAY ROCK, DIAMOND; SYNDICATE LODE, BUTTE, MONTANA. (See page 562.)

foreman, or superintendent, but that he must be a practical, experienced man who knows what ought to be fairly expected from every man in the mine's employ, what every bit of labor ought to produce; not in a niggardly, stingy spirit, but with full realization of the fact that anything and everything that costs money should produce money; that there should be no pets nor favorites, no drones nor "soft jobs," and that every dollar be spent as though it were his own. He should be able to do anything and everything in or around a mine and then be careful not to do it, but to surround himself with men who can each attend intelligently to his particular duty. Such a man is worth considerable to his employers, and even at a high salary is a good investment. The biggest mistake a mining company can make is to suppose that because a man is "sharp," or a "good fellow," or has made a success at something else, that he can run a mine.



PARROT, COLUSA-PARROT AND NEVER SWEAT COPPER MINES, BUTTE, MONTANA. (See page 552.)

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....Publisher

San Francisco, December 3, 1898.

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Necessary Notice.

Among other committees of the California State Miners' Association recently appointed was one to take charge of the mineral exhibit at the Paris Exposition. If this committee is to be purely an ornamental one, not to be heard from till the '99 meeting of the convention, and then report that it still awaits the pleasure of the convention, it were better to have no committee at all. If its members are given opportunity to get to work and accomplish something, the committee is the most important, in a general way, of any one so appointed. The appointment of the committee assumes that California is to be represented at Paris in 1900, and that the California Miners' Association is to take charge of the matter—two assumptions not warranted by the facts, though the good will of the Association is indicated in the creation of the committee. California tacitly announced this year that it did not want adequate representation at the Omaha Exposition. There was a great opportunity to advertise the State's mineral resources to 5,000,000 people, and other commonwealths, with better business grasp, eagerly seized the desirable chance to their profit. In this California acts like a staid, long-established business house that considers itself so well known and important as to render advertising unnecessary, and when it finds young, energetic rivals taking its business away is surprised at the lack of appreciation or discrimination on the part of the public. This is an age of advertising, and anything of standard merit, whether a business, or an industry, or a State, should use every honest chance to get favorable notice. At Paris in 1900 will be a fine opportunity for California and every other American State. With such opportunity three things are necessary—the intent to use it, the money to properly place the exhibit, and the men to do it.

Such notice is necessary. No matter how rich any State is in its mineral resources, they cannot be suitably developed without such advertising as such expositions will afford. To do this is beyond the province or the purpose of any miners' association; at the start there should be at the State's disposal at least \$25,000, and the men in charge of it should not be hampered by the necessity of other daily occupation. Were such a committee duly delegated to-day, and given the amount stated, they could faithfully devote the time between now and the opening of the Paris Exposition, and not have an hour nor a dollar too much. The California Miners' Association deserves credit for indicating its realization of these things, but the idea needs to be worked out on broader lines than the purpose or the policy of the Association make possible.

This paper suggests that the first main requisite is money, which the State could with propriety furnish, and that the committee appointed by the

Miners' Association can begin by concerted action to get adequate appropriation from the State next month in the Legislature. Nothing less than \$25,000 will be of any avail, and any aid from any reputable source should be invoked.

Property Rights of Relocators.

Never in the history of this paper were so many inquiries received as are now daily sent here regarding current mining topics. Many of them are answered by mail; others are grouped and answered in "Concentrates," the questions themselves being omitted to save space; several of the questions each week have either been answered recently, or are impossible of satisfactory reply. As is natural at this season of the year a large percentage of the present inquiries relates to locations, assessment work, etc. This paper does not undertake to answer any such question authoritatively; and in cases involving property values it is always more ultimately satisfactory to get competent legal opinion. This last advice was recently given an Idaho man who wrote asking if he could relocate an abandoned property with a 5-stamp mill on it, but he writes back that though "all the lawyers" up there tell him "he can take up the property and do what he likes with the 5-stamp mill" yet, he hesitates, and wants "to know what the MINING AND SCIENTIFIC PRESS thinks about it." As is often the case, simultaneously with this query comes one from Nevada City, Cal., with precisely the same proposition involved, another from Prescott, Arizona, a fourth similar case from Utah. The Nevada City man argues it a little in his letter. He says:

"The parties who put up the mill failed to do their assessment work within the time required by law. Can I locate the claim and hold the mill to the exclusion of the men who put it there and owned it up to the time they failed to do their assessment work? Lawyers here tell me that I can hold all machinery on an abandoned claim, but I don't see what interest the U. S. Government has got in the personal property placed on a mining claim. It seems to me that the Government can only give a title to the land which belongs to it, and that any machinery placed on a mining claim belongs to those who put it there. We want an opinion from the MINING AND SCIENTIFIC PRESS. Also, can feeders, belts, wire cable, attached to cars used in lowering ore by inclined tramway, be sold lawfully, as personal property, the same as supplies? Cannot the owner of the mill recover damages for selling them? Was there ever such a law passed to give locators of abandoned claims a right to hold machinery placed thereon by previous locators?"

This whole subject is discussed at some length in "Lindley on Mines," and is of sufficient importance to justify an excerpt therefrom. Under the heading, "Right of second locator to improvements made by the first," appears the following:

"When the estate of the first locator becomes extinguished by his failure to comply with the law, and the second enters and perfects his relocation, the dominion and control over the property passes to the latter. If the former thereafter remains in possession, unless at the time of the relocation he has resumed work, he is a mere occupant without color of title, and the completion of the second location, if effected peaceably and in good faith, operates in law as an ouster of the prior occupant¹. Thereafter the relocater is clothed with 'the exclusive right of possession and enjoyment of all the surface included within the lines of the location'². Such improvements or betterments as have been placed upon the property by the original locator, if they fall within the class designated as fixtures, become a part of the realty, and the subsequent appropriation of the land carries with it, necessarily, whatever may be affixed to it. Prior to the determination of his estate by the perfection of a relocation it cannot be doubted that the prior locator may sever and remove all machinery, buildings, and other improvements which, by the manner of their attachment to the soil, have become a part of the freehold. But his right of entry for that purpose ceases when

his estate is terminated. It is a general rule of law that all improvements of this character upon public lands of the United States pass to the purchaser from the Government³, and the relocater of a mining claim holds his estate by purchase⁴. One cannot set up equities in improvements against the Government, or a purchaser from it⁵, and the statutes which permit their removal after the land has passed into private ownership are void, as interfering with the primary right of disposal of the soil reserved to the United States upon the admission of the several States⁶. It is unnecessary to enter into a detailed discussion of what constitutes fixtures. It has been frequently held that machinery, such as engines, boilers, hoisting works, mills, pumps and things of a like character annexed to the soil for mining become part of the freehold⁷. As such, they will pass to the relocater.

"While this is undoubtedly true, upon application for a patent the relocater will not be permitted to include in his estimate of the value of improvements required by law to be made as a condition precedent to patent, any of the labor done or improvements made by the original locator.⁸ Expenditures and improvements for such purpose must have been made by the relocater or his grantors.⁹"

The above appears to be sufficient answer to our correspondents' inquiries.

Since the above was in type, another "hard nut to crack" comes, in the following, from one, who, like the rest, pins his final faith on the decision of this paper. He says:

"Can a mill site on which a mill has been erected be located as a mining claim? The mill site is not patented, but a mill is erected thereon, negating the fact of abandonment."

In answer, it is to be said that mill sites can only be legally located on non-mineral land. If at any time prior to the issue of the receiver's receipt in patent proceedings mineral is discovered within a located mill site in sufficient quantities to justify exploitation, a valid mining claim may be located thereon, provided the entry on the ground is made for that purpose, peaceably and in good faith. The question as to whether the mill site has been abandoned or not is entirely immaterial. (See *Snyder v. Waller*, 25 L. D. 7).

(To forestall the possibility of receiving several further inquiries from readers of this last paragraph to the effect "Would a mining location within the mill site take the mill?" the writer can only reiterate his advice that in all such cases involving values the exact special facts in that particular case be placed before a competent attorney; for, though fully appreciating the compliment conveyed in the request for authoritative statement, the MINING AND SCIENTIFIC PRESS hesitates to assume judicial functions, more especially in the absence of specific knowledge of all the detailed facts.)

COLORADO has seized upon an idea that vigorously pushed is one of the things that will most materially aid in mining development—it is the tunnel. Colorado miners have "dropped on" the fact that the twin expenses of hoisting and disposing of water can in no other way be so simply solved as by tunneling. Tunnel enterprises are springing up in every part of that State's mining counties, and though, of course, like any other good thing, the idea can be overworked, yet the scheme has so many manifest advantages that it is deservedly a favorite. The activity therein is a pointer to other mining communities that languish because of the deterring cost of old-time shaft development.

FROM Nevada comes the doubtful statement that Wm. M. Stewart will not be returned to the U. S. Senate. This is too good to be true. The S. P. is all powerful in Nevada, and that corporation needs him. The only interest this paper has in the matter is the good of the mining industry; so long as Senator Stewart is able to vote in the U. S. Senate, so long needed changes in the Federal mining law will not be made.

MR. TESLA now proposes to run the machinery of the Paris Exposition with electric power sent instantly across the world from Niagara Falls. So long as that airy gentleman has free access to the Sunday publications, there is no limit to the wonderful things he can do—on paper.

¹ *Belk v. Meagher*, 3 Mont. 65, 80; S. C. on Appeal, 104 U. S. 279, 284.
² *Rev. Stats.* 2332.
³ *Collins v. Bartlett*, 44 Cal. 371; *Pennybecker v. McDougal*, 48 Cal. 163; *McKiernan v. Hesse*, 51 Cal. 594; *Treadway v. Sharon*, 7 Nev. 37.
⁴ *Meyersdorf v. Frohner*, 3 Mont. 282, 320. See ante, 253.
⁵ *Hawke v. Deffenbach*, 115 U. S. 392; *Sparks v. Pierce*, Id. 408.
⁶ *Collins v. Bartlett*, 44 Cal. 371.
⁷ *Merritt v. Judd*, 14 Cal. 60; *Treadway v. Sharon*, 7 Nev. 37; *Rosville Alta M. Co. v. Iowa G. M. Co.*, 15 Colo. 29.
⁸ *Acting Commissioner Holcomb*, *Copp's Min. Lands*, 300; *Commissioner Burdett*, 1 *Copp's L. O.* 179.
⁹ *Rev. Stats.* 2332.

Concentrates.

At Butte, Montana, the Butte & Boston Co. has on its payroll 549 men.

SAN FRANCISCO's mining dividends for Nov., '97, were \$90,725; for Nov., '98, \$135,075.

The November dividends of Cripple Creek, Colo., mining companies totalled \$318,250.

"BRASS AND BRASS" means where the two brasses of a bearing are locked together.

In the Butterfield mine, near Quincy, Cal., was found last week a ninety-dollar nugget.

The copper output of Arizona in 1897, according to revised figures, was 81,019,922 pounds.

The deepest vertical shaft in Montana is in Butte—the Green Mountain, 2100 feet in depth.

The last assessment on Con. Cal. & Va. was in May, '98—25 cents per share—delinquent in June.

The Grizzly mine is near Pike City, Cal. It has a 10-stamp mill; nothing has been done there recently.

In '99 the Osceola, Mich., Copper Co. expects to produce 20,000,000 pounds of copper at \$40.90 per pound.

The Mercur M. Co., Mercur, Utah, was awarded a gold medal at the Omaha Exposition for its cyanide exhibit.

An electric hoist of unusual size will be put on the Granite mine at Victor, Colo., to raise ore from a depth of 700 feet.

For the present the headquarters of E. H. Benjamin, Secretary Cal. State Miners' Assn., are at 331 Pine St., San Francisco.

The loss in the transmission of power, for twenty-four miles, by the Electric Power Co. at Canyon City, Colo., is said to be only 7 per cent.

The Cleopatra Smelter at Ouray, Colo., has passed into receiver's hands. The liabilities are given at \$21,000 and the assets at \$32,500.

The dam built by the Victor M. Co. in Josephine county, Oregon, is 50 feet high, 65 feet long at the bottom and 300 feet across at the top.

The projected tunnel from Ward to Sunset, Colo., three and one-half miles long, will require, it is estimated, five years to complete and cost \$500,000.

A CISTERN, to hold just 200 bbls., must be 9½ feet diameter and 12 feet deep. If bricked up, it will take 1560 brick 4x8x2, if laid edgewise, or 3000 if laid flat.

By the accidental explosion of a blast in the Cleveland mine at Springdale, Wash., last week, J. Moriarity was instantly killed and W. Johnson seriously injured.

ACCORDING to the Marquette, Mich., *Mining Journal*, "the Calumet & Hecla Co. can lay copper down in New York at 13c and make 100% on the cost of production."

The Comstock Pumping Association has received all the money called for from the mining companies—\$51,250—to defray the cost of lowering the water 500 feet.

At Hancock, Mich., on the 23th ult., the Franklin stamp mill was destroyed by fire; loss \$150,000. There will be 600 men thrown out of employment for six months.

AFTERMATH of sundry swindles in connection with the Klondike rush is the filing of damage suits in Seattle by men who were defrauded by transportation companies.

"MECHANICAL EQUIVALENT" is the amount of mechanical energy converted into heat; the "mechanical equivalent" of one unit of heat is equal to 772 foot-pounds of work.

ON a California mining location made after Nov. 2nd, '98, it is possible to make the \$50 in work required under the State law apply to and be a part of the \$100 required by the U. S. statute.

LARGE deposits of "pure sulphur ore" are reported discovered four miles from Coyote Wells, San Diego Co., Cal., thirty-five miles north of the Godbe sulphur mines in Baja California.

RECENT findings of alleged "tin" in Colorado are too indeterminate to warrant notice. Tin is appreciating in value, and a tin mine would be second only in value to a copper mine at present figures.

The Tiger-Poorman mine in the Cœur d'Alenes, Idaho, up to 1895 was operated by two companies. From the time of the discovery of the mines in 1884 to 1895 each company paid about \$500,000 in dividends.

THERE is nothing to prevent an inventor from filing an unlimited number of applications for patent for the same subject matter, if some benefit, real or imagined, would seem to justify the additional expense.

RECENT chemical experiments prove that all waters have action on copper; that "hard" water takes up little lead from lead pipes, but that "soft" water and carbonated water so dissolve considerable quantities.

THAT was a good suggestion of Gov. Budd's at the convention of the Cal. State Miners' Association last week, viz.: to have that \$250,000 State appropriation for restraining barriers, etc., specially set over from the general fund.

COMPANIES desiring mention of dividends declared should make statement of the dividend, its date and amount. Nothing of the kind is published herein "second-hand," or from hearsay. The idea is to have the matter accurate.

STORMS' "Mine Timbering" is believed to be equal to the requirements of any miner. It can be had upon application to the Cal. State Mining Bureau, Fourth St., San Francisco. To other than Californian residents there is a charge of 50 cts.

RIGID qualitative analysis has demonstrated within the month the non-existence of the supposed new metal in platinum ore called "davyum." The substance is not elementary, but is composed of rhodium and iridium, with a trace of iron.

THE Reno, Nev., suggestion could be practically pushed by the use of a traction engine. Daniel Best, San Leandro, Cal., makes a road engine that will pull a load of thirty tons up and down a grade of one foot in eight, and of much greater weight on the level.

MISSOURI's State mine inspector claims that his State now leads in production of lead and zinc, and says the output of lead ore for the last fiscal year was 73,687 tons, which sold for \$3,011,055, and that the output of zinc ore reached 139,668 tons, and sold for \$2,927,321.

BUT one pre-emption or homestead right can be used and one can take up only one timber claim. The number of mining claims that an individual or a company can take up is, however, only limited by the ability to do the assessment work necessary to hold them.

In Nevada Co., Cal., there are 234 gold quartz mines and 96

placer mines. There are 67 stamp mills, with an aggregate of 698 stamps; of these 67, 47 are operated by water power, 11 by steam, 5 by electricity and 4 by gas engines. The stamps average 900 lbs. weight each.

SKAGWAY reports that counterfeit bills are made and sent to that place for the purpose of swindling Klondikers who have just come from the interior out of their money. The bills are \$100 silver certificates, and the detectives believe that they are made in San Francisco.

AT the Three Stars mine, near Ophir, Cal., last week, the engineer left the bucket suspended in the shaft while working on a pump some distance away. The brake slipped and the bucket fell 500 feet onto the machine drill at which H. Corr was working, breaking both his legs.

ELABORATE tabulated information as to the carrying capacity of pipes, friction therein, effective H. P., etc., appeared on page 174 of the issue of Feb. 12th, '98, answering the questions received this week from J. D., Boise, Idaho, R. L. N., Asland, Ore., and M. S. L., Breckenridge, Colo.

IN consequence of the rains this week at Nevada City, Cal., Mgr. Eglebright of the South Yuba Water Co. notified the mine owners at Nevada City and Grass Valley who use water for power that they could start their machinery last Wednesday. About 1500 men were enabled to resume work.

PLACER BASIN, IDAHO, in which the work done this summer is said to prove the new camp a permanent and profitable mining section, is practically in the Seven Devils district, and, in common with the mineral regions as far north as Salmon river, is reached by way of Weiser and up the Weiser river.

IN the "Schultze process," the gold ore, without being crushed or roasted, but just as it comes from the mine, is put into a furnace, "oxidized" by heat, purified by gas, hydrated by steam, disintegrated into powder, concentrated by a pneumatic separator, etc. Proof of its practical success has as yet escaped publicity.

IN a note of deep mines in California last week a mistake was made regarding the Magalla, Butte Co., mine. The workings are 4000 feet from the bottom of the shaft, horizontally. The vertical depth is 500 feet. The Kennedy in Amador Co.—2300 feet from the surface—is probably the "deepest" mine in California.

LORD RUSSELL, England's Chief Justice, last month publicly opposed the British "promoter," stating that in the past seven years "the winding up of British stock corporations has resulted in a loss to stockholders and creditors of \$140,000,000." Of this, probably one-twentieth was lost by connection with American schemes.

AT Temple Bar, Nevada, on the Colorado river, the company of hydraulic miners use coal brought from Kingman, Arizona, at an expense of \$28 per ton. A 30-in. pump draws water from the Colorado, which, carried 10 miles, is forced through a 6-in. nozzle, equaling 1000 in. through a 1-ft. aperture under a 165-foot head per minute.

THE capacity or power of an engine is the amount of work it can do irrespective of economy. A 22x36-in. steam engine, running 110 revolutions (660 ft. piston speed) per minute, has, at 80 lbs. initial pressure, a capacity of about 397 H. P.; but it is more economical, that is, uses less steam per H. P., when worked to from 225 to 342 H. P.

A CLOGGED STRAINER, broken or leaky water valves, a leak in the suction pipe, the water valves being stuck open or shut, the water being too hot for the lift, running the pump at such speed as to cause too much friction of water in the suction pipe—these are among the causes why a steam pipe will not work when the steam end is in good condition.

THE South Yuba Water Co. of Nevada county, Cal., has kept a record of the rainfall in that locality for many years. It shows that the precipitation in that county for 1898-99 up to November 29th has been 6.17 inches, the smallest for the past thirty-five years; the lowest previous rainfall was 17.28 inches in 1863-64. The record for 1897-98 was 30.15 inches. The greatest fall was 115.26 inches in 1867-68.

AT Anaconda, Montana, the Anaconda Co. has constructed three tunnels leading into large chambers which catch the fine dust, which is taken out of the chambers every day from the five flues. Each flue produces about 3000 tons of dust containing about 12 per cent copper. It is estimated that \$48,000 in copper is saved from each flue, aside from the gold and silver. After the fumes pass the long flues but little dust goes up the perpendicular stack.

REGARDING the Jacksonville, Or., query as to the size of pipe to carry 1000 miner's inches of water, with a total fall from inlet to outlet of 18 feet in a length of 600 feet, maximum depression of pipe below inlet being 40 feet: Assuming the miner's inch to be an inch under 6-inch pressure, the pipe should have a diameter of 21 inches (diameter being the inside diameter of small courses, or, if taper courses are used, then of the small end of each). The velocity of flow in the pipe will be about 11 feet per second, and suitable provision should be made to prevent the discharged water from cutting ditch banks.

GOLD ores may be divided into two classes: Those that yield up their gold entirely, or nearly so, to treatment with mercury and other methods; those too low grade for smelting and from which the gold cannot be extracted in any other way, or only in so partial a manner as to give no profitable results. The former are known as free gold or free milling ores; the latter are termed refractory or rebellious ores. In these, ingredients are found which act on the mercury or chemicals, preventing effect on the gold and silver it is sought to recover. Many of these ores are especially amenable to the cyanide process.

A SLUICE BOX 5 ft. wide, 32 in. deep, 14 ft. long, on a 5% grade, would easily run 2500 in. of water. It would cost about \$22.50. In its construction would be about 1500 ft. lumber and 25 lbs. nails. There would be 4 sills, each 4x6 in., 7 ft. long; 8 posts, 4x6 in., 3 ft. 2 in. long; 16 braces, each 1½x4 in., 2 ft. long; 2 top rails, 2x7 in., 14 ft. long; 3 bottom planks, 1½x20 in., 14 ft. long; 2 tongues, 1x½ in., 14 ft. long; 2 side planks, 1½x20 in., 14 ft. long; 2 more 1½x12 in., 14 ft. long; 9 riddle strips, 1½x3 in., 5 ft. long; 28 lineal ft. side lining (blocks 3x 20 in.); 28 lineal ft. bracing to hold down sluice, 4x6 in.; 27 blocks 17 in. sq., 13 in. deep.

DURING the year the U. S. Geological Survey has surveyed topographically 30,057 miles, making a total now completed of approximately one-fourth of the area of the entire country, exclusive of Alaska. The field surveys of Indian Territory were completed last June. This latter work has demonstrated that it is more economical to survey large areas in this manner than under the contract system heretofore employed by

the Government in land subdivision surveys. It is anticipated that the 60,000 square miles of forest reserves can be thoroughly and completely surveyed within five years when adequate appropriations are made.

THE amount of heat required to generate one pound of steam depends upon the temperature of the water and the pressure of the steam. The colder the water and the higher the pressure, the more heat required. To make a pound of steam at 212° F. from one pound of water at 32° F., takes three separate lots of heat, viz.: to raise the water from 32° to 212° takes 180.9 heat units; to make that water into steam at no pressure, 992.9 heat units; to raise that steam at no pressure to steam at the atmospheric pressure of about 14.7 pounds per square inch above vacuum, 72.3 heat units; total, 1146.1 heat units, equal to 883,789 foot-pounds of work.

IN California the See Yup and other big Chinese companies send their gold to China without anyone knowing what amount they are getting from the mines they are working, but many of the individual miners and small gangs of Chinese, who are still working about old placer diggings, send a portion of the gold they glean to the San Francisco mint. These roving "bedrock scrapers" work about eight months in the year in the mountains—from April to November—and the mint figures show receipts of \$40,000 a month from them. About \$30,000 a month additional from Chinese goes to the mint through Wells, Fargo & Co.'s express and the banks, a total of \$60,000 a month.

"THE development of the iron industry in the United States," says an Eastern writer, "seems simply marvelous when we consider that iron ore is mined in what is called the Lake Superior district, transported by railroad from 50 to 100 miles to the lake, transported thence by vessels over 800 miles to a lower lake port—and much of it from there to Pittsburg, and even Johnstown, by rail—manufactured into steel, and yet sold at the rate of three pounds for 2 cents. It is the most marvelous and wonderful change that has taken place in this country within the last century, and is as great an astonishment to those engaged in the trade as to anybody else. While the United States is a large producer of gold and silver, she is the largest producer and manufacturer of iron and steel in the world."

THE contract for 328 miles of pipe for Coolgardie, Australia, recently advertised in this journal, was given two Australians, one in Sidney, and one in Melbourne. Their proposition is to make the pipe of steel spirals packed in concrete. Sheet metal is cut into strips of the required width. These are fed into a machine and welded into one continuous strip. As the strip is fed into the machines rivet holes are punched; then the edges of the laps are brought together by machinery and held during the process of riveting, which is all done by compression. The lap is thrown on the outside of the pipe, rendering the inner surface smooth and even throughout its length. A hydraulic cement is packed around the laps to make the pipe water tight. The contractors will get the material in Pittsburg, Pa. The whole matter has been described before, a long technical account of the scheme appearing in the issues of March 12th and June 25th, '98.

BRITISH COLUMBIA seems at present well supplied with smelters. The smelter at Trail, owned and operated by the Canadian Pacific, has treated the Rossland ores exclusively. A lead stack is being added to the plant and the company is trying to get silver-lead ores in the Spokane country. The Pilot Bay, B. C., smelter, built to treat the output of the Blue Bell mines, a low-grade silver-lead output, has not been in operation for some time. It is understood to be now the property of the Omaha & Grant Smelting Co. The Hall Mines Co. smelter at Nelson was built by that company to treat the Silver King mine ore and is in continuous operation. The Le Roi Mining and Smelting Co. plant at Northport, Wash., is exclusively for the Le Roi ore. This company has passed into the hands of the British-American Corporation. A smelter was built in Spokane several years ago by men with a capital of \$1,000,000, but after its completion some dissatisfaction arose over the cost of construction and possible revenue, and the smelter was never "blown in."

ALUMINUM is now being used for electrical conduction. At the works of the National Electrolytic Company at Niagara Falls, N. Y., current is supplied by the Falls Power Company through aluminum cables. The current is started on its journey through bars, after which it is carried by cables. The bars are 25 feet long, 6 inches wide, and ¼ inch thick. Four are placed in parallel, and at every 25 feet they are bolted and riveted together. On reaching a given point the bars are connected up with twelve aluminum cables. These cables are about 1½ inches in diameter, made of No. 10 wire and covered with rubber insulation. In connecting the ends of the bars to the cables, castings which contain sockets are used. The ends of the cables are placed in the sockets, and melted tin is poured about them. In this installation about 22,000 pounds of aluminum are used, and it is estimated that the same work would require 48,000 pounds of copper. The conductivity of aluminum compared with copper of the same section is 63 to 64 per cent, and for the same weight more than double. Aluminum cables are also projected for the new electrical scheme at Snoqualmie Falls, Wash.

ANSWERING six separate inquiries as to placer locations: there is no prescribed "shape;" the individual location cannot exceed twenty acres in area, and the claim need only "conform as nearly as practicable with the U. S. system of public surveys and the subdivisions of such surveys;" two locators can jointly locate forty acres of placer ground, three, sixty, and so on up to eight locating 160 acres, which is the limit; one discovery of mineral is sufficient on any one twenty acres of the entire 160. The same rules as to development, etc., apply to placer as to lode claims, viz.: under the U. S. law "not less than \$100 worth of labor must be performed or improvements made thereon," until patented. Under the provisions of the Act of Congress approved January 22, 1890, the first annual expenditure becomes due and must be performed during the calendar year succeeding that in which the location was made. Expenditure made or labor performed prior to the first day of January succeeding the date of location will not be considered as a part of or applied upon the first annual expenditure required by law. The California State law requires that since May 26th, '97, on any California lode mining claims \$50 worth of work must be done within sixty days after posting the notice of location. A woman, married or single can locate and hold a mining claim. Under the U. S. statutes anyone locating a mining claim any time in '98 after Jan. 1st, '98, has until Dec. 31st, '99, to do the necessary \$100 worth of work or improvements.

The Mining Industry at Butte, Montana.

Written for the MINING AND SCIENTIFIC PRESS.

The city of Butte lies on the southern slope of a mountain spur, overlooking the valley of Silver Bow creek, which drains toward the Pacific. In the vicinity are barren buttes, from which the place derives its name. The center of the town is at an altitude of about 5500 feet above sea level. Continuing from the town to the summit or ridge, an additional height of about 2000 feet is reached. Between the town and the summit, trending east and west along parallel lodes, are the copper and silver mines whose productions have made Butte famous in the industrial world. The area encompassed in the district proper is about four by six miles.

Missoula gulch, starting in the western part of Butte, cuts northerly to the crest of the mountain, near the upper end of which are Centerville and Walkerville. Dublin gulch starts half a mile farther east, parallels Missoula, and breaks in a saddle between hills. At the eastern end of the main mountain spur, where Silver Bow creek comes in from the north, is Meaderville, commercially a part of Butte, where there are some relics of earlier days.

Butte is entered by the Oregon Short Line from the southwest; by the Butte, Anaconda & Pacific from the west; by the Northern Pacific from the east and northwest. A local terminal line traverses all portions of the slope and summit, reaching practically all the mines.

South and east of the city, in Silver Bow valley, are five smelters, each having a concentration mill in connection therewith, operated respectively by the Colorado Smelting and Mining Co., the Butte Reduction Works Co., the Parrot Smelting and Mining Co., the Butte & Boston Co., Montana Ore Purchasing Co. The great smelting works of the Anaconda Copper Mining Co. are at Anaconda, twenty-nine miles west of Butte. The extensive smelting and refining plant of the Boston & Montana Co. is located at Great Falls, on the Missouri river, 170 miles northeast of Butte. The affairs of the Butte & Boston and Boston & Montana are under one and the same management.

The first operations in this district were in the placer beds of Missoula gulch in 1864. At the head of this gulch the Alice mine was opened in 1877 and sold to Walker Bros. of Salt Lake City. Its production of silver, with some gold, has been continuous since that date. For a few years its product was phenomenal, and the town of Walkerville sprang up and teemed with prosperity. The Alice lode trends east and west, dipping toward the south, and is of good width. Its ores to the quantity of seventy-five tons per day are handled by the Alice Co.'s dry crushing, pan amalgamation mill. They contain much of the sulphurets, and by roasting after crushing the process of amalgamation is successful.

South of the Alice is the Lexington lode, which extends from Walkerville on the west to the Bell copper mine on the east. It was opened soon after the Alice and was sold to a French syndicate in the eighties. The Moulton, a parallel silver ledge, was opened about the same time. Farther west is the Blue Bird, which started operations in 1885 and up to 1892 produced about 2,000,000 ounces of silver. Thus the Alice, Lexington, Moulton and Blue Bird are mentioned as the prominent figures in what might be called the silver producing era of this district. Though much silver is still being produced in Butte district, the bulk of it is in connection with copper as a by-product.

South of the silver ledges above described, and running parallel with them in an east and west direction, are five distinct copper lodes, all bending slightly toward the south as they approach the east end of the spur near Meaderville. These are known as the Bell-Modoc, Syndicate, Anaconda, Colusa-Parrot and Intermediate lodes. The first-named includes the Bell, Modoc, High Ore and Speculator. The Syndicate takes in the Yellow Jacket, Moscow, Wake-up-Jim, Mountain Con. and Green Mountain. The Anaconda lode starts with the Never Sweat, passing on eastward through the Anaconda, St. Lawrence, Mountain View and Rarus, one mile in length. The Colusa-Parrot lode is opened on its course for two miles, beginning with the Gagnon on the west, proceeding eastward through the Parrot, Colusa-Parrot, Moonlight, Pennsylvania and Silver Bow, near Meaderville.

All the lodes named, both copper and silver, are in a granite formation, the gangue usually being quartz and feldspar.

The first copper discoveries were made in the Parrott, and the Colorado Smelting & Mining Co., in 1879, built the first plant to produce copper matte in Butte. They were soon followed, however, by the Parrot Smelting Co., which erected a plant in 1881.

The Colusa-Parrot mine was first worked for silver, which led to the opening up of its great copper bodies.

In the copper zone the lodes range from 50 to 200 feet wide, but often with rich stringers passing from one lode to another, and frequently the material between neighboring ledges is so well mineralized as to

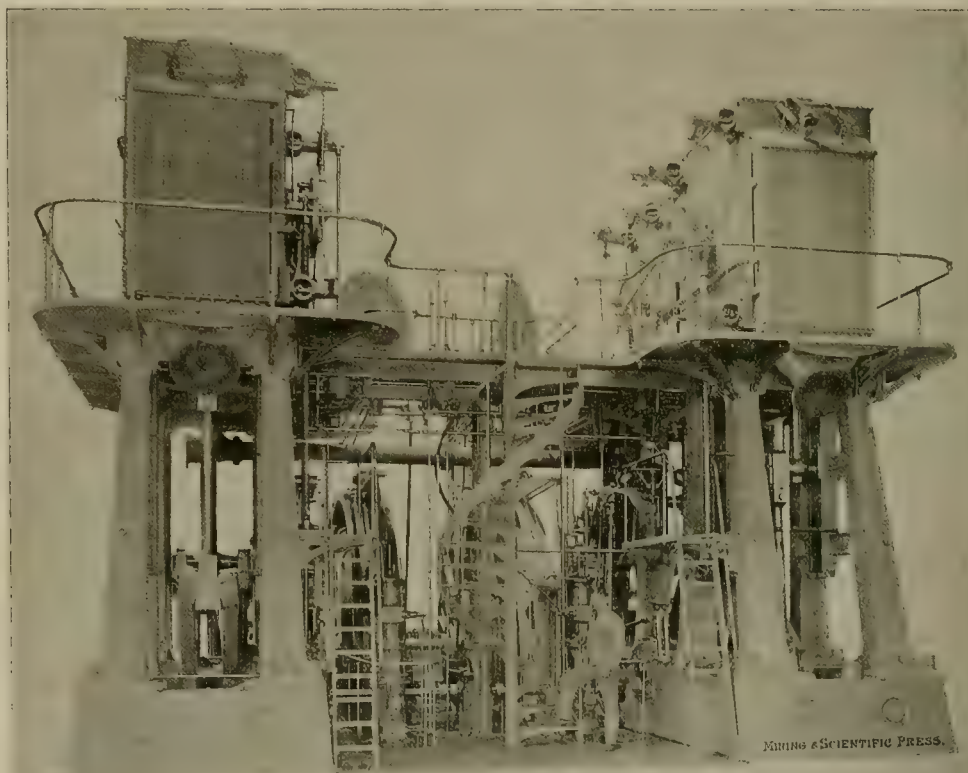
make it difficult to fix a boundary between them. This fact, it is claimed, has given rise to much of the pending litigation, the theory of the apex law opening the way, in such cases, for claiming indefinite lateral extensions of a lode.

The ores in the copper lodes are claimed to run from 4% to 60% copper and from 5 to 40 ozs. silver per ton. In the west end of the copper belt they are possibly more siliceous and better adapted to concentration than those coming from near Meaderville. In the copper mining operations the ores are separated in the mine into two classes, viz: high grade smelting ore and concentrating ore. The copper mines range in depth from 1000 to 1700 feet, and many of them have hoisting facilities to sink 3000 feet.

Mr. Chas. W. Goodale of the Boston & Montana smelter, in a paper on concentration of Butte ores, classifies them as follows: 1. Copper-silver ores, such as are produced by the Anaconda group, Mountain View, Colusa and Parrot. 2. Silver-copper ores, of which those produced by the Gagnon are examples. 3. Silver ores containing small amounts of gold, such as are produced by the Alice, Lexington and Nettie. In the first class he finds a high per cent of high-grade ore which can be smelted direct, though a considerable proportion is of a siliceous low-grade character, requiring concentration. In the ores from the Gagnon, which he puts in the second class, he finds nine-tenths of their tonnage

ings comprise eighty different claims. The Boston & Montana main shafts are the Mountain View, East and West Colusa, Pennsylvania and Leonard. The Butte & Boston operate the Silver Bow, East and West Gray Rock, Belle of Butte and Blue Jay. The Parrot Co. operate the Parrot, Stewart, Little Mina and Bellona. The Montana Ore Purchasing Co. operate the Glendary, Rarus and Mountain Chief. The Colorado Smelting & Mining Co. have the Gagnon, Nettie and others. Clark Bros., who operate the Butte Reduction Works, have the Original, Colusa-Parrot and others. To the Washoe Co. belong the J. I. C., Pauline, Washoe and Gold Hill.

Mechanical Equipment.—The mechanical equipment of the mines of the Butte district could properly form the subject of a separate article, but only a few brief notes thereon can be given herein: Taking up the Anaconda group, the Never Sweat shaft is equipped with a compound hoisting engine of the vertical type, fitted with two 26-inch high pressure and two 46-inch low pressure cylinders, each of 72-inch stroke. These engines operate skips holding ten tons of ore; the skip, ore and rope, weighing 40,000 pounds, are moved at the rate of 2400 feet per minute. Photographs of hoisting engines are enclosed, with photos of outside appearance of several mines. The engines mentioned were built by the Union Iron Works of San Francisco and are massive. I know of no larger or more powerful hoisting engines anywhere. The main valves of each engine are



THE "MODOC"—ONE OF TWO LARGE HOISTING ENGINES AT THE ANACONDA, MONTANA.

require amalgamation. Silver ores, such as come from the Alice, which he puts in the third class, he asserts, have not been concentrated with good results, because of the large per cent of silver bearing minerals being disseminated through the gangue in such minute particles that even the finest crushing does not liberate them from the quartz. These ores are treated by chloridizing-roasting and amalgamation, as at the Alice mill.

Mr. Goodale estimates the cost of concentration in Butte district to be 35 cents per ton in the plants of larger capacity, and \$1 per ton in those of smaller capacity. He places the average value of Butte concentrating ore at 7 per cent copper.

The Butte Reduction Works, consisting of smelter and concentration mill, is an interesting plant. Its concentration department, which has recently undergone complete remodeling, handles about 480 tons per twenty-four hours. Its ores come from the Colusa-Parrot, Original and Stewart, and the bulk of the tonnage is concentrated before smelting. This mill utilizes crushers, rolls, jigs and concentrators. The round tables are to be torn out. They have just commenced to regrind the jig tailings by means of Chili mills and ball grinders, the slimes from which are drawn through a system of tanks for sizing and settling, the residuum therefrom being passed over the concentrating tables.

Statistics at hand show that Butte district produces over 200,000,000 pounds of copper per annum, which is 50 per cent of the copper product of the United States and 30 per cent of the product of the world. Of the Butte product, the Anaconda Copper Mining Co. produces nearly one-half. Its principal mines are the Anaconda, St. Lawrence, Never Sweat, Mountain Con., Green Mountain, Wake-Up-Jim, Diamond, Bell, High Ore and Modoc. Its hold-

ings comprise eighty different claims. The Boston & Montana main shafts are the Mountain View, East and West Colusa, Pennsylvania and Leonard. The Butte & Boston operate the Silver Bow, East and West Gray Rock, Belle of Butte and Blue Jay. The Parrot Co. operate the Parrot, Stewart, Little Mina and Bellona. The Montana Ore Purchasing Co. operate the Glendary, Rarus and Mountain Chief. The Colorado Smelting & Mining Co. have the Gagnon, Nettie and others. Clark Bros., who operate the Butte Reduction Works, have the Original, Colusa-Parrot and others. To the Washoe Co. belong the J. I. C., Pauline, Washoe and Gold Hill.

The boilers at this shaft are five in number, 250 H. P. each; two others of same capacity are being put in. In addition to this there are now building six boilers of internal fire type, with two furnaces, shell of boiler 9 feet in diameter and 22 feet long. The new compressor here is of the Ingersoll-Sargeant make, has steam cylinders 30 and 56 inches diameter by 60-inch stroke, with air cylinders 30½ inches diameter. Another compressor of same diameter is being put in, to be ready to use soon. The compressor building being erected here is 116x81 feet; boiler house adjoining is 56x109 feet. These buildings are of structural steel frames, with brick curtains. A new steel gallow-frame is also being erected at the Never Sweat, same being 100 feet high, weighing 155 tons.

At the Anaconda shaft a new set of hoisting engines have just been installed. They are of the hori-

zontal type, fitted with cylinders 30 inches diameter by 72-inch stroke. A new steel gallows-frame has just been finished at this shaft. The St. Lawrence shaft is provided with hoisting facilities similar to those of the Anaconda. Two buildings of steel struc-

ers and a steel gallows-frame are being put in. This, like the others, is equipped to hoist from 3000 feet depth.

The air compressors of the Syndicate group have a capacity of about 25,000 cubic feet of air per

feet depth, has Riedler deferential plunger pump, with mechanically operated water valves.

The compressor room of the Boston & Montana group is an interesting feature. Its Nordberg compressor has triple expansion steam cylinders, with three-stage air cylinders. The first cylinder takes air at atmospheric pressure and compresses it to fourteen pounds per square inch; after leaving that cylinder it passes through an intercooler filled with copper tubes. Through these tubes cold water is circulated to reduce the temperature of the air. From the intercoolers the air passes to the intermediate air cylinder, where it is compressed to about thirty-five pounds per square inch. From there it passes through another intercooler to the high-pressure cylinder, which raises the working pressure to eighty pounds. This is claimed to be the only triple expansion air compressor in the district. It furnishes air for about seventy-five drills at the East and West Colusa, Pennsylvania, Leonard and Silver Bow. The high-pressure cylinder is steam-jacketed at boiler pressure of 150 pounds per square inch. The intermediate and low-pressure cylinders are jacketed with steam reduced by means of reducing valves. The inlet and discharge valves are operated by separate eccentrics, permitting a wide range of adjustment. The condensers consist of two Nordberg air pumps, each having capacity to handle the entire plant. The circulating pump is of the rotary type, being operated by a small engine.

At the Butte & Boston smelter, at Meaderville, four new converters, twenty-five tons capacity each, are being put in, making this plant, like others in the district, able to reduce the copper matte to bullion. A new steel frame building is being erected to enclose the converters.

The Precipitation Process.—Most of the copper mines of Butte district produce considerable quantities of water. In a few cases city water is turned into them to extinguish fires therein. The water comes in contact with the sulphide of copper ores, which, by the action of water, heat and air, is changed to a sulphate, the latter being soluble in water. The superfluous water, from whatever cause its presence in the mine is attributed, must be pumped out. In many cases, in which it is strongly impregnated with copper sulphate solution, the water is pumped to the surface into tanks filled with scrap iron. By adding common salt to the solution in these tanks the sulphuric acid therein is changed to muriatic acid, which, acting rapidly on the iron, converts it to a chloride solution, the pure copper being precipitated in its stead. This method of saving the copper, which was formerly lost in solution in the superfluous water from the mines, has become an important branch of the industry. The Anaconda Co. operates quite a plant by this method, while the B. & M. Co. leases the privilege to outside parties on a royalty. This method is said to have been first practically exemplified by a man "who was too lazy to work." He doesn't have to work much now.

Butte, Mont., Nov. 15th, '98.

WASCOTT.

Transference of Heat.

TO THE EDITOR:—A correspondent of *Nature* who is associated with the observatory at Toulouse calls attention to a singular phenomenon, the scientific explanation of which he seeks. Take a bar of iron in the hand by one end and plunge the other end in the fire, heating it strongly, but not so much that the hand cannot retain its hold. Then plunge the heated end in a pail of cold water. Immediately the end held by the hand becomes so hot that it is impossible to retain it in the fingers. This phenomenon, said by the correspondent to be familiar to workmen in iron, is ascribed by them to some repellent action which they suppose the sudden cold to exert upon the heat contained in the iron, which is thus driven to the opposite extremity.

An answer to the above seems simple. Heat is but a manifestation of motion; the more intense the motion the stronger the manifestation. The plunging of the iron into a cold medium intensifies or increases the motion, hence the observer's so termed phenomenon.

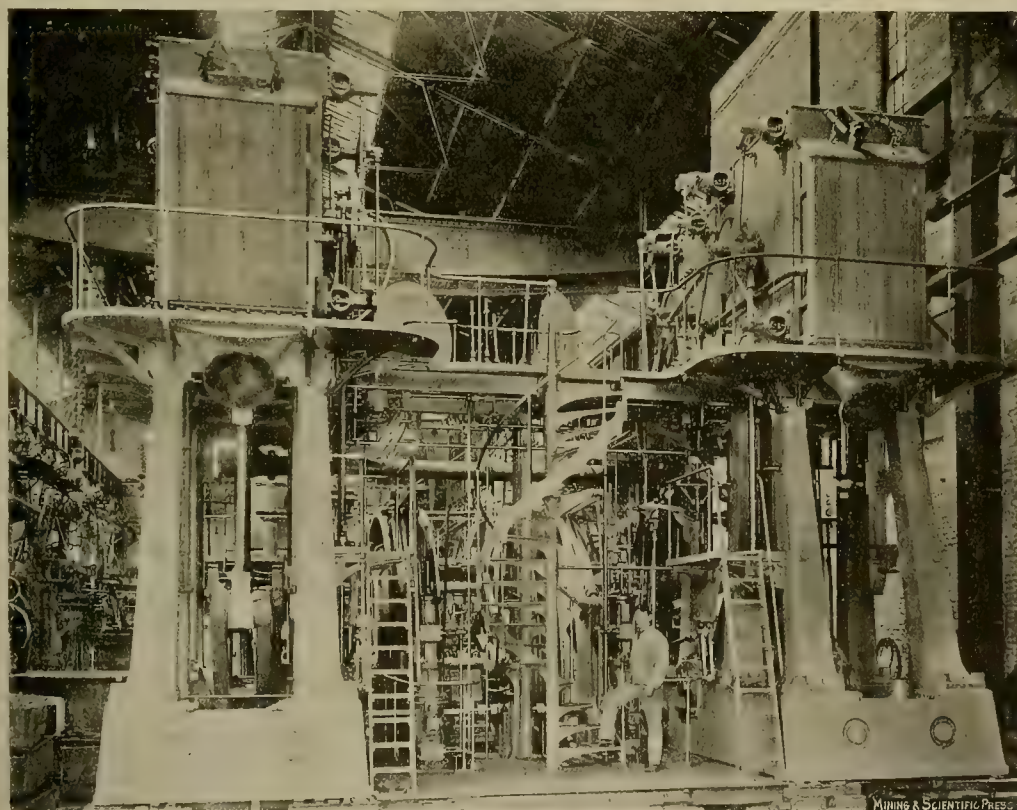
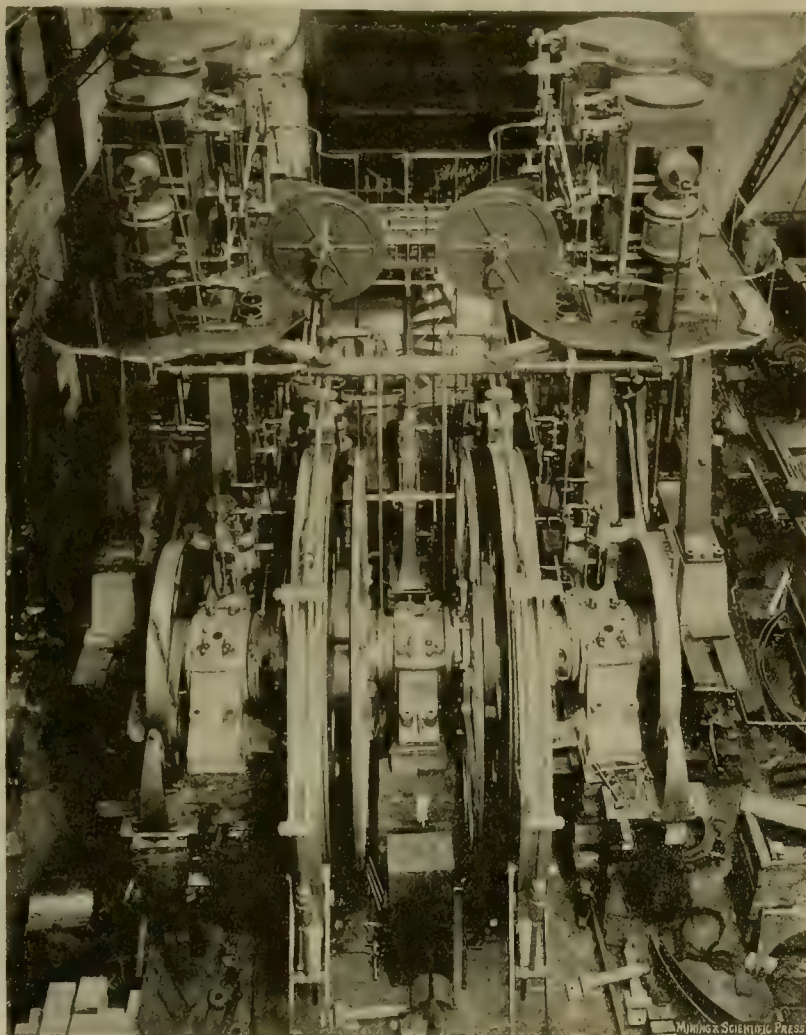
That there is violent motion involved in violent cooling is shown in the rearrangement of the particles of some metals by the act—for instance, the carbon in steel.

It may be suggested that there is an electrical condition involved or evolved, but as heat and electricity are convertible terms that does not change the determination at all.

As heat and cold are but comparative conditions, anything above ultimate cold being warm and anything below ultimate heat being cool, it can readily be perceived that any increased violent motion will manifest itself to our senses as heat.

Heat and cold not being entities, it is evident they do not exist but as recognized sensations, consequently they can hardly be conceived of as being engaged in combat in a mass of iron, as suggested above.

A determination of the question can be had by intensely heating a determined mass of metal to a determined degree of heat, and plunging into a determined mass of cooling medium of known capacity for heat, and observing if the cooling medium



THE "MODOC" AND THE "AZTEC," TWO OF THE LARGEST HOISTING ENGINES IN THE WORLD.

ture have just been completed for blacksmith and carpenter shops.

The same company's shafts in the Syndicate group, consisting of the High Ore, Bell, Diamond, Green Mountain and Mountain Con., are also well equipped with machinery. The High Ore has a 30x72-inch hoisting engine of same pattern as that of Anaconda and has a compressor of same type and dimensions as that of Never Sweat. At this shaft six new boil-

minute. The West Colusa shaft of the Boston & Montana Co. is three compartment, heavily timbered, each compartment being 9 feet by 5 feet 4 inches, in which are operated two-car, single-deck cages. Above the shaft is a steel gallows-frame 76 feet high. The hoisting engine is of the Nordberg type, 20x60 inches, direct acting, with steam brakes, clutches and reversing gear. It is high speed and almost noiseless. The same company's Leonard shaft, 700

manifests more heat than is due to the change of temperature of the metal mass. If it does, it will manifestly be due to the violent cooling.

CALIFORNIAN.

The International Date-Line.

Our acquisition of the Philippines, according to an agreement between the American and Spanish peace commissioners at Paris last Monday, stimulates the study of general geography, and persons to whom the Pacific ocean was formerly but a broad, uninteresting waste of water, will now become fairly familiar with the positions, resources, and strategic values of those islands, and conversant with cable routes, differences of longitude and time, ocean distances, and other matters that formerly attracted but slight attention. There is one point, however, upon which appears that there is something to be said.

Dewey's great battle at Manila was begun at about 5 o'clock in the morning, on May 1st, by Manila time; and the public press has frequently discussed the question of when the battle began, by New York time. Some of the articles have favored Sunday afternoon, May 1st, and some Monday afternoon, May 2d, others, correctly, have decided upon Saturday afternoon, April 30th. It is here proposed to establish the correctness of the Saturday date, and to give data which will enable the reader to compare any proposed New York date and hour with the corresponding date and hour upon most of the Pacific islands that are of any considerable present importance, and, approximately, with any San Francisco date.

First, it is necessary to recall the fact that at any given instant the local time at any given place west of New York is earlier than New York time by one hour for every 15° of longitude that lies between the two places. Thus when it is 4 o'clock p. m. by New York local time, it is 3 o'clock (local time) at a place 15° west of New York, 2 o'clock at a place 30° west, and so on. This is indicated by the figures at the bottom of the accompanying map of the world. (The longitude of New York is not precisely 75° west, but the map illustrates the point well enough for present purposes.) The fact that local time is one hour earlier for every 15° that we go westward is readily understood by the following reasoning: When the sun is just rising at New York, it will not have risen yet at any point due west of that place. That is, it will rise later at points that are to the westward. Suppose, now, that we wait precisely one hour. The sun will then be one hour high at New York, and there will be a place, somewhere to the west of New York, where it is just rising. Let us mark this new place, wherever it may be. Then, whatever the hour may be at New York, the local time at the spot so marked is one hour earlier. In the same way, let us select another place, farther yet to the westward, where the local time is one hour earlier still, and having marked this place, let us proceed in the same way until we have portioned out the entire twenty-four hours, and found twenty-four stations, such that between every two consecutive stations there is a difference in local time of one hour. The vertical lines on the map are spaced off in this way, as indicated by the figures at the bottom of each of them. There are 360° in every circle; and therefore when one goes entirely around the world along any one of the horizontal lines (which represent circles of latitude), he must pass through 360° of longitude. As there are twenty-four vertical lines, each one hour from its neighbors, it will be seen that the difference in longitude between any two of the twenty-four successive hour lines is $360^\circ \div 24 = 15^\circ$; showing that the local time is one hour earlier for every 15° that we travel to the westward.

It is now easy to compare the hours at any two places on the earth, by allowing one hour for every 15° difference of longitude between the two places, and remembering that the time grows earlier towards the west, and later towards the east. Thus Manila is approximately on the 120th meridian of east longitude (reckoning always from Greenwich, England); and hence when it is 5 o'clock, A. M., at Manila, it is approximately 4 o'clock, P. M., in New York. The figures at the bottom of the map show the hour for every 15° of longitude, throughout the world, when it is 5 o'clock A. M., at Manila. The relations of longitude and the local hour are so simple, that it may seem strange that any question should arise about the New York time of Dewey's fight; but it will be observed that thus far we have only discussed the hour on each meridian, and the fact is, that it is not the hour that gives rise to the numerous discussions that have been held, but the day. It is generally admitted that the fight began at 4 o'clock in the afternoon, by New York time, and the only question at issue is, whether Sunday at Manila corresponds to Saturday, Sunday, or Monday in New York.

To clear up this matter, let us imagine a traveler

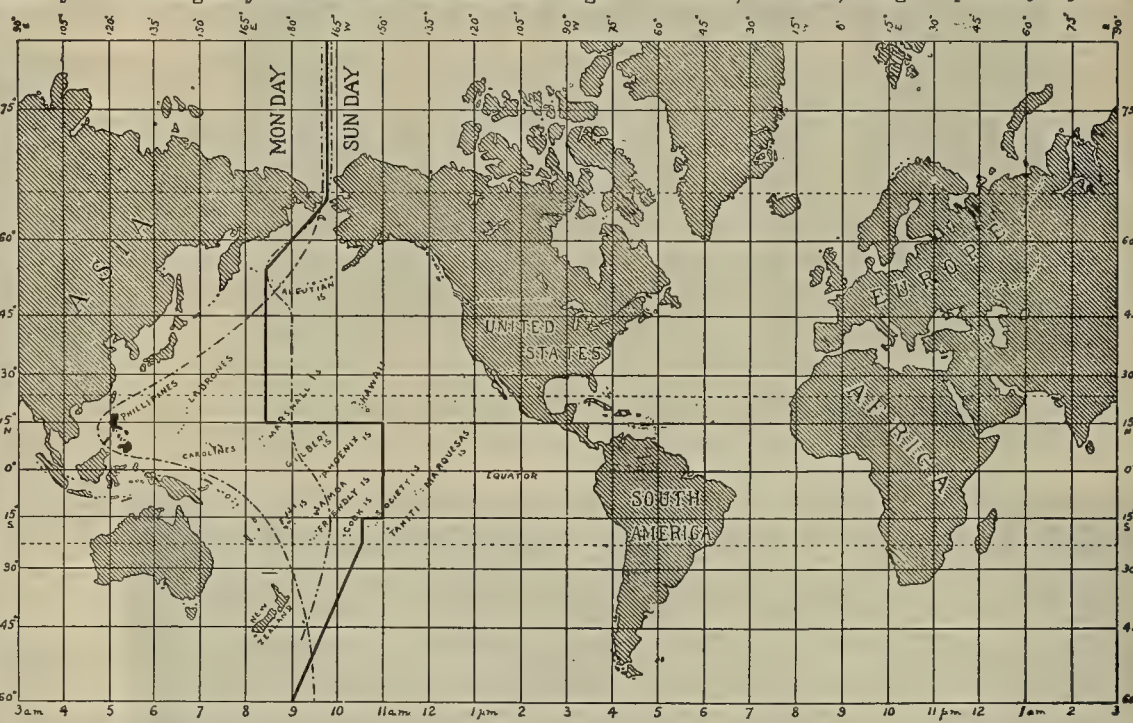
journeying to the westward. Let us suppose that he leaves New York at noon on Sunday, and let us suppose, further, that he travels just as fast as the earth turns on its axis, so that he follows the sun in its apparent westward progress with such precision that he always keeps it directly south of him. It will be noon, therefore, at every place he passes. Suppose, now, that he asks, at every point of his journey, what day of the week it is. Leaving New York on Sunday noon, he will be told, in Jersey City, that it is Sunday. At Pittsburgh he will also be told that it is Sunday. At Chicago they will answer "Sunday," and the reply will be the same at Omaha, Denver, and San Francisco. Even away out in the Pacific, at Hawaii, they will still tell him, as he passes through the islands, that it is Sunday noon. But this thing will not be kept up indefinitely, because when he has gone all the way around, and has returned to New York, he will have been gone twenty-four hours, and the New Yorkers will insist that it is Monday noon. Everywhere in Europe, too, he would have been told that it is Monday noon. Yet it has always been the same day to him. The sun will have been always due south, and everybody that he has met will have admitted that it is noon. There must be some place on the journey where he will be told, for the first time, that it is Monday noon, instead of Sunday noon. At this place, if he wishes to be in accord with people that he meets, he must arbitrarily change the name of his day from Sunday to Monday. To a landsman this arbitrary change in the date is strange and confusing; but the mariner who sails the Pacific ocean grows accustomed to it, so that for him it loses its strangeness.

Our imaginary traveler would find that the change

is given on page 120 in the popular edition of a school geography. This line, reproduced herewith, comes down through Bering's strait, sweeps away to the westward so as to just pass to the westward of the Philippines, and then returns, in a southeasterly curve, so as to pass south, just to the eastward of New Zealand.

The line just described was intended to separate the islands that were colonized from the east from those that were colonized from the west. Since this line was published, however, new information concerning the early history of the Pacific islands has become accessible, and one is now able to draw a line which effects the separation a little more accurately. If drawn strictly according to historical principles, the date line should cut across North America, following the line that now separates Alaska from Canada; for Alaska was first colonized by the Russians, who brought with them the Russian date. When American settlers moved there, they carried with them the date of the United States, and this led to some confusion. The difference in the dates was rendered of less importance, however, by the fact that Russians still use the Julian calendar, and hence their dates do not agree with those of other countries, under any circumstances. The only practical difficulty that the double origin of the settlers introduced, was that the Sunday of the Americans was the Monday of the Russians. When Alaska was purchased from Russia, in 1867, the date in use there was made to conform to that used in the United States; so that at present, there is a uniform practice regarding dates, throughout the continent of North America.

This line, however, though it probably separates



MAP OF THE WORLD, SHOWING THE INTERNATIONAL DATE-LINE, ACCORDING TO VARIOUS AUTHORITIES.

in his day would come somewhere between North America and Asia; but when we come to ask more precisely where the change would take place, we find that there is some difficulty in deciding; and it is this difficulty, in all probability, which has led to most of the disputes about the New York date of Dewey's victory.

Mariners are in the habit of changing the date arbitrarily, upon crossing the 180th meridian from Greenwich, England; but this fact is of no service to us, if we wish to compare the date of one of the Pacific islands with the corresponding date at New York, since the mariners pay no attention to the local dates on the islands that they pass. The ideal way to find out where the date actually does change would be, to canvass the entire Pacific ocean, so as to find out what date is actually in use on every one of the islands, when it is (say) noon on the 180th meridian of a certain day at a particular place. A line drawn from pole to pole in such a manner as to keep all islands bearing one date on one side, and all islands bearing the other date on the other side, would afford us a perfectly definite basis for the comparison of dates. Such a line is called the "International Date Line." The Hydrographic Office of the U. S. Navy Department says that "no information concerning the actual date in local use on each of the Pacific islands has as yet been collected and published, in such authoritative form as to be entitled to entire confidence. As a general rule, it may be said that the date will probably be found in use, at the different islands or groups, which results from the one carried there by the first European or American colonists, and which, therefore, must be a different one according as the colonists came from the east or west."

A line drawn, presumably, from data of this kind,

with some degree of accuracy the islands that were colonized or discovered from the east and west respectively, does not represent the present course of the true "international date-line," where the day changes as we pass from island to island. The actual present date-line passes to the eastward of the Philippine islands, for example, as will be seen by the following bit of history. The Philippines were discovered by Magellan, in 1521, and Manila, the chief city, was found by Legaspi just fifty years later, in 1571. Magellan sailed around Cape Horn, bringing his date from the east. After the islands were colonized, too, they kept the same date as the Spanish possessions on the opposite side of the Pacific; and this condition of matters prevailed until nearly the middle of the present century. The Philippines having then come into commercial relations with neighboring countries and islands to which the date had been brought by way of Cape of Good Hope, it was found to be inconvenient to retain the date that had been brought from South America. Accordingly, under date of August 16, 1844, Narciso Claveria, who was then Governor-General of the Philippine Islands, issued a proclamation in which he decreed that, "considering it convenient that the mode of reckoning days in these islands shall be uniform with that prevailing in Europe, China, and other countries situated to the east of the Cape of Good Hope, I ordain, with the consent of his Excellency the Archbishop, that, for this year only, Tuesday, December 31st, be suppressed, and that the day following Monday, the 30th of the same month, be styled Wednesday, January 1, 1845." This proclamation, having the sanction of both the civil and ecclesiastical authorities of the islands, was effective; and the date now used on the Philippine islands agrees with that prevailing at Hong

Kong and other Asiatic ports to which the date was carried by way of Cape of Good Hope. This places the Philippines to the west of the present date line. The Hydrographic Office states that "the Mariana or Ladrone islands, which are under the political government of the Philippines, may also be safely placed as west of the date line, but some doubt is felt as to the date in the Caroline islands, although this group, being mainly under Spanish rule, probably carries the same date as the Philippines. The Fiji islands are reported to carry the same date as Australia."

Recent editions of geographies take account of these facts, the date-line being shown as following the 180th meridian more closely; passing through Bering strait and sea, leaving all the Aleutian islands to the east, and joining the 180th meridian just south of that chain. It leaves the meridian of 180° again just north of the equator, and after passing to the east of Samoa, Tonga, and Chatham islands, which use the same date as Australia, it joins the meridian of 180° again in about 45° south latitude. This line is shown on the accompanying map, and is nearly correct.

Finally, Professor William Harkness, Director of the United States Naval Observatory, gives the course of the date-line as follows: "Starting in the Arctic ocean, along the 169th degree of west longitude from Greenwich, to latitude 65° north; thence to a point in latitude 55° north, longitude 172° east; thence along longitude 172° east to latitude 15° north; thence along latitude 15° north to longitude 150° west; thence along longitude 150° west to latitude 15° south; thence along latitude 15° south to longitude 156° west; thence along longitude 156° west to latitude 23° south; thence to a point in latitude 60° south, longitude 180°; and thence along longitude 180° to the south pole." The line so defined is shown full and black in the accompanying map.

A few words more will make the use of the date-line clear. Manila is in longitude 120° east (its exact position is latitude 14° 36' north, longitude 120° 52' east). When it is 5 o'clock, Sunday morning, at Manila, it is 8 o'clock, Sunday morning, in longitude 165° east, as will be seen by the map. If we continue to go east, we shall find that when we reach longitude 135° west, that the hour will be 12 o'clock, noon; but the name of the day must be changed from Sunday to Saturday, since we have crossed the black date-line; and in crossing the date-line going east, we must go back one day in our date. Therefore, although our journey from Manila has been instantaneous, and we have not seen the sun either rise or set, we must call the time Sunday noon when we reach longitude 135° west. From this longitude eastward to New York we do not cross the date-line again, so we merely add one hour to the time of day, or every 15° of longitude that we cover. New York does not use her own local time, having substituted for it, "standard time," which in her case is the local time of the 75th meridian. Following eastward to longitude 75° west, and adding one hour to the time for every 15° of longitude traversed, we find that it is 4 o'clock Saturday afternoon, by New York time, when it is 5 o'clock Sunday morning, by Manila time. Hence Dewey's battle began at 4 P. M., on Saturday, April 30th, by New York time. In order to verify this result, let us continue eastward from New York until we reach Manila again. Adding one hour to the time for every 15° of longitude; we find that it is 11 o'clock, Saturday night, when we reach longitude 30° east; midnight, Saturday night, at longitude 45° east; 1 o'clock Sunday morning at longitude 60° east; and so on, until we reach Manila, in longitude 120° east, where we find that it is 5 o'clock Sunday morning, which verifies our work. In going from New York eastward to Manila we do not make any sudden change in the date, because we do not cross the date-line.

A few examples may make the use of the date-line clearer. (The full, black line of the Naval Observatory is to be taken as the true date-line in these examples.) (1) When it is 4 o'clock Wednesday morning at a place on the equator in longitude 135° west, it is 1 o'clock Thursday morning at the point whose latitude is 30° south, and whose longitude is 80°. (2) When it is Friday at 4:30 P. M. in latitude 45° south and longitude 165° west, it is also Friday at 4:30 P. M. in latitude 30° north and longitude 165° west. (3) When it is Tuesday at 11 o'clock P. M. in latitude 14° north and longitude 179° east, it is Tuesday at 1 o'clock A. M. in latitude 16° north and longitude 151° west. A very curious fact that the date-line suggests is: if the heavy black date-line is correct, then from 5 o'clock A. M. to 7:32 A. M., New York time, there are three different days in use in the world. For example, from 5 A. M. to 7:32 A. M., New York time (i. e. 75th meridian time), on Thursday morning, it is Thursday throughout most of the world; but there is one region where it is Wednesday, and another region where it is Friday. The reader can prove this fact, and locate the regions, he will have a pretty clear understanding of what the date-line is.

Cleaning Mercury.

TO THE EDITOR:—In the issue of the 19th inst., under the heading of "Temperature of Battery Water," an incidental mention is made of the use of

acid and cyanide of potassium in cleaning mercury, with which I make no issue, but wish to say to inexperienced millmen, be very cautious and discreet in your treatment of mercury, and even more, of your plates, with acids and cyanides. I believe it to be a too common practice to give the plates a free bath of one or the other of these chemicals, without after using anything to neutralize their effects; consequently their surfaces are left saturated with it, resulting in the rising of a copper film for days, imperfect amalgamation and loss of gold. I believe it would have been almost better for mine owners if the virtues of acid and cyanide in relation to mercury had never been determined. The caution cannot be too often or too emphatically reiterated.

Nov. 29th, '98.

CALIFORNIA.

The Refining of Base Lead Bullion Containing Silver, and High in Gold.*

NUMBER V.

By G. H. BLAKEMORE.

Retorting the Alloy.—In some refineries the Tatham retort furnace is used, in others the Brodie. I have worked the Du Faur tilting retort furnaces, and for easy handling these furnaces are far and away ahead of the others. A few improvements can be made on the Du Faur furnace as shown in text books on lead. For instance, the worm gear for revolving them can be left out altogether as it is a nuisance, and the arm of 1½ flat iron projecting some 6 inches, riveted onto the side of the furnace instead. When the furnace has to be revolved, a piece of 1½-inch pipe 3½ feet long, slightly flattened at one end, is slipped over the 1½-inch arm, and the leverage so obtained enables the workman to tilt the furnace with the greatest ease and steadiness, so that as little as a spoonful might be poured out of the retort. Another improvement is to connect all the grate bars to a lever, so that by a backward and forward movement of the lever the grate bars all work together, allowing the ashes to fall through. This lightens the work on the men and an occasional shake on the lever keeps the grate clean and bright.

Six furnaces, capable of taking a Class 409 Battersea retort, will handle all the alloy made in a plant treating 150 tons of silver-gold-lead weekly. Each retort will take 560 pounds of alloy. They cost about 50s. each in London. Their life is very variable. Eight retorts taken at random lasted as follows: 35, 8, 23, 23, 18, 24, 22, 21 charges. Leaving out the low one the average is roundly 24½ charges each, which is about the usual figure obtained in refinery works.

Work on the Retorts.—When the retort is hot enough the charge of alloy is weighed out and as much as the retort will hold is shoveled into it. In half an hour or so the charge in the retort sinks down considerably and more of the remaining portion of the charge is put in, until at last the whole of it has been shoveled into the retort. A small shovelful of coal is put into the retort on top of the alloy and the condenser is then slung to the furnace by its chain and luted up over the neck of the retort. The fire is then urged on to heat up the retort as rapidly as possible.

The condenser is made of ½ thick iron plate bent to form a round pipe about 10 or 11 inches in diameter and about 18 inches long. A bottom (with a 1 to 1½ inch hole, 2½ inches to its center from the edge) is riveted on. The open end is cut diagonally, so that when it is slung over the neck of the retort, which projects out of the furnace, the diagonally cut edge will be flat up against the vertical face of the furnace, so giving the retort a drop out of the horizontal line of about 9 inches. The bottom of the retort has a staple riveted on it to allow a chain of iron, with a ring at each end, to pass under it. The rings hook onto lugs on the furnace and in this manner the condenser is supported. A thin lining of lime-clay and cement composition is rammed around a wooden centerpiece and when this is withdrawn it leaves the lining about 1½ inches thick in the condenser. On the top side of the condenser are two more 1-inch circular holes, the one nearest the top being so placed that a rod can be passed through into the inside of the retort. The other one is near the lower end of the top side. In work, the hole for trying the retort and the tap hole on the flat end of the retort are plugged with a piece of fireclay, the other one is left open for the zinc vapors to escape. Sometimes an explosion takes place and the condenser is blown off. The heat is an important matter in distilling the zinc; the higher it is the quicker the work and the more zinc obtained. In about an hour or so after the condenser has been luted on, the flame from the vent hole changes in color to the peculiar greenish tinge of burning zinc, showing that the distillation and condensation of zinc has commenced. It takes from ten to sixteen hours to finish a charge, some alloys working much better than others, or it may be that the workmen let the heat fall during the operation, although they can never be caught at it. At intervals the tap hole is opened and the zinc runs out into moulds. The quantity produced is very variable; more zinc is always obtained from silver crust alloy than from gold crust alloy. When at last no more zinc is forming in the condenser (the appearance of the vent hole shows this) it is removed and

the lead is then poured out direct into moulds that stand on trucks, by tilting the furnace. A small shovelful of coal is thrown into the retort to prevent oxidation of any lead left behind, for the litharge thus formed would soon eat holes in the retort. If it is possible to do it easily, it is advisable to partly turn the retort after every half a dozen charges to change the line at which the lead stands, because the retort is usually eaten through at the line of the melted charge.

Everything produced is sampled, usually to know how the work is proceeding. The zinc obtained is used over again in the desilverization of fresh charges of softened bullion. If a refinery is being run on the lines of producing silver bullion without parting, and only a small amount of dore bullion, it is advisable to use the retort zinc only when zinging for gold. Otherwise the zinc made by retorts working on gold alloy, and that from the silver alloy retorts, is sure to be mixed by the men and as there are always small traces of gold in zinc from the gold alloy retorts, it will contaminate the silver crust made and of course will prevent making silver free from gold.

In addition to the bullion and dross produced by the retorts, there is made a variable quantity of zinc powder more or less high in silver and gold. Mixed through it is quite a considerable amount of scrap metallic zinc and this is recovered by sieving the powder through a No. 12 sieve. The scraps can be melted up in an iron pot and cast into bars for use again. The powder which goes through the sieve is bagged up to save loss and sent to the blast furnaces, and used on the charge in small quantities at a time.

The following assays will serve to give an idea of the value of the retort bullion, with retort dross and zinc powder per ton produced from the same charge, each line representing a complete charge:

| Retort Bullion. | | Retort Dross. | | Zinc Powder. | |
|-----------------|----------|---------------|----------|--------------|----------|
| Ag. Ozs. | Au. Ozs. | Ag. Ozs. | Au. Ozs. | Ag. Ozs. | Au. Ozs. |
| 1860.9 | 243.6 | 1923.40 | 141.3 | 7.32 | 0.04 |
| 2533.2 | 304.0 | 1866.40 | 168.8 | 20.52 | 1.84 |
| 2621.0 | 155.7 | 2343.90 | 416.2 | 15.32 | 1.02 |
| 2418.9 | 182.5 | 1875.66 | 183.6 | 1.18 | trace. |
| 2592.0 | 96.0 | 1044.1 | 205.2 | 20.78 | 2.74 |
| 3866.7 | 371.1 | 1367.9 | 141.7 | 2.18 | trace. |
| 2033.8 | 182.1 | 1601.1 | 241.85 | 5.47 | trace. |
| 2702.2 | 450.0 | 2074.25 | 347.85 | 332.21 | 52.24 |
| 3119.9 | 483.3 | 1579.15 | 236.05 | 6.89 | 0.59 |

The zinc powder in No. 8 is very high both in silver and gold, probably due to some of the rich bullion having run over into the condenser.

The following figures are based on 475 retort charges and show the average weight of the different products produced per charge:

| Charge Weight, Lbs. | Bullion Produced, Lbs. | Zinc Produced, Lbs. | Dross Produced, Lbs. | Zinc Powder, Lbs. | Coke Consumed, Lbs. |
|---------------------|------------------------|---------------------|----------------------|-------------------|---------------------|
| 552 | 423 | 48.09 | 61.40 | 21.20 | 506 |

The amount of zinc recovered is usually about 60 per cent of the virgin zinc originally used.

(To be Continued.)

Tunnel Rights.

One who locates and prospects by a tunnel, under the Colorado act, has a right to 1500 feet along an undiscovered "blind" vein or lode discovered in the tunnel for a distance of 3000 feet from the surface of the tunnel. His right dates from the location of or the commencement of work upon his tunnel, and is contingent upon his prosecuting his work with reasonable diligence. If a claim is located along the line of the tunnel, the surface locator has the right to all veins, lodes and ledges within the lines of his location as against the tunnel owner to the same extent as he has against a subsequent surface locator; that is, a surface locator by virtue of his discovery of mineral in place in a vein, has thereby the right to locate so much of the surface ground and to obtain a patent thereto; by this right he also becomes possessed of all veins, lodes and ledges whose apexes are within the said lines of his claim extended downward vertically, and this whether these veins are what are called "blind" lodes or whether they appear at the surface. If his discoveries are prior in point of time to the location of the tunnel or the commencement of work thereon, he has this right, although these lodes or veins may be within the line of the tunnel and be subsequently found therein. This point was not raised in the case of the Enterprise Mining Co. vs. the Rico-Aspen Co., recently decided in the Supreme Court of the United States. The point there decided was as to the title or right of possession to a blind vein discovered within the said lines of a surface location made subsequent in point of time to the location of the tunnel, the vein being a "blind" one or one not appearing at the surface and being subsequently found in the tunnel. The court, under this state of facts, decided that the tunnel owner was entitled to the vein, and that he did not need to adverse the surface man when the latter applied for a patent, if at the time he had not discovered the vein in his tunnel.

*Australasian Institute Mining Engineers.

Temperature of Battery Water.

TO THE EDITOR:—In the issue of Nov. 19th I note an article on the above subject, that induces me to give my experience in the matter. I have worked ores and operated the milling of gold-bearing quartz for the past forty years in all climes, hot and cold, and invariably found that when the battery water was below 50° it had to be heated to obtain best results in the saving of gold. I found that when quicksilver was fed into the mortars, the water being at a low temperature, the cohesive power of the quicksilver was lost to a perceptible degree, hence it became a poor medium for gold saving, more especially if the rock contained even a small percentage of pyritic matter, which assisted materially the non-cohesive action of the quicksilver, and, by the trituration of the stamps into cold water, becoming subdivided into minute globules, its natural affinity impaired, these globules escaped from the plates and were lost. This was shown by assay of tailings and slimes. By heating the battery water to a temperature of not less than 80° or more than 90°, the quicksilver became normal, lost none of its cohesive power, but was considerably increased and active. Then the maximum saving of gold was attained. The inside plates did not scour, but retained 75 to 80 per cent of gold in the mortars: but care had to be exercised that the amalgam was not allowed to get too thin. By carefully watching the outside plates, the quicksilver could be easily regulated, and less used—requiring less, being so much more active in its warm state than when used with cold water. I would never permit the use of any nitric acid on the plates, even in its most diluted form, as it has too ready an affinity for silvered plates, which creates a nitrate of silver in weak form; but the action is sufficient to cause oxidation, rendering them inert and destroying their gold-saving property. A weak solution of potash or cyanide is well enough, used with care and sprinkled lightly over the plates, rubbed up with a soft, new shoe-brush, but always used from below upwards. If in good condition, the plates will show the marks of the brush hairs, giving a slightly corrugated appearance.

W. FRANK DRAKE, E. M.
Sonora, California.

Making White Lead by Electricity.

To the Editor of *Electrical Review*: Referring to your publication of a notice on "The Manufacture of White Lead by Means of Electricity," in your issue of Nov. 2, page 280, I beg to call your attention to the fact that a process has been patented lately in the United States which produces a white lead of superior quality by means of electricity. A small plant is now in operation in Brooklyn, by which between five and six pounds of white lead are produced per hour. The process employs a solution of ammonium nitrate and bicarbonate, and produces two pounds of white lead per electrical horse-power hour. The product is perfectly white, and has a body and covering capacity equal to the best quality in the market. The process is continuous, and requires no interruptions for the removal of the product. The cost of operation depends exclusively on the cost of electrical energy, the electrolyte being continuously regenerated. This process has the advantage as against the process mentioned in your paper that the ammonium salts used prevent the formation of plumbites and plumbates, which, on being reduced on the cathodes to spongy metallic lead, waste electrical energy, besides spoiling the product.

L. P. C.
New York, Nov. 10th, '98.

THE cost of bringing a car of machinery by rail from New York to the Pacific coast is \$1.25 per hundred. The same carload can be sent from New York to China for \$1.15.

ACCORDING to careful estimates three hours of close study wear out the body more than a whole day of hard physical exertion.

Railroad Contractors' Car.

The heavy railroad contractors' car shown in the accompanying illustration is built to stand the hardest kind of service, and its makers—the Gates

the Jeffrey Mfg. Co. that a belt, in order to withstand severe usage, should possess not only strength, but also be of a composition to resist the abrasive character of the materials handled. In the Century belt plies of extra heavy

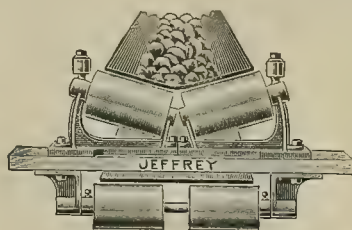


RAILROAD CONTRACTORS' CAR.

Iron Works, Chicago, Ill.—say it has given universal satisfaction. The illustrations graphically portray its use and purpose. It weighs 8280 lbs. Its general specifications are as follows: Standard gauge, wheels 24" diameter, length of box 9' 6", width of box 8', depth 2'. For railroad quarry or open-cut work it is of material service.

Century Conveyor Belt.

The Century conveyor belt, herewith illustrated, has been brought out by the Jeffrey Mfg. Co. of Columbus, Ohio,



CENTURY CONVEYOR BELT.

for their special use in conveying materials of various kinds, particularly for handling gritty and abrasive material, such as ores, broken stone, gravel, sand and the like. It has been demonstrated in every-day practice of

carrying surface reinforced to any thickness that the work requires. For prices and further information address the Jeffrey Mfg. Co. at its main office and works, Columbus, Ohio, or at any of its branches.

Brake for Mining Cage Hoist.

An improved form of brake for mining cage hoist has been recently tried on the Cabitza shaft of the Malfidano mines. The brake is purely mechanical and of simple construction. A rope is attached to a rod, which is guided by a stirrup attached to the cage. A spiral spring surrounds part of the rod. In connection with this spring two sets of brake bars are operated, arranged at right angles to one another. Each consists of a central part, and at each end there is a jointed limb. The limbs of the one set form straight bars, those of the other, forks. These limbs can engage under certain conditions, the first set with the guide rails of the cage, the second with the horizontal beams of the shaft structure. As long as the rope is holding the cage the spring is under tension, and the limbs mentioned are bent down so they clear the obstacles. When the rope breaks the weight of the cage straightens the brake bars, so that the central part and the limbs form in each case a straight line. The limbs will then press against the guide rails and prevent the rapid descent, and the forks will come to rest on the horizontal beams which are placed about 5 feet apart.

A RECENT TRAVELER among the Indians of Catuquinarn, in the Amazon region, between the rivers Embyria and Embyrasu, says they employ a wireless telephone. It is made by digging a hole in the ground inside the house and laying the bottom with coarse sand well piled. On this is laid a wooden drum, or hollow cylinder of wood, half filled with fine sand and layers of broken wood, bone and powdered mica. The upper part of the cylinder, which is empty, rises above the floor of the hut, and is closed by leather, then wood and lastly india rubber. Outside the cylinder is packed round with fragments of wood, leather and rosins, which are covered with hard rubber at the level of the soil. To use the apparatus the drum is struck by a wooden hammer, and the vibration is evidently transmitted through the soil. The answer is heard in the drum, which acts as a resonance chamber. Messages can thus be sent over 1500 yards from house to house.

SUPERINTENDENT C. A. Boyd, of the Walker Manufacturing Company, is reported in the Cleveland, Ohio, *Press* as saying: "Electricity will completely supplant steam as a motive power in less than ten years. We are to-day building electrical power devices that two years ago were not conceived. If the knowledge of electricity and new methods of using this mysterious power advances in the next decade as it has done in the last, steam locomotives and factories operated by steam power will be curiosities."

THERE is a scheme on foot for the improvement of Table Bay harbor, Cape Colony, which will involve ten years time in the completion of the engineering work, and will require an expenditure of \$25,000,000, approximately. The project provides for the enlarging of the dock, increased graving dock accommodation and a hydraulic plant for the landing of coal. The harbor, when completed, will embrace 208 acres; it will have five jetties, three of them 1800 feet long and two 1000 feet long.

AN invention has been devised by which photographs may be taken under water. The light is furnished by an incandescent lamp in a steel case in the diver's headpiece, the luminous rays being protected by a reflector placed in the rear of the steel case, and the electricity provided by a small dynamo carried in the boat above. The photographic apparatus consists of a common camera within an india rubber envelope, its front glass. The machine is regulated and pictures taken by pressing buttons through the india rubber covering. It has been thus demonstrated that pictures can be taken under water of objects at a distance of 10 or 12 feet.

Mining Summary.

ALASKA.

The last monthly report of the Alaska-Treadwell mine shows 22,000 tons ore crushed and \$59,314 in bullion. Ore averaged \$2.70 per ton. There were 425 tons sulphurets treated, yielding \$30,981, included in the total. Expenses for the month were about \$31,000.

On Nov. 14th at the Alaska United gold mill 120 stamps began operation; another mill of 100 stamps will be completed in April and the Alaska-Treadwell mill of 300 stamps will be running in May, and 880 stamps will be dropping within a radius of a mile and a half. They will make 1800 tons of sulphurets per month. These mills are all on the same ledge, which in one place on the Treadwell ground is 416 feet wide. They are down in the deepest place only 420 feet.

Juneau Miner: The Apollo mine of the A. C. Co. at Unger gives occupation to 150 people. For eight years work has been conducted in this mine. Between \$30,000 and \$40,000 is produced by the 40-stamp mill every month. The concentrates, which average \$40 per ton, are shipped to San Francisco for treatment.

Another promising mine is the Sitka, one mile from the Apollo, supposed to be on the same ledge. Extensive development work has recently been carried on at this property and it is contemplated to build another mill shortly. All the gold, 90 per cent or more, heretofore credited to Cook Inlet, was taken from the placers along the streams emptying into Turnagain Arm, one of the headwaters of the Inlet. Several claim owners on this creek have daily cleanups.

On Six-mile hydraulic operations will begin early next season; the plant is already on the ground. Resurrection creek has been worked for several seasons, but very little prospecting has been done further up the creek than seven miles. The gold on this creek is fine and quicksilver is necessary to save it. The average output per day to the man on it is perhaps about \$3.50. Across the arm a company of Californians are making extensive preparations for hydraulic mining. In addition to placer mining, some work has been done on quartz prospects in different parts of the arm, while large improvements are being made at Snug Harbor. About 300 people will winter at Hope and Sunrise, the chief mining camps of this section. The output of gold for the season is hard to ascertain, but it will be less than last year, in consequence of high water.

ARIZONA.

At the Grand Reef mine, at Wilcox, development work continues and some good veins have been found. On the Del Monte group of mines, near Harrisburg, seventy-five men are at work. Near Russellville, on the Wolfraimite claims, sixty men are at work.

The Katie mine, at Mineral Park, is developing into a silver producer. A crosscut tunnel is broken into a ledge of 700-ounce ore at a depth of 160 feet. The first shot knocked down a ton of ore worth \$400.

The Septazuma M. Co., near Geronimo, is installing a smelter plant; fourteen carloads of machinery arrived, including three 50 H. P. boilers. Col. Brodie intends starting work on the Crown Point mine, near Prescott.

Mohave county Miner: J. McGregor brought a shipment of ore from the Yellow Ned mine, El Dorado canyon, to the Klugman sampling works, last week, which yielded 9 ounces gold and 146 ounces silver per ton. The shaft on the mine is 60 feet deep and shows an ore body 3½ feet wide all the way.

Prescott Courier: Thompson & Rowe had sixteen tons of ore run through the Silver Flake mill at Prescott with satisfactory results. J. Chambers had a lot of ore run through the same mill, giving \$40 a ton gold.

Arizona Bulletin: M. Alexander reports a strike in the Spenzuma mine of a 10-foot ledge. A good stream of water has been encountered in one of the tunnels.

Pick and Drill: The Congress mine has reached a depth of 1700 feet, Crowned King 1000 feet, Planet-Saturn 700 feet, Little Jessie 500 feet, McCake 500 feet, Jersey Lily 450 feet. Every gold mine in Yavapai county, with two exceptions, that is working at a profit has been developed and equipped by the wealth taken from the mine.

Prescott Courier: Near Placeritas the company operating on Millner's property in French gulch has struck copper ore which is 14 feet across, and the erection of a smelter at that point is contemplated. The Monte Cristo mine near Prescott continues to show well. Three feet of ore has been struck in the north drift and 2 feet in the south drift.

Mohave Miner: D. W. Risher has begun operations on the American Flag mine, Walapai mountain.

Globe Belt: G. Bowen is working on the Great Republic group of five copper claims in Pinto district, and the properties are showing well.

Arizonian: At Dos Cabezas the Philadelphia mill is being reconstructed. The hoisting works of the Philadelphia and First Chance are being overhauled with a view of starting development. At Silver Bell, Pima county, the new furnace was blown in last week and is using forty tons of ore daily.

The Holland mine is shipping high-grade ore from the Harshaw district. Assays show 2000 ounces in silver per ton. The Crowned King mine, Yavapai county, is known only as a gold mine, but its ore produces about twelve ounces silver per ton. The Congress ore carries a good deal of silver. Ore from the McCabe mine carries six ounces gold to twenty ounces silver per ton. Ore from the Monte Cristo carries one hundred and fifty ounces silver to four ounces gold per ton.

Phoenix Republican: An experimental run of the steam shovel is going on in Walnut Grove on the placer banks. The old Crook mine in Yavapai county is to have a stamp

mill. The property is said to be looking well. Lyons' new quartz mill on the Hassayampa is completed. Supt. Clark of the Fools Gulch mine has twenty-five men at work. He has reached a depth of nearly 800 feet and will continue until 2000 feet is reached, when the mill will be started. A vein of ore 3 feet wide, running \$30 per ton, is said to have been recently struck. The Storm Cloud mine near Prescott is proving a good property.

CALIFORNIA.

Amador.

Jackson Ledger: On the new shaft for the Kennedy at Jackson, V. S. Garbarini has a force at work excavating for foundations and preparing to erect buildings to contain the new machinery, which is to be the best on the mother lode. The plant will at first be operated by steam, but is to be constructed to be operated by water or electricity. A ledge has been encountered in the Balliol shaft about 20 feet thick. The owners of the property intend opening the property for milling.

At the Jackson Exploration and D. Co.'s property the past week Gen. Mgr. Dye had his force cleaning and repairing the reservoir, and its capacity has been doubled. In Pine Grove district the Douglas mine has been operated by J. Ross, Jr., of Sutter Creek, for the past year. The development work has progressed to such a point that a mill is to be erected on the property forthwith.

Jackson Republican: At the Spagnoli mine work continues with encouraging results. The sinking will continue at the Zeila mine six weeks longer. At present fifteen of the forty stamps are in use.

Butte.

Oroville Register: M. Scowden bought a quartz mine near Enterprise and has put fifteen men at work.

Oroville Mercury: Clark Bros., who have been mining an old river channel at Big Bend, recently closed down for lack of water, have resumed operations, the late showers having raised the water. They will push work during the winter. The Russel, Wing & Malone Co. will also begin operations at once at their mine. They are said to have good gravel, and anticipate a profitable run.

Calaveras.

(Special Correspondence).—As soon as the rains set in work will be commenced on several claims near here. Hurd & Bunney, who have a lease on the Red Gold mine, have finished a mill run of seventy-five tons and the results were very satisfactory. Peyton & O'Connell have ten men working in their mine known as the Blood property. They have about 150 tons of ore on the dump of good grade. About Dec. 1st they will start their new 2-stamp mill. At the old Sheep Ranch mine they have nearly finished putting in electric power to run the mill. The hoist will be run by steam, and for the first time in four and one-half years this old producer will shortly be in operation. The Utica M. Co. of Angels were compelled to shut down their hoists and compressors last week after a three weeks' run since finishing the repairs to the ditch and flume, owing to the lack of water.

Murphy's, Nov. 28th, '98.

A strike is reported from the Thorn mine, near San Andreas, of a 15-foot ledge. At the Thorpe mine a gallow's-frame, over 100 feet high, is being built. The 30-stamp mill will be running in a few weeks. The old shaft is being timbered and enlarged.

San Andreas Prospect: Work has resumed in the Lamphear mine near Mokelumne Hill, and taking out ore has begun. W. T. Harris has a contract with the company owning the property to get out 7000 tons of rock. It is locally reported that the Eclipse gravel mine on Tunnel Ridge, which has lain idle for seven months, will resume work. The mill on the mine at Collierville was put in operation last week. In the mine there is a ledge from 2 to 6 feet in width which will yield on an average of \$42 to the ton.

San Andreas Citizen: At Murphy's, Schwoerer Bros. are taking out a milling from the old Centennial mine. Heinsdorf & Schwoerer are refitting their 5-stamp mill to run several hundred tons of ore from their mines. Heard & Brunner crushed fifty tons from the Red Gold mine, which proved profitable. L. Hansell has begun operations on the Summit Blue mine. A 2-stamp mill has been built on the Blood mine at Collierville. The Hausell gravel mine is in good shape to be worked awaiting rain. A water wheel, pump and derrick have been built to work the bottom of the channel.

El Dorado.

Georgetown Gazette: The Horseshoe Bar mine at Josephine is being worked with a full crew. J. Shultz continues work on his quartz mine. At Pilot Hill D. Wilkinson has a force at work on the Hidden Treasure mine. Cramer & Bars are doing extensive work on their mine. They have a tunnel in 500 feet. B. M. Berry has resumed work on his mine at Michigan Flat. F. C. Leavitt sold the American River gravel mine near Placerville to C. Noneman for \$1200. E. Holmes sold to W. S. Hickman the Sailor Slide mine near Georgetown.

Placerville Republican: M. E. Ames sold the Green Mountain Tunnel mine near Placerville to G. W. Kimble who has begun work on the property. As soon as the gravel is prospected to justify it a 10-stamp mill will be put up.

Inyo.

Independence Independent: The Reward mine has been closed down. Supt. Hoskins has gone to St. Louis to make arrangements to resume work. At Ballarat Supt. Harrison expects to resume operations on the Cleveland mine soon. Mine owners in South Park district are meeting with encouragement at their work progresses. At Mineral Hill

R. Day, superintendent of a group lately bought, is meeting with success in development work.

Kern.

Near Tehachapi, A. Winters sold four claims of antimony mines to F. De Frietas, agent of the Rapid Transit R. E. Co. of New York, for \$20,000. A shaft has been sunk 60 feet, and antimony 90 per cent pure taken out.

Randsburg Miner: A strike of good ore is reported on the Black Hawk mine near Randsburg. The cost of the new 30-stamp mill for the Yellow Aster M. Co. is said to be \$41,500. The Red Dog mill people have given up their bond on the G. B. mine. Ten tons of ore milled from the Merced mine yielded \$1450 in bullion. The Eureka mill has been running on small lots of ore, but in nearly all cases of good quality. They are now at work on Wedge ore. On the Standard good ore was found last week. A new strike is reported in the Triby mine, of the Yellow Aster group. The body of ore is said to be large and what has been milled averages \$30 per ton.

Randsburg Miner: Edmonds & Stassforth had three tons of ore milled at the Eureka mill, Randsburg, which plated \$25 a ton. Ten tons from the Merced yielded \$1440. This is the second cleanup in three months, the result of three men's work, the first going \$1600. After paying a royalty of 25 per cent and expenses they have left \$2000. Twelve tons of Wedge ore yielded \$1200. This came from the 350-foot level. The Eureka mill cyanide plant made a cleanup last week of \$900. This is the third in three months, the first being \$1200 and the second \$1100. Fifteen tons of ore from the Buckboard mine netted \$50 per ton. This is the richest part of the mine; they have in some parts of it a ledge 25 feet thick, which will mill from \$5 to \$8 a ton. The Red Dog mill at Johannesburg is running on Butte ore. They cleaned up \$5000 from ninety tons. Willard & Harrison are moving their mill at Cuddeback lake to the Blackhawk mine near Randsburg, where there is a large body of ore that will run from \$5 to \$40 a ton. They will get water from the Squaw Springs system and connect with a pipe line.

Lassen.

Work on the Hayden Hill mine has been suspended for the winter.

Los Angeles.

Work on the Red Rover mine, near Acton, has resumed and a new reservoir has been built.

The Puritan mill at Acton will be shipped to the mine of E. D. Cot in Kern county.

Mariposa.

Mariposa Gazette: The Big Betsy mine at Coulterville is working twenty men. They have finished a new hoist. A. T. McKenzie is Supt. The Columbus M. Co. has been organized in Coulterville and has bought the Lafayette, Eureka, Black Horse, Alba, White Ball and Eureka No. 2 mines and will begin work on them without delay.

Sonora Banner: On the east belt, near the Tuolumne county line, the Big Betsy mine, owned by the Golden Crown Co. of San Jose, has been under development for a year. The shaft from the 350 level has been retimbered to the surface. The new hoisting works are completed and a 10-stamp mill will be built. Sinking continues and twenty-five men are employed.

Nevada.

The main tunnel of the Columbus drift mine near Nevada City is in 1800 feet. They expect to reach the channel in 200 feet.

Work has been suspended on the Columbus mine, near Nevada City, on account of the death of its owner, C. Waterhouse.

The sheriff last week sold sixteen and three-quarters acres of land belonging to the Gold Hill M. Co. to W. H. Martin for \$500, to satisfy a judgment for \$870.11 and costs. The company are the owners of the Nevada City mine. Mainhart & Co. have closed down their mine near Emigrant Gap for the winter.

The machinery at the Empire mine at Grass Valley is being run by electricity.

Grass Valley Telegraph: A strike has been made in the 700-foot level of the Merrifield mine at Nevada City, owned by the Champion Co. The ledge is large and of good grade.

Nevada City Herald: When water for mining can be had a monitor will be in operation on the Gravel Hill claim near Nevada City. A restraining dam is being built, permission having been granted for same, and 2000 feet of pipe line is being laid to the South Yuba ditch. About 1000 feet of sluices will be built. Twenty men are employed. The Gravel Hill is owned by A. M. Gray of San Jose and S. L. Bullard of Los Gatos.

Grass Valley Union: A crushing of ore was recently made from the Gladstone & Bismark mine, near Nevada City, which yielded \$10 per ton, exclusive of the sulphurets, which are high grade. The mine is controlled by S. Smith.

Grass Valley Miner: The Eagle Bird mine at Maybert, which was closed down all summer for lack of water, has started again. Men work on the day shift and the mill is kept running at night. As soon as there is water enough, both shifts will be put on again and the mill will run night and day.

Grass Valley Tidings: San Francisco and Sacramento capitalists will operate the Junction mine, near North San Juan. They propose to put up a mill right away. E. Donald of Sacramento will superintend the work.

Placer.

The recent rains have enabled the Gold Blossom and Three Star mines near Auburn to start their mills and resume work in the mines.

Plumas.

Quincy Independent: The Butterfield M. Co. is doing well on Squirrel creek, near Quincy. Over \$200 were taken out in one day last week. Last week J. S. Webber, P.

Kinney and T. Keams of Utah were examining the Pliocene gravel mine near Quincy.

Quincy Bulletin: The Bullion mine in Mohawk has six men developing the property. The ledge is reported 8 feet wide. Last week were started five stamps on the Bushman quartz mine near Quincy. The mill has ten stamps, all of which will be running when the water supply increases. It is reported that the Scott mine near Quincy is again in gravel and taking out \$20 a day to the pick.

Riverside.

A new vein of ore has been opened in the Gavilan mine, near Perris, at a depth of 400 feet. The men working on contracts in the Good Hope mine are reported doing well. Hook Bros. made a shipment of \$500 last week from the Santa Rosa cyanide plant, near Perris.

W. Vercoe of Riverside, Supt. of Gavilan gold mines, has returned from England. It is locally reported that he effected the sale of the Santa Rosa mine to an English corporation. W. A. Doran, Pres. Gold Canyon G. M. Co., whose properties are situated near Salton, is preparing to build a 6-stamp mill. There are several hundred tons of ore on the dump ready to be crushed. Burke & Townsley, in the Chuckawalla mining camp, near Salton, have four men at work and fifty tons of ore on the dump.

San Bernardino.

At the Rose mine, near Victor, the new shaft is down 250 feet. It is believed necessary to go 150 feet more to get into the pay ore. They are working three shifts; erecting the new cyanide machinery will soon begin. Machinery and supplies continue to go to the Dale mining district.

San Diego.

Yuma Sun: The mines at Venus Camp, Picoacho district, owned and operated by H. W. Blaisdell, have a fifty-ton cyanide plant in operation. The second monthly cleanup was made recently and the value of the bullion brought down was said to be \$35,000, while the expenses were about \$12,000. The previous month's run was \$29,000.

Shasta.

J. F. Flannery has sold to the Iron Mountain Investment Co. the Crown Point, Ophir, Young America and Big Emma mining claims in Flat Creek mining district. Among the improvements by the Mountain Copper Co., the latest is a steam shovel to load the calcined ore into cars for the smelter. The work formerly required ten men fifteen minutes to load a car, while the steam shovel does the work in less than two minutes.

Bigrave & Collins are taking out good ore from their lease on the Washington mine at French Gulch. Van Matre & Fox are taking out good quartz in the same neighborhood.

Shasta Courier: H. Paige has leased the Pugh & Malcom placer claim on Clear creek, near Shasta, and will work the property when the rains begin.

Redding Searchlight: French Gulch mines last week shipped 154 sacks of ore to the Selby smelters. A shaft is being sunk on the White Oak mine in the Harrison Gulch district, by Capt. Roberts and his company.

Sierra.

(Special Correspondence).—The Alta mine near Alleghany, a property that had been abandoned for years and upon which work was resumed a few months ago, has found a streak of good ore. T. J. Parsons of San Francisco is interested in the enterprise.

At the Oriental mine Mgr. Hill has accomplished much work during the few months since he began rehabilitating the old property. The mine is being unwatered at the rate of 500 gallons a minute.

At the Plumbago work continues on the power and air transmission plant. Of the 6600 feet of flume 4600 are completed. The mine is producing its usual quota of ore.

The resumption of work on properties abandoned years ago at shallow depth is gradually increasing in this district.

Alleghany, Nov. 25th, '98.

At Boston Flat the Steamboat Tunnel, being run by Langman and five other miners from Grass Valley, is in 1200 feet and the ground is good.

Downieville Messenger: After another short run Buckingham and Bothwell made a satisfactory cleanup at their quartz mine near Downieville. Last summer a mill was erected at the mine, but it has not worked satisfactorily, and the owners contemplate improvements early next season.

Slaskiyon.

The Cherry Creek M. Co., near Yreka, is putting up a 10 stamp mill. They have 500 tons of ore on the dump.

Yreka News: A company, represented by M. Thornton, has bought the old Allen property in Quartz valley and will immediately employ a large force. T. E. Williams has taken a contract to extend the lower tunnel in the Mountain Belle mine in Hamburg district. This is the property formerly known as the Cartwright & Phillips mine. It was purchased not long ago by a Cincinnati company, represented by R. M. Shearer, the present Supt. The Antelope mine, formerly known as the old Drummer Boy, has been bought by Hunter & Mahler, who have partially cleaned out the tunnel and drift and uncovered a 4-foot ledge that will mill \$20 per ton. This property was worked in the early days by a horse arrastra. There are over \$4000 on the waste dump that can be saved by modern methods.

Yreka Journal: A Chinese company, having leased the Pacific mine, in Klamath river, will continue operations day and night, until high water drives them out. The Chinese working the McConnell & Quinne mine, Klamath river, have been troubled by the breaking of old drifts in sinking to bedrock.

They have been successful in their cleanups. —The Gold Run and Know Nothing Creek mines, in the Salmon river country, are running with a full force and are said to be paying well. —The Lang & Bratt quartz ledge at Horse Creek, Klamath river, is turning out well. The ledge is 6 feet wide. —Jillson & Co. are taking out good quartz at Cottonwood. —The Spangler Bros., at mouth of Humburg creek, are prepared to carry on extensive operations as soon as water is obtained.

Trinity.

Seventeen tons of pipe for the J. P. Wood hydraulic mine at Junction City are en route from Redding.

At Bragdon river mining is followed with success and the quartz mine of Rogers & Thresher is proving a good property. —Near Trinity Center Perry Bros. & Co. have leased the Robinson mining property and are working the ore by the cyanide process. —Strode Bros. have closed their mine near Carrville for the season.

The Chamberlain claim near Lewiston, worked with one giant and water supply for eight hours daily, has put in new boxes and will run all winter. —The La Grange mine near Weaverville has cleaned out its ditches and is making five hours' run daily. They will run three eight-hour shifts when water supply permits.

The Mountain Boomer mine, in the New River district, is being extensively worked by San Francisco capitalists, together with J. W. Frank of Red Bluff. The mine is an old property, worked years ago, and was given up as being worked out. The old works have been reopened at a depth of 240 feet and an upraise made in which a 30-inch ledge has been uncovered which is said to run \$40 a ton. A new tunnel is being run which will be 650 feet below the old one.

Tuolumne.

Jamestown Nugget: The Mexican M. Co. has placed on the group of mines recently bought from Urquart Bros. machinery to thoroughly develop the property. —The Mt. Jefferson at Big Oak Flat is opening up new ground and has good milling ore ready for stopping. —The Big Oak Flat Nos. 1 and 2, owned by the T. M. L. M. & D. Co. of Fresno, are running day and night. They have five stamps going at present and are preparing to add ten more. —The Mack mine, idle for many years, is being reopened by Oakland people. They are working three shifts of men and have sunk 50 feet in the past three weeks, finding good ore. This makes the shaft 200 feet deep. Drifting has begun. The same people have a bond on the Woodin mine and will start work on it soon. —The Accident mine, owned by James Bros., has been bonded to M. Doan of Boston. —The Whisky Gulch mine, bonded to J. L. Roberts, gave an average mill test from the new shaft of \$38.52 per ton. —The Longfellow mine has a new hoist plant and patent dump skip and will sink 500 feet. —The San Juan mine, owned by M. Fisher and others of San Francisco, is preparing to get new machinery and being developed. —At the Ophir mine M. King took out over \$800 last week. —M. Gillespie of Oakland has bonded a mine from J. Baitano and begun work. —On the Slap Jack mine a body of milling ore was discovered. —Argle & Paw in the Dewey mine have found a 3-foot vein of \$18 ore. —The Big Betsy mine has uncovered a body of high-grade ore. It is said that a stamp mill will soon be erected. M. Hillish of San Jose is the owner. —Shafer & Co. found a 3-foot ledge that mills \$7.50 a ton.

Sonora Democrat: Progress is being made in development on the Excelsior mine near Sonora. —The Shawmut-Eagle mine near Jacksonville has been running full capacity the entire dry season. —More good rock was taken from the chute of the Hope mine near Sonora last week. —Indians are reported to have discovered good gravel diggings on the Tuolumne and men and squaws are making satisfactory cleanups. —Some placer miners continue to make small wages in Woods creek at Brown's Flat, notwithstanding the bed of the stream has been gone over for fifty years. —On the Booker ranch R. Stevenson has a force driving a shaft on an extension of the Scrub Oak. —The Bonanza mine has closed down and the workings allowed to fill with water. The mill is also hung up. Work will be resumed when water can be secured for power. The mine is equipped with a steam plant, but the difference between \$3 and \$15 per H. P. caused the cessation of work. The mine can be unwatered in ten days.

Yuba.

At the Pennsylvania mine, Brown's Valley, a 300 H. P. electric motor is being placed and a cable road built from the shaft to the mill. A station is being cut at the 600 level, where an electric pumping plant will be located.

COLORADO.

The Denver mint receipts for November show a total of \$1,923,718, as against \$1,237,199 for the same month of 1897. The receipts for the first ten months of 1898 were \$18,269,271, as against \$10,920,844 for the same period in 1897, a gain of \$7,348,427. The gold output of the Cripple Creek district during November is estimated at \$1,447,500.

BOULDER COUNTY.

Boulder News: The Virginia mine at Eldora shipped a trial carload, the best of which run \$1200 to the ton and the screenings \$230. —In the Mogul tunnel, at 775 feet, another vein—the twenty-fourth—fifteen inches wide and two ounces in value has been cut.

Ward Gazette: The Adit mine put on a force last week. The tunnel has been enlarged. Pushing the Nivot branch of the tunnel and getting out ore will be done with speed. —In the Allen a cross lead was encountered which measured 2 feet across, carrying considerable iron.

CLARK COUNTY.

At Silver Plume, Kerns & Wilson, leasers

on the Bismarck, recently shipped nine tons of ore that milled 20 ounces silver per ton. —J. B. O'Connell made a shipment of eight tons from the same mine that returned 208 ounces. —An 18-inch vein of ore running 150 ounces silver per ton has been opened up in the White mine. —The Johnson in Argentine district is turning out ore that mills from 200 to 300 ounces silver per ton and a small percentage of gold.

CLUSTER COUNTY.

At Silver Cliff the Jay Gould has struck good ore with the diamond drill and will start a shaft. —The Troy has been leased by a Cripple Creek company.

EAGLE COUNTY.

Near Red Cliff the Black Iron mine is outputting from 50 to 80 tons of ore per day.

EL PASO COUNTY.

At Victor, Beckman & Co., leasing on the eleventh level of the Orpha May, received returns from a 10-ton shipment last week averaging \$72 a ton. —Three electric hoists were installed by the Colorado Electric Power Co., one on the Deadwood, the Findley, and the Jack Pot. —The Granite mine near Victor is producing thirty tons a day, but most of the rock is low grade. —The Legal Tender of the Golden Cycle Co., near Altman, last month output about 2700 tons.

The production of the Victor mine at Victor has been curtailed to eighty tons daily, of which about one-fourth is sorted into first and second smelting grades, while the remainder goes to the cyanide mill.

At Victor the production of the Gold Coin the past week was 100 tons a day. —The lessees on the Porcupine last week marketed forty tons of ore of high grade. —The Ajax Co. is erecting a plant of machinery on the Ajax on Battle Mountain and making preparations for deep mining. A 125-H. P. boiler, 100-H. P. engine with compressor and pumps are in place. —Three carloads of ore, one of high grade, and the remainder two-ounce ore, were shipped this week from the Trail, controlled by the Battle Mountain Co.

Victor Record: The Fluorine mine, near Victor, is to be operated by its owners, the Montreal G. M. & M. Co., instead of the lessees. The mine in eleven months has produced in the neighborhood of \$175,000. Every ton of ore marketed has been mined from no greater depth than 42 feet. —At the Modoc ten to twenty tons daily is the regular production. —The Moon-Anchor produced 200 tons of ore last week, of which about 135 tons was of smelting grade and the balance milling grade. —On the Half-Moon the Johnson lease produced thirty tons a day last week. —A carload of ore recently shipped from the Orpha May yielded \$340 a ton. —Two narrow-gauge cars is the daily output from the Van Amburg & Edwards lease, one of the Raven Co.'s properties. The ore averages \$50 a ton. —The Baltimore Leasing Co., on No. 6 shaft of the Victor, are mining a carload of ore daily, averaging \$28 to the ton. The ore body in the stope from the 160-foot level has widened to 14 feet.

GILPIN COUNTY.

Central City Call: The Piece mine at Central City is making daily shipments of from thirty to forty tons. The mill ore treated at the Hidden Treasure mill runs from three to four ounces gold per cord, and the lessees are doing well. The smelting ore has been averaging \$75 per ton. —At the New Foundland mine ore is hoisted from the 700 level. The last lot of smelting ore gave returns of \$332 a ton for first class, while the screenings went \$179 per ton.

LAKE COUNTY.

At Leadville, the Ibeix mines keep the shipments of gold-copper ore above 8000 tons per month, notwithstanding the new work under way at the six shafts. A place which had been abandoned some time ago as worthless, was opened up again by one of the foremen who thought he could find pay ore, and is shipping fifteen tons per day. —The Resurrection G. M. Co. employs 150 men and ships 200 tons daily. —The Penn mines ship 100 tons daily of gold quartz.

Leadville Miner: The cage in the 1000-foot shaft of the Mab mines is running twenty-four hours every day. Over 200 tons of ore are hoisted and shipped daily from this property, besides handling the waste from the development work under way. This mine is comparatively a dry one, the workings only making 100 gallons of water per minute. The principal owners are local men. —Shipments from the new ore bodies being worked from the interior shaft of the Mahala have averaged 150 tons per day. The grade of this ore averages better than the cores from the diamond drill indicated. The hoisting and pumping from the underground shaft is done with compressed air.

Leadville Reporter: About Jan. 1, the Mahala Co. expects to handle 150 tons of ore a day. They are now shipping about seventy tons a day, and are pushing development work. Their diamond drill explorations show ore bodies of richness and large area.

Leadville Miner: The Ballard mines at Leadville are shipping fifteen tons per day of gold quartz which averages about \$30 per ton. The discovery of pay ore in this mine was made at a cost of \$10,000. The Denver and Rio Grande railroad sent out 750 tons of ore in one day last week. Two local smelters handle ore to their full capacity and three railroads haul the surplus to outside smelters. —The Ardell Mining and Concentrating Co., operating dumps with the Sherwood process, have demonstrated the success of the new undertaking. The material from the Shields and Venture dumps showed values of \$5 per ton, while the concentrates average 72 ounces silver and three-tenths ounce gold. —McDonald & Thompson have started iron shipments at the rate of twenty tons per day. —The Big Four M. Co. and the Fanny Rawlings lease have 130 men on the payroll. The Big Four is shipping fifteen tons daily of gold-copper ore. The Fanny Rawlings is shipping fifty tons of

carbonate and sulphide-copper ores, carrying gold. The ore is 40 feet wide and some of the stopes are 50 feet high. The oxidized ore nets \$45 per ton and the sulphides \$35 to \$40.

MINERAL COUNTY.

The Occidental mine, near Creede, is 130 feet deep and in the last 35 feet has ore of good value; they will soon begin shipping.

PARK COUNTY.

Fairplay Flume: A good strike was made at Puma last week by Gillman Bros. on the Boomer lode at 500 feet depth of a body of ore which ran 60 per cent lead with some silver and gold.

PITKIN COUNTY.

The recent strike on the Argentum-Juniata at Aspen is reported to be 12 feet wide and will average between 300 and 400 ounces in silver.

The recent discovery in the A. J. mine of Aspen was the result of accident. An old stope showed indications of caving, and a few shots were put in to hasten it. This exposed a face of 400-ounce silver ore, which has opened into a well-defined ore body.

SAN JUAN COUNTY.

The output from the Tiger mine at Silverton is twenty tons daily. The force is forty men, and it will not be cut down for the winter.

IDAHO.

At Wardner the Bunker Hill and Sullivan's Kellogg tunnel is in over a mile and is adding 12 feet a day. No very hard rock has been found nor has there been any sign of mineral. It was commonly expected that blind leads carrying ore would be cut before going as far as they go.

At Burke the Hummingbird tunnel made by hand work 96 feet last month.

Near Pierce the American Placer Co. is putting in a hydraulic elevator and will soon be ready for operation. —The Oro Fino Placer Co. is ready for operation as soon as the water supply will justify starting. —The Eureka Con. Placer Co., is operating on Reed's creek, with enough gravel to last twenty years. These are all new companies.

At Warren, in the Good Enough mine, one 6-foot body of high-grade ore has been found, and another 5 feet wide. The ore averages about \$40 per ton. —The Little Giant is 300 feet deep and has a pay chute 2 feet wide of good grade. —At the Iola extraction of ore is progressing satisfactorily. Thirty-five men are employed, and the mill is running night and day. The Iola ledge has 5 feet of ore that will average \$60 per ton.

The tunnel on the I. X. L. near Boise will be driven 500 feet farther this winter.

Unwatering the Checkmate will begin soon. —The Challenge mine has a 2-stamp mill in operation. —Seven men are employed on the Birthday mine. —The Pass M. Co.'s property at a depth of 400 feet has found a vein of considerable value. The drift shows ore for a length of 70 feet and a thickness of 6 to 18 inches of shipping grade. —Controlling interest in the Camas No. 1 group, on the Hailey gold belt, has been sold to a Chicago company.

H. Lime has bought the old Cooper diggings in Stanley basin, Custer county, and began moving machinery to the ground for a steam dredge. The ground is said to average 40 cents per cubic yard. —F. W. Bacon, receiver of the American D. & M. Co., filed in the U. S. Court last week his report of the operations at Gibbonsville for October. There was produced plate bullion \$8624.65 and 78.60 tons of concentrates, estimated at \$2447.60, making a total product for the month of \$11,072.25. The costs exceeded the net earnings by \$832.30. —Near Atlanta the Yuba mine and mill, which employed a large force since spring, closed for the winter, but will start up early next season with an increased force and new machinery. —From Osburn a carload of high-grade ore was shipped from the Yankee group and one from the Mineral Point. Near Osburn most of the properties are almost exclusively silver. —Near Kendrick the Mascot M. Co., in the Pierce district, has struck ore of which a mill test of forty tons netted twenty-seven and one-half ounces gold. Work has begun on a 200-foot tunnel, which will open up a large body of ore. The milling capacity is forty tons daily. —The Tiger-Poorman mine on Canyon creek in the Coeur d'Alenes has a vein of silver-lead in which the ore chute is about 1200 feet long. The mine employs about 175 men and is shipping 1500 tons of concentrates per month. It has given employment to from 150 to 175 men for the past ten years. —At Murray H. L. Phillips, who has a bond on the Darling properties in the silver-lead belt, shipped two carloads of carbonate ore to the Selby Smelting Co. at San Francisco, they having made a good bid for the ore some time ago.

Mullan Citizen: The Hecla mine near Mullan shows 7 feet of ore that runs 65 per cent lead and fifty ounces silver. —The Bunker Hill & Sullivan expects to take ore out of the big tunnel next spring.

Challis Messenger: A dredge will be built this winter and put in operation next spring to work the placer mines at Stanley basin. Material is being put on the ground to build this boat. —On Moose creek in Lemhi county the dredge has a capacity of 5000 cubic yards a day and saves 96 to 98 per cent of the gold. —The Clayton M. & S. Co. at Clayton closed the smelter on the 10th inst. for the winter, after a successful run. The mines have been reduced to their usual winter force.

Florence Miner: The Hiyu mine at Florence has resumed and is working fifteen men. The mill will start up soon. —Work at the Blossom mine is going ahead rapidly. The mill is running steadily.

Boise Statesman: The dredges at Idaho City and Pocatello have closed operations for this season, but they ran long enough to demonstrate that they are paying. Work is still going on on two at Centerville. Two

more will be built at Idaho City as early as the weather will permit next spring. —The Pheasant mill at Pioneer has closed down until the snow is deep enough to prevent slush ice from running in the ditch that furnishes water for power. —Near Grimes Pass, a Texas company is developing a good ledge. A shaft is down over 200 feet and drifts are being run. It is announced that a mill will be erected next spring. —The Lucky Boy mill, in Gambirius district, started up recently. Five more stamps will be added, and it is the intention to add more next spring, so that the low-grade ore can be worked at greater profit. —The Stephens Bros. will develop their mine all winter. —The Twin Springs Co. have closed down the Bear Run placer claim until spring. —A San Francisco company is grading for hoisting works on the Basil mine near Centerville. They will put a shaft down 400 feet.

De Lamar Nugget: The following is the report of the De Lamar M. Co., Ltd., for October: Leached 5082 tons. Bullion produced from cyanide treatment, \$37,405; clean-up from pan mill, \$7550; estimated value of ore shipped to smelters, \$500; miscellaneous revenue, \$55; total, \$45,510; miscellaneous expenses, \$33,500; profit for month, \$11,950.

Emmett Index: E. H. Robb's mine is turning out good coal. They are not able to supply the demand at \$4 a ton on the dump.

MONTANA.

At Helena the Superior Court last week granted petitions to A. J. Shaw and F. B. Grinnell, receivers, respectively, of the First National Bank and the Spokane Savings Bank, to accept final payment from Clark & Sweeney for the bond and stock of the Last Chance M. Co., in the Coeur d'Alene, Idaho, district, which they bought from the receivers and on which several payments have been made the past year. In accordance with the order of court, Sweeney paid \$48,839.33 in full settlement. Of this sum \$39,344.70 goes to the First National Bank, and \$8,494.63 to the Spokane Savings Bank. The banks held 225,200 bonds of the Last Chance Co. and 97,108 shares of the stock as security for loans at the time they failed. Clark & Sweeney undertook the purchase of the bonds and stock, and have paid in all, interest included, about \$130,000 for the property. In addition, they have bought up other bonds and stock of the Last Chance until they have secured all but 8000 of the 400,000 bonds, and all but about 45,000 of the 500,000 shares of stock. They recently closed a deal with the Prickett estate of Edwardsville, Ill., for \$63,240 worth of bonds and 30,000 shares of stock. These transactions of late have been in behalf of the Empire State Idaho M. Co., which was organized last spring in New York City, and which now owns and operates the Last Chance mine, and includes in its assets all the surrounding claims. Clark & Sweeney are largely interested in the company, which has been a dividend payer almost from the day of its organization.

At the Queen of the Hills mine at Nelhart a concentrator will be built next spring. —The Moulton M. Co. at Great Falls contemplates building a concentrator early in the spring.

At Nelhart fifty-five men are leasing on Broadwater ground. In October they shipped 200 tons of ore. —At the Big Seven fifty-five men are employed.

The Big Seven mine at Nelhart is becoming more of a gold than a silver mine, though the silver is very high grade. The mine is down 1085 feet. —Dwyer Bros. are developing a property in the same locality.

G. Phelps has bonded the Empire mine near Livingston for \$55,000 and further development will begin at once. —From the mines at Bear Gulch M. Co. sixty tons of ore are being taken out daily. Between thirty and fifty men are employed. —Near Stevensville Ellis & Co. have a gold-bearing vein which increased in width from 1 foot at grass roots to 5 feet at 57 feet depth and assayed from 75 cents at uncovering to \$52 at 50 feet. —Near Winston the East Pacific is building a flume preparatory to putting in an electric plant that will produce 400 H. P., part of which will be utilized at the mine. The new bunk house will be heated by steam and lighted by electricity. —At Nelhart the Galt mine has started up and men are cleaning out the property. —The Florence is shipping twelve cars of ore per month. It employs forty-four men. Only the richest ore is shipped. —Fifty-five men are leasing on Broadwater ground. Last month they shipped 200 tons and this month the output will be greater. —At the Big Seven fifty-five men are employed. —A concentrator will be erected at the Queen of the Hills in the spring and more men will be employed; twenty-eight are now at work. —The Moulton will erect a concentrator in the spring.

The debts of the old Golden Sceptre mine at Quigley have been covered by issuing 10-year 6 per cent bonds for \$500,000, and it is believed the new company, the Majestic, will resume operations next spring and complete the extensive work inaugurated. There is a mountain of low-grade gold ore and over \$300,000 had been expended in the mine and on a plant when the eastern stockholders refused to furnish more money and work ceased.

Libby News: At Sylvanite the Yankee Girl and Juliet are worked as one property. Three tunnels run on the Yankee Girl and Juliet will aggregate about 1000 feet. —Jim Hill has over 500 feet of work done on it, and is considered one of the coming big mines of the camp. Development work will continue this winter. The Jim Hill is a gold property. —The Eberhart is developed by 400 feet of tunnels. The ledge is 12 feet wide, and the best assay is \$28.75 in gold and silver, principally in gold. —Near Sylvanite is the Montana, a silver-lead property, on which the ledge is 16 feet wide, and there are 4 feet of concentrating ore which will average \$28. —In the Friday mine the development consists of 500 feet of tunnels and a shaft 150 feet deep. The ore is free milling and high grade. —In the B. &

M. the ledge is 14 feet wide and runs \$24.85 in gold.

Libby News: There have been more men at work on the placer mines of Libby creek this year and less gold taken out than in any previous season. The cause is that most of the men were doing development work, opening claims in better shape than ever before. Next year will witness an increase of interest in placer mining in this district which will keep an even place with the greatly stimulated activity in quartz mining. The development work done at the Hydraulic placer mines by Capt. Leavenworth will lead to extensive operations in the spring. The work done by the South Bend & Montana M. Co. has been satisfactory to Nicar & Co., who have returned to Indiana, and will be back early in the spring to mine on a much larger scale than heretofore.

Whitehall Zephyr: At Twin Bridges work on the new smelter is moving along, and, the weather permitting, the plant will be completed Jan. 1st. The capacity will be 100 tons per day. It will have two stacks, and its promoters think it will handle any ores except those containing a valuable percentage of copper. Receiver Bacon of the American D. Co. has asked permission of the court to put some of the properties of the company into operation, and for two weeks a party appointed by the court has made an examination of the Golden Sunlight properties near Whitehall.

NEVADA.

The Golden Eagle Co. in Central mining district, Humboldt county, has a shipment in transit of \$100 per ton value and will repeat this at short intervals throughout the winter. The latest strike is between 5 and 6 feet of ore, samples from 2 feet of which yield \$20 in gold. In the lower tunnel a vein was found at a distance of 315 feet and at a depth of 220 feet, showing from \$1 to \$18 in gold. The Ophir Co. in Humboldt county has driven its tunnel 350 feet and has found ore that shows \$30 per ton in gold. At Lovelock it is reported that J. H. Thies has bought the sulphur mine at Rabbit Hole for \$21,000. The North Mountain M. Co. at Eagan canyon has made its last clean-up of auro-cyanides for the season and closed down for the winter. Supt. Eager's first report of work in the Occidental at Virginia shows 12 feet of ore of milling value developed on the 450 level.

Hawthorne Bulletin: Two carloads of ore from the Holmes mine were shipped to Virginia last week for a mill test.

The King Solomon sulphur mines at Rabbit Hole Mountain are producing good sulphur. A large body has been struck of high value. Sulphur has been found in thirty different places in the mines. A \$2500 bar of bullion was shipped from Olinghouse canyon last week. About 230 sacks of gold ore, weighing 25,000 pounds, were shipped from Weiser last week from the Placer basin mines, owned and operated by Jackson & Taylor, to the sampler works. If this shipment for a mill run shows satisfactory results a mill will be built on the property at once. Placer basin is in the Seven Devils district, but the mineral characteristics are different.

At Pioche the Yuba mine is reported producing good concentrating ore. At White Pine, Cannon & Co. of Salt Lake City are sinking a shaft on Teacup group and will erect a hoisting plant in the spring. In the North Mountain Co.'s mine in the spring the tunnel 1200 feet long will be retracted. A carload of ore from the Golden Eagle mine in Central district was shipped from Winnemucca to Salt Lake last week.

Austin Revelle: J. F. Mitchell bought from T. J. Bell the Superior and Gold Belt mines at New Pass and has made the first payment. He has also made a payment on the group of mines belonging to Ryan, Sutton, Murphy & Co., the second payment to be made in sixty days. The mines are gold bearing and the ledges large and the ore free milling, with ore in sight to keep a large mill running for years.

Virginia Enterprise: The overhauling of the machinery of the hoist plant at the C. & C. shaft at Virginia is completed and steam was turned on last week to strip the pump compartment of superfluous material to have it ready for the installation of the Risdon hydraulic plant. The C. & C. shaft is in good condition and but slight repairs will be required. The Pelton wheels on the four stations of the shaft, placed there as part of the water power wire cable transmission plant, will be utilized to operate compressors for furnishing air to ventilate the openings when mining below the Suto tunnel level is resumed. Mgr. Ross says that the installation of the Risdon plant will be completed and water lifting begun Jan. 1st. The survey of the Suto tunnel by Civil Engineer Haist is completed. He found the tunnel in good condition and little variation in the grade of the drain flume has occurred, the excavation made to receive it being for the most part in hard rock. He says that the flume is in better condition than he expected to find it. It will be ready to receive the water when the hydraulic plant is installed.

Virginia Chronicle: The Justice M. Co. at Virginia resumed work through the Woodville shaft this week. The new mill of the company is located close to the hoisting works. T. J. Barbour, R. S. Moore, J. Harrower and G. H. Evans, representing the Risdon Iron Works Co. of San Francisco, this week descended the C. & C. shaft with Mgr. Ross to the Suto tunnel level to look over the situation preparatory to installing the Evans hydraulic pumping plant. The shaft is in good condition and everything is ready for lowering the material for the plant when it reaches here. The installment of the plant will be completed and water lifting begun before the time specified in the contract, Jan. 1, 1899.

The new mining camp of Searchlight in Lincoln county, discovered last May, made a recent ore shipment that yielded \$77 a ton. The Bulldog Gravel M. Co. in Lyon county has its new pump in place and water

is taken out at the rate of sixty gallons per minute. The operators have a streak of good gravel and are taking out about \$4 per day to the man; there are four of them in the company.

NEW MEXICO.

The Good Hope Bonanza M. Co., at Hillsboro, contemplates building a mill. At Bland, mining men guarantee a daily output of 500 tons of ore if the proposed railway is built to Bland.

The Richmond mine at Hillsboro made a shipment of seventy tons of high grade to the reduction works last week. The Andrews cyanide mill is treating thirty tons of Trippie mine ore per day. The Snake mine, at Hillsboro, shipped sixty tons of high-grade ore recently. The Iron Duke mine, in Taos county, shows a body of ore 30 feet thick. The Ace 40-stamp mill at Baldy has started up. The Opportunity mine leasers shipped from Sierra county last week 121 sacks of ore, which netted them \$640. The Monte Cristo M. Co., at Golden, operating a dredge and dry washer, are putting in a pump to use the water over again, and keep the machinery going day and night. The Old Abbe's shaft, at White Oaks, has reached a depth of 1100 feet, and good ore has been uncovered at every level. The company is putting in a plant to catch the gold escaping the batteries.

Silver City Enterprise: A car of iron ore per day is shipped from Legal Tender Hill mine at Silver City. From Pacific mill tailings, in 364 days, were concentrated 18,827 tons. The concentrates and slimes shipped to the Reduction Co. were 5707 tons. The metal contents were: Gold, 1907 61 ozs., at \$20 per oz., \$38,152.20; silver, 50,663 ozs., at 58 cents per ounce, \$29,567.14; copper, 250,738 lbs., at 11 cents per pound, \$27,580. The Pinos Altos G. M. Co. has 100 miners and timbermen employed in several properties. Development on the mines is proving the veins to be valuable.

The management is developing ore reserves to supply a mill of large capacity, to be erected. Ruthenberg & Newcomb have leased the Hudson and Thomas mines near Pinos Altos. These properties have large bodies of lead ore developed which is too low grade to stand transportation. A smelting plant will be erected at the mine. At White Signal J. M. DeKiersey has opened an 18-inch vein of ore on the Black Swan mine, which runs 14 per cent copper, 1½ ounces gold and 19 ounces silver per ton. Fritter & DeKiersey are operating a new turquoise property in this district. At Hanover, Brockman & Hughes made a 10-ton shipment of copper ore from the Hanover No. 2 mine. The Mineral Point Zinc Co. has twenty miners employed and is shipping twelve cars of ore per month to the company's works at Mineral Point, Wisconsin. M. Ruthenberg has taken a lease on the mines of the old Valverde Co. and has a force developing the ore bodies. It is probable that a concentration or lixiviation plant will be used to recover the copper.

At Santa Rita J. B. Gilchrist has twenty-five men employed on his leased properties, the Guadalupe, Chino, Oxide, Robert E. Lee and Yosemite mines. E. W. Clark has twenty men employed on the Cortez mine, which he is working under lease. It is a copper property. McLaughlin & Curtis have eight men on the Montoya claim. They are taking out pay ore. Dawson & Jones have ten men on their lease on the Rita mine and are taking out good copper ore. At Mogollon the Confidence mine has eighty men employed in development work, and taking out ore on which the company's 30-stamp mill at Whitewater is kept busy turning out gold and silver bullion. The company has installed an electric power plant at the mine.

OREGON.

Near Blue Mountain, the Golden Giant dredger will be ready to operate Dec. 1st. Its capacity is 2000 cubic yards per day.

J. W. Howard, near Paisley, Lake county, has quartz ore assaying \$60 gold.

Baker City Epitaph: Near Baker City, the Deer Lodge, Oregon Clipper and Yankee Jim mines were bonded for two years for \$100,000, on which \$15,000 was paid down. The investors are Philadelphia people. They have already begun preparations for work on the Deer Lodge mines. Within a short time twenty-five men will be at work on a 3000-foot tunnel and crosscuts.

Baker City Republican: Cox & Slade will open up placer ground near Buckland station for the spring run of water. J. F. Bachthaler of Portland, owner of the Ollie Woodman mine, will resume work soon. At Golconda, progress is made on the bromine-chlorine plant. It will be finished shortly after Jan. 1. It will treat ores of a refractory nature, and cause the resumption of work on claims hitherto considered worthless.

Jacksonville Times: Cook & Howland, near Jacksonville, have their mines ready and will make a big run if water does not fail them.

The Black Channel M. Co.'s property on Foote creek has been leased by J. P. Lee, who is operating with a strong force. It is locally reported that a strike has been made on the Applegate. The Gold Key Co., operating the Braden mine, is sinking a well to obtain water to operate the mill.

The Sterling M. Co. has finished its clean-up for 1898, which was good, and is making preparations for next season's run. The Gold Standard M. Co. will erect a concentrator soon; they have a large quantity of base ore on the dump. The free milling quartz which has been worked paid well. The Isabella M. Co. is pushing work on their property near Glendale. The company was organized last October and began work immediately. They have ordered a 10-stamp mill, which will be in operation soon. They are building a dam across Cow creek and will bring water two miles through pipes and flumes.

Baker City Republican: Jackley & Turner are rushing things at the No Good mine near Cornucopia. This is the mine from which was recently milled twenty tons of ore netting

\$1000. The C. M. O. Co. is now milling another lot from this property. The ledge is about 5 feet wide. The C. M. O. Co. has struck two ledges in the Union mine, one about 5 feet and the other 16 feet wide. M. Beers is developing the Flag Staff. He has a ledge assaying over \$100 a ton. At Susanville Mount & Co. made a good strike last week of a ledge about 1½ feet wide. The Urie dredger on John Day river, near Sumpter, is working in a satisfactory manner and if the weather permits will run all winter.

Grant's Pass Mining Journal: W. Greder of San Francisco bought the Young copper property near Waldo. He represents a company and will put men at work immediately to developing the property. A strike is reported from the Golconda mine near Baker City of ore ranging from \$30 per ton upwards. There are 1500 tons of good grade ore on the dump. The plant will be finished about February next and will cost over \$100,000. Brown & Graham of Denver have bonded the Don Juan and begun operations. In the Collateral in crosscutting they struck a 5-foot ledge of high-grade ore. Ten tons of ore, with twenty more on the road, were shipped from the Badger mine near Susanville, the average value being \$110 per ton. At the Congar mine a vein of silvanite was recently discovered assaying \$180. A shipment of ore netted \$60 per ton. A. Hansen's mine, the Deer Lodge, was recently bonded by J. Larkins of Spokane for \$100,000, and \$15,000 was paid down. In Coos county a California company is putting up a mill, expecting to operate it this winter. The Myrtle Point M. & D. Co. has several hundred tons of quartz near the mill that will average \$15 in gold per ton. The placer miners are ready for a winter's run and will begin as soon as rains come. There were some good cleanups at the headwaters of the Coquille and Sixes rivers during the summer.

Baker City Democrat: At the Virtue mine near Baker City thirty-eight men are at work. M. Baisley in the Carroll B. mine, in Mabel district, struck a ledge 2½ feet wide with a rich pay streak running through it. C. G. Wheeler is developing a property on option in the interest of Eastern capital. The Phoenix mine in the Robinsonville district was sold last week to Geiser & Hayes for \$27,500. The new owners will probably erect a mill and prosecute active development work on the Phoenix next spring. In the meantime the ore taken out will be crushed at the Pyx mill two miles from the Phoenix mine.

Ashland Record: The dredging company operating near Tolo has closed down for the winter. Sixteen men were employed. The returns are said to have been satisfactory. The last day's work cleaned up twenty-one ounces of gold. The owners of this plant will erect another, somewhat larger, in the spring to operate near Grant's Pass. B. T. Wyant & Sons, who operated the Anderson placer mine near Ashland with success last season, have again leased the same, and last week began a run of nine months. The two river mines operating in Klamath river below Henley quit last week for the season. The American Bar has been operating since last February their day and night crews being thirty men. J. Weininger, who has a wind-dam near Henley, has been at work with a force since May. He will begin work on his placer mine near Fool's Paradise for the winter. Kubli Bros. made a short run of ore through their 5-stamp mill at their Golden Standard mine and realized \$1500. J. P. Lee has leased the Black Channel mines near Gold Hill and began operations with a large force last week.

Ashland Tidings: The Vindicator Placer M. Co., on Wolf creek, will put in what is said to be the largest dam in the State. Its dimensions will be 50 feet high, 250 feet across the top and a depth of 25 feet. Douglas and Josephine counties report great activity in mining, unprecedented in their history.

Baker City Republican: J. H. Cradlesbaugh has bought a half interest in the Imperial group of mines, six in number, in Grant county, near the Baker county line. The upper tunnel is in 270 feet on the ledge and has cut a pay chute for 70 feet. The chute is from 3 to 4 feet wide and twelve tons of ore from it milled \$17.30 a ton. Where the ledge crosses the creek, 1000 feet below the tunnel, it is nearly 100 feet wide and the ore runs \$10 per ton.

SOUTH DAKOTA.

Deadwood Times: The greatest clean-up on record at the Holy Terror mill last week, after a six days' run, was \$70,000. This means \$7000 for each of the ten stamps in the six days, or \$166.66 a day. Each stamp will handle approximately four tons of ore a day, and these figures show the average value of the ore to be nearly \$900 to the ton. At Keystone, R. M. Maloney bought a five-ninths interest in the Egyptian No. 1, No. 2 and the N. Pope and all of the J. R. D. West Star and Gold Link properties for \$60,000.

UTAH.

Shipments from Tintic last week were ninety-one cars of ore, twelve cars of concentrates and twenty-nine bars of bullion.

The Cleveland M. Co. at Mammoth will begin prospecting the ground Jan. 1. A carload of high-grade ore from the J. Bowers at Diamond was shipped last week. Work has started on the Crown Point at Bingham.

The main incline at the Mercur mine is being equipped with a gasoline engine and hoister that will be the largest of the kind to be installed at Mercur with a capacity of 1000 feet. The Godiva mine at Eureka has ore over 50 feet wide and shipments will begin with the new year. It is likely that a mill will be erected next season. J. McChrystal is Supt.

The Star M. Co. near Bingham made its initial shipment of auro-cyanide. Operations at the Sunshine are to be resumed.

The properties of the New Mammoth at Bingham are showing \$14 in gold and an ounce in silver per ton from an 8-foot vein. At Park City it is reported that resumption of work on the Daly West properties will soon begin. At the Ontario the reopening of the mine will be upon a large scale. Work has begun on the Frankie group at Tintic and will be continued through the winter. From the Red Wing at Bingham another high-grade ore shipment has been made and two carloads of concentrates have been delivered. The shipment from the Red Wing showed 118 ounces silver, 18 per cent lead and 5.6 per cent copper. The Mercur mine turned over 1175 pounds of auro-cyanide to the sampler last week.

The sale of the War Eagle property, comprising eight claims adjoining the Silver King mine at Park City, owned by H. Newell, I. J. Hall and others, and which was bonded to the Silver King Co. sixteen months ago, and \$3500 paid at the time, was completed last week by the payment of \$47,500. M. Soh, Salt Lake City, has contracted to furnish European customers with 700 tons of antimonial ore, the percentage of the metal to be not less than fifty per ton. He says he is authorized to contract with miners producing antimonial ores, agreeing to pay for all consignments so soon as loaded on the cars.

The shaft on the Mammoth at Tintic has reached the 1800 level. From the recent strike on the 600 level assays last week from several samples gave 18.8 per cent copper, 282 ounces silver and some gold. The three cages are kept busy every hour of the twenty-four.

The Grand Central mine at Mammoth output last week 250 tons, and for the month it will exceed 1000 tons. The ores are maintaining a good average. Ore of an average of 10 per cent copper is taken from the Boston Consolidated at Bingham. At the Eureka Hill mill, Tintic, with forty stamps dropping, in October the management shipped sixty-four bars of bullion containing gold and copper, and with sixty stamps now in operation Mgr. Hilton expects eighty bars for November.

Three shipments of high-grade ore were made from as many Alta producers last week.

Mercur Mercury: In the Raven at Mercur good ore has been found. The semi-monthly shipment of cyanides was made from the Mercur mill last week. It weighed 1200 pounds. A shipment of cyanides from the Geyser-Marion reached Salt Lake last Saturday. The Daisy made another shipment of cyanides last Saturday, which was large and valuable.

A shipment of ore was made by the Argent last week and it is the intention to make shipments regularly through the winter. Galena has been found in the Shamrock mine at Stockton on the 450 level. It is said that Mitchener & Colbath have taken \$5000 worth of ore out of the Honorine. A shipment of high-grade cyanides was made by the Chloride Point at Mercur last week. The Columbia is yielding good results. A shipment of high-grade ore was made last week which yielded 40 per cent lead, seventy ounces silver and \$3 in gold per ton. In the Antler a vein 2½ feet in thickness has been found showing \$7.60 in gold and five ounces in silver. The Northern Light has opened up large bodies of ore, carrying from 300 to 500 ounces of silver per ton. The ore is being sacked for shipment.

Mercur Miner: Work has begun on the Cedar Hill group of claims recently bought for \$40,000, by Mayne & Cary. They have sold a portion of their interests to Indiana people and will develop the property as rapidly as possible, expecting to erect a mill early next spring. At the La Cigale the shaft is down 860 feet. A body of ore is blocked out ready to be hoisted as soon as the roaster is completed, which will be soon.

Park City Record: The Massachusetts near Park City is pushing a drift from the 600 station. Twenty-five men are at work. The Clarissa broke into the ledge last week and found a vein 5 feet wide. Men are incising the 700 feet of tramway from the Silver King hoisting works to the new mill, and a large force is employed placing the mill's new machinery, which will be ready about Jan. 1.

Bingham Bulletin: A 100-ton lot of concentrates was shipped from the Dewey mill at Bingham last week, the first product of the 2000-ton run being made on second-class from the Old Telegraph dump. Nelson & Richardson have started work in the lower tunnel of the Daylight lode. Work is being pushed on the Ophir mine by W. A. Robertson & Co.

Three carloads from the Landmark & 89 were shipped last week. It is locally reported that a fifty-ton concentrator will be built for the Old Telegraph mine and Mgr. Lavagnino hopes to have the plant running before winter is over. In the St. Joe M. Co.'s group, comprising ten claims, the Ublig tunnel No. 1 is being run for development. This tunnel is in 500 feet. Assays of \$20 in gold are obtained. At the Boston Consolidated, in the 600-foot tunnel, a 4-foot vein has been uncovered, the average value being 8 per cent copper and from \$3 to \$6 in gold to the ton. The Starlus mine is down 180 feet.

WASHINGTON.

C. Burns is developing mining properties near Darlington which are showing well. Price & Dickson's Blue Bird claim gives assay returns of \$50 in gold and 10 per cent copper. At Republic, in the Lone Pine, drifting continues in pay ore. Values run \$65 in gold and the general average for last week was \$20. The ore body is 14 feet wide. At Republic the ore in the Golden Harvest is 3 feet wide and of good values. The Merrimac shaft has found quartz of fair grade. Supt. Harvey of the Republic mine will soon start work on the Lone Pine. In the San Paul the ore body is growing. The Reindeer G. M. & M. Co. continue work in the tunnel. The group comprises three claims. Surface work has exposed the ledge for 2000 feet and assays range from \$4.13 to \$6.54.

On the Iron Monitor work is progressing. The tunnel is in 115 feet.—Work on the Pocahontas is being pushed.—The Eureka Queen tunnel is being driven on, while the quartz shows well.

WYOMING.

It is locally reported that Haggerty & Deal, part owners of the Rudefeha copper property at Battle Lake, have sold their interests for \$70,000, with \$10,000 down, the balance in six and twelve months. The ore assays 62 per cent copper and \$18 in gold.—G. Doane, owner of the Rambler, is pushing work on his claims and will soon begin shipments again.

FOREIGN.

BRITISH COLUMBIA.

The B. A. C. began development of the Le Roi last Monday.—Shipments from the mine will continue at the rate of 200 tons per day. The force will be kept at about 250 men, and as soon as conditions will justify shipments and miners will be increased. The ore will go to the company's smelter at Northport. Now that the company is in possession of the Le Roi the development of its other properties will be pushed and fifty or sixty additional men will be put to work on the Columbia-Kootenay, the Nickel Plate, the Great Western, the Josie and the No. 1. That will make the corporation's payroll about 450 men per month.—The Minnehaha near Cariboo has sold \$32,000 of treasury stock in Toronto, to continue development of the property, on which about \$18,000 has been spent.—The Fontenoy has been sold to Greenwood and Vancouver people, who had it under bond for \$32,000. It is said that the new owners will undertake development work at once.

From Kaslo the ore shipments for last week were 232 tons.—T. McDonald of Camp McKinney last week sold to A. C. Jamison the Annie L. fraction in that camp. The price is not made public. Mr. McDonald receives a considerable sum in cash and retains 225,000 shares of stock.—The Eureka, owned by Standard Oil people, has been developed to the extent of \$28,000.

The Spokane Review learns that the Turner combine will receive between \$3.25 and \$5.50 per share for their Le Roi holdings. Under the terms of the agreement with the B. A. C., it will be recalled, they are to receive \$7.25 in money and the cleanup of all the ore on hand at the Northport smelter. At the time the contract was signed there were about 17,000 tons of ore on hand. It was agreed that the Turner people should have the use of the smelter for the treatment of this ore, and it was further agreed that the B. A. C., if it so wished, should have the option of sampling the ore and paying the Turner people its cash equivalent.

Rossland Miner: The ore shipments from Rossland for seven days ending Nov. 19 were 4623 tons. Shipments for same week last year were 1635 tons. The total shipments from the camp since January 1, 1897, aggregate 185,511 tons.

At Fairview, at a general meeting of the Tin Horn, Comstock-Mammoth and Winchester companies, an amalgamation of the three was decided upon. A new company is to be formed with a capital of \$1,000,000, the property of which will consist of the Tin Horn properties, including the mill and the mining claims of the Comstock-Mammoth Co. and the Stemwinder mine, upon which a large air drill plant and hoisting machinery are operated; the Fairview townsite, the charter and franchises of the Fairview Power Co. and the coal deposits on the Penticton road. The first object of the new company will be to push further development on the Stemwinder, and to install additional machinery and erect a mill capable of treating the ore in large quantities.

LOWER CALIFORNIA.

A good strike was made in the mines of the Ibarra G. M. Co. at Calmali at a depth of 600 feet. The owners of the mines are San Francisco men.

W. R. Farnsworth, near Escondido, is meeting with success in the Dewey mine. The ledge is of fair size and good value.

MEXICO.

F. Lohrs bought one-fourth interest in the mines near Suagui Grande, Sonora. It is a producing property.—Unwatering the Ahogado mine is progressing and the old workings are partly accessible.—Near Matape, the Sonora M. & D. Co. have opened in their Money-maker mine a 2-foot ledge of free milling gold ore which goes \$21 per ton. They ship ten miles to a mill.

La Campana gold mine near Sasabe has sixty men employed and keeps a 10-ton stamp mill running night and day, crushing 600 tons of ore a month. Most all supplies for the mine are sent via Tucson and all bullion is shipped to Tucson through the Sasabe custom house. The tariff tax at Sasabe is 7 per cent of the bullion value.—J. B. Haggin is pushing development on a mine near the Campana mine. The water problem at the latter property was solved by sinking a well four miles from the mine and piping the water.—Chicago capitalists are developing a property near the La Campana mine.

Two Republics: Grant, Congell & Co. near La Colorada, Sonora, on cleaning out an old mine the property proved to be valuable, and they are shipping ore carrying \$16 gold and \$300 silver to the ton, with a good percentage of lead.—A. Fowler, owner of the Surprise-Tunnel mine near Chuichupa, has a body of

high-grade ore and will ship soon. He must pack his ore eighteen miles to Chuichupa, whence it will be sent by wagon ninety-two miles to Casas Grandes, thence by railway to El Paso.—At Coahuila a company has been formed to exploit recently discovered gold mines in the Carmen mountains, for which machinery has been ordered, and the mines are to be worked on a large scale.—At Parral, Chihuahua, the Mexican Railway has built a 50-mile branch, which has induced companies to purchase some of the old mines that have been idle for years.—Stalforth Bros. are running their 30-stamp mill day and night and the Jesus Maria will start up soon with a new set of pumps and will build a large concentrating plant.—J. J. Long has surveyed a road from his mines to a tract of timber land sixty-five miles from Parral, to furnish wood and timber for his mines.—The antimony deposits near Catorce, in the State of San Luis Potosi, are to be worked by a company.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 23, 1898.

614,792.—ADVERTISING ARCH.—Dodson & Archibald, El Monte, Cal.
614,712.—INK WELL.—J. T. Forrest, Chehalis, Wash.
614,655.—BUILDING BLOCKS.—H. F. Ingerson, Alameda, Cal.
614,664.—GAS GENERATOR.—Mace & Keough, Oakland, Cal.
614,746.—OVEN.—Oberfeld & Braunbeck, S. F.
614,747.—AX.—O. Ohlson, Seaside, Oreg.
614,511.—WINDOW SCREEN.—R. M. Spencer, S. F.
614,675.—SEWER GATE.—S. S. Tilton, S. F.
614,676.—BICYCLE BRAKE.—R. G. Tucker, La Grande, Oreg.
614,779.—SASH BALANCE.—O. Vannorine, Los Angeles, Cal.
614,640.—AUTOMATIC LOADER, ETC.—G. M. Wheeler, Tacoma, Wash.
614,524.—GAME.—J. O. Yardley, Stockton, Cal.
23,724.—DESIGN, MONUMENT.—T. J. Owens, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

ACETYLENE GAS GENERATOR.—A. F. Mace, Stockton, Cal., and L. R. Keough, Oakland, Cal. No. 614,664. Dated Nov. 23, 1898. This invention relates to an apparatus which is especially designed for the generation of acetylene gas. It consists in the novel arrangement of a carbide-containing tray and in a novel method of removing the ash or residue while the carbide of calcium is being used inside of a gas-tight cylinder or other receptacle. The object is to provide an improved means for obtaining acetylene gas from carbide of calcium, and to effect a sufficient disturbance or reversal of the carbide of calcium which is held and used in the gas-tight compartment so as to quickly and efficiently remove the ash, and to adjust the mechanism by which the operation is carried out so as to free the unused carbide of the ash which accumulates, and in regulating the supply of water by the movement of the gas produced. It consists of a cylindrical chamber with means for introducing the carbide of calcium in charges, a perforating tray or holder fixed across the interior and forming a support for the carbide, a spray pipe turnable with the cylinder and through which water is delivered into the upper part of the horizontally journaled cylinder so as to discharge upon the body of the carbide, and mechanism by which the cylinder is oscillated upon its journals so as to alternately tilt the containing tray to an angle upon either side, whereby the mass of carbide rolls and shifts its position so as to lie within an angle formed between its support and the inner wall of the cylinder. A small rising and falling gasometer is interposed between the generator and the main gasometer, and is connected directly with the lever arm of a water-controlling cock so that the movements of the gasometer open or close the cock and regulate the supply of water to the generating chamber. The ash which is separated from the carbide is sifted through the perforated tray containing the carbide into the chamber beneath.

DESIGN FOR A MONUMENT.—T. J. Owens, San Francisco, Cal. No. 23,724. Dated Nov. 23, 1898. This invention relates to an ornamental design for monuments for cemeteries. It comprises an essentially rectangular base, with sides and ends inclining inwardly toward the top, said top being also inclined so that one end is higher than the other. The angles of the rectangle are cut away so that the base presents two upwardly converging sides and ends of less length than the sides, these four angular faces connecting the sides and ends. The inclined tablet has the sides formed in the concave arcs, the upper end with straight edges, and the central angular projection and the lower end forming an obtuse convex central angle. The collars of the tablet are cut away to correspond essentially with the angular corners of the base.

Coast Industrial Notes.

—A cable line to the Philippines via Hawaii is an existing necessity.

—About 5,500,000 salmon eggs have been placed in the Fraser river.

—At the Mare Island, Cal., Government Navy Yard 1700 men are busy.

—Fifteen miles of narrow-gauge railroad are to connect Truckee and Tahoe City, Cal.

—The U. S. Government has acquired the Philippines; an outlet for Pacific coast trade.

—The Crow's Nest Coal Co. are said to be trying to secure 500 miners for their mines at Fernie, B. C.

—Sacramento, Cal., proposes to spend \$40,000 in a water supply from the north fork of the American river.

—Victoria, B. C., has a surplus of \$32,223 in the city treasury, \$12,000 of which is to be used for water works improvements.

—The U. S. torpedo boat Davis, at her trial trip at Portland, Or., Nov. 24, averaged 23½ knots per hour. In two hours she made 92 miles.

—Nine miles of the railroad from Golconda, Nevada, to the mines of the Glasgow Co. have been graded and the rails are ready to be put in place.

—Monterey, Cal., gives the Monterey & Fresno Ry. Co. all its water front conditional upon beginning active construction work by Jan. 1st, '99.

—The Seattle, Wash., city council has awarded the contract the Cedar river water works to Gahn & Byone of Chicago for \$1,050,000.

—Packers' rates from White Pass to Lake Bennett are 4½ cents per pound on large shipments and 5 cents per pound on shipments of one ton or under.

—In an oil well under the sea, in Summerland, Santa Barbara Co., Cal., this week, was made a "strike" of natural gas, in large quantity, as yet unrestrained.

—The Blue Lakes Water Co. is building a new power plant at Blue Lakes City, near Mokelumne Hill, Cal. Aluminum will be used for electrical conduction.

—Near Stockton, Cal., on the 27th ult. the steam chest on the river steamer T. C. Walker exploded, killing three employees and three passengers, and scalding several others.

—The yield of dry wines in California this year, it is calculated, will be 8,000,000 gallons. The product last year was 27,000,000. Sweet wines will be about half the product of last year.

—The Los Angeles, Cal., Times says the Santa Fe R. R. Co. has purchased from the Southern Pacific a half interest in all trackage rights between that city and Bakersfield, thus giving Santa Fe its entrance into San Francisco.

—The new U. S. of Central America, composed of the republics of Nicaragua, Salvador and Honduras, which had its birth November 1st, had an area of 110,000 square miles and a population of 2,000,000. Its great importance was due to its coast line and the fact that in it will lie the Nicaragua canal. The tripartite republic, however, went to pieces last week.

—From April 1st to June 30th, '98, the U. S. Government chartered fourteen ships on the Pacific coast, having a total tonnage of 41,152, and carrying capacity of 629 officers and 13,059 men with their complete outfit of camp and garrison equipment, arms, ammunition, medical and subsistence stores for a voyage of over 7000 miles to the Philippines. The payment for service vessels, under charter to June 30th, '98, was \$319,764.

—The U. S. battleship Wisconsin was successfully launched at the Union Iron Works, Potrero, San Francisco, last Saturday. The keel of this vessel was laid February 11th, '98; length, 374 feet; beam, 72 feet; depth of main deck, 34 feet 6 inches; depth of superstructure, 42 feet; draught of water, 23 feet 6 inches; displacement, 11,525 tons; speed, 16

knots; two sets triple expansion engines, indicated H. P., 11,000; high pressure cylinder, 33½ inches; intermediate, 51 inches; low pressure, 78 inches; stroke, 48 inches; revolutions, 120; eight single cylindrical boilers, 16 feet 3 inches diameter by 10 feet long; total grate surface, 685 square feet; total heating surface, 21,205 square feet; steam pressure, 180 pounds.

How Our Export Trade Increases.

The remarkable growth in our exports of manufactures is illustrated by a table just prepared by the Treasury Bureau of Statistics, showing the exports of leading articles of manufacture at ten-year intervals during the past thirty years. This table shows the exports of each class of manufactures whose value exceeded \$1,000,000 in the year 1898, comparing that year's exports with those of 1888, 1878 and 1868, and thus presenting a bird's-eye view of the growth of our leading exports of manufactures during a thirty-years' period.

The total export of manufactures in 1898 was more than five times that of 1868, that for 1898 being \$288,871,449, while that of 1868 was in round numbers about \$60,000,000, expressed in the depreciated currency of that date, and when reduced to the gold standard by which our manufactures are now measured would be less than \$45,000,000.

Thirty-four classes of manufactured articles show an export of more than \$1,000,000 each in the year 1898, while in 1868 only seven of those classes showed an export of as much as \$1,000,000 each. Five classes of articles show an export in 1898 of more than \$10,000,000 each, while in 1898 only one of those classes showed an export of as much as \$10,000,000. Even in 1888, only ten years ago, but seventeen of the thirty-four classes showed as much as \$1,000,000 each in value and but three of them passed the \$10,000,000 line. In these calculations it must be borne in mind that values of nearly all articles are now less than at the earlier dates considered, so that these statements of the exports of great groups of articles, while necessarily expressed only in values, doubtless represent in 1898 a larger quantity for each dollar or million of dollars than in 1888 or 1878, and especially more than in 1868, when the values were expressed in depreciated currency.

Of the important classes of manufactures, those of cotton, leather, wood and iron and steel, present the most striking evidence of growth. Exports of cotton goods which in 1868, even expressed in the currency of that date, were less than \$3,000,000, but in 1898 were over \$17,000,000. Exports of leather, which in 1868 were less than \$2,000,000, were in 1898 more than \$21,000,000. Manufactures of wood, which showed an exportation of \$2,000,000 in 1868, were in 1898 over \$9,000,000. Manufactures of iron and steel which expressed in the currency of 1868 were a little over \$3,000,000 were in 1898 over \$70,000,000. None of the great items of export show as rapid growth as copper, of which the exports in 1868 were less than \$500,000, while in 1898 they were over \$32,000,000. Paraffin, a comparatively recent development in the great petroleum industry, amounted to less than \$50,000 in our exports of 1868, while in those of 1898, amounted to more than \$6,000,000.

That these statements, which show a wonderful growth in the value of our exports do not, because of decreased values in most cases, exhibit the real growth in quantities of articles exported, is illustrated in the single case of refined mineral oils, in which the exports since 1868 have increased ten-fold, while the values as expressed in this table are but two and a half times those of 1868. That it is impossible, however, in a table of this character, to show quantities, is of course apparent, as the great classes considered are made up of so many items measured by different units, that it is impracticable, in an attempt to group these facts in a single table, to do more than present statements of total values by classes. The table is as follows:

EXPORTS OF LEADING CLASSES OF MANUFACTURES FROM THE UNITED STATES IN 1868, 1878, 1888, 1898.

| | 1868. | 1878. | 1888. | 1898. |
|------------------------------------|--------------|--------------|--------------|--------------|
| Iron and steel..... | \$ 8,352,466 | \$16,052,709 | \$17,763,034 | \$70,387,527 |
| Refined mineral oils..... | 20,020,016 | 43,564,869 | 41,280,401 | 51,782,316 |
| Copper and manufactures of..... | 479,488 | 2,329,901 | 3,812,798 | 32,180,692 |
| Leather..... | 1,414,372 | 8,080,030 | 9,583,411 | 21,113,692 |
| Cotton manufactures..... | 2,971,054 | 11,438,660 | 13,013,189 | 17,024,092 |
| Chemicals..... | 2,757,732 | 3,414,694 | 5,633,972 | 9,441,783 |
| Wood manufactures..... | 2,086,154 | 3,963,823 | 4,733,104 | 9,098,219 |
| Cycles..... | | | | 6,666,529 |
| Agricultural implements..... | 673,381 | 2,575,168 | 2,645,187 | 7,609,732 |
| Paraffin..... | 47,395 | 155,398 | 2,168,247 | 6,030,222 |
| Paper and manufactures of..... | 524,188 | 1,066,094 | 1,073,661 | 5,494,594 |
| Tobacco manufactures..... | 3,100,084 | 3,621,317 | 3,779,345 | 4,818,493 |
| Fertilizers..... | 35,404 | 1,208,049 | 1,255,028 | 4,359,834 |
| Scientific instruments..... | | 27,929 | 714,514 | 2,770,809 |
| Books, maps, etc..... | 349,993 | 586,355 | 1,734,571 | 2,434,325 |
| Flax, etc., manufactures..... | 592,617 | 1,202,752 | 1,391,216 | 2,557,465 |
| Sugar and molasses..... | 348,579 | 4,920,094 | 3,355,679 | 2,111,656 |
| Carriages and horse cars..... | 404,072 | 979,003 | 1,381,291 | 1,946,231 |
| Spirits..... | 113,121 | 1,149,272 | 871,377 | 1,850,333 |
| Oils, vegetable..... | 186,703 | 323,341 | 381,990 | 1,843,011 |
| India rubber manufactures..... | 170,689 | 305,767 | 866,887 | 1,723,838 |
| Clocks and watches..... | 536,700 | 936,003 | 1,529,606 | 1,727,469 |
| Zinc manufactures..... | 66,214 | 216,580 | 18,601 | 1,339,669 |
| Marble and stone manufactures..... | | 597,356 | 644,544 | 1,792,682 |
| Gunpowder, etc..... | 546,182 | 3,549,459 | 638,616 | 1,595,016 |
| Stationery..... | | | | 1,283,867 |
| Musical instruments..... | 173,341 | 758,477 | 908,540 | 1,006,021 |
| Glass, etc..... | 609,008 | 829,682 | 881,628 | 1,211,014 |
| Brass manufactures..... | 16,841 | 589,451 | 308,124 | 1,300,003 |
| Starch..... | 205,481 | 605,521 | 202,932 | 1,371,549 |
| Soap..... | 626,994 | 658,139 | 815,864 | 1,300,003 |
| Railway cars..... | | 532,340 | 826,465 | 1,478,188 |
| Paints, etc..... | 131,923 | 239,075 | 492,709 | 1,079,518 |
| Wool manufactures..... | 306,879 | 449,084 | 471,353 | 1,069,632 |

NOTE.—Values in 1868 are expressed in currency whose value was 71.5 in gold.

This Paper Fifty-Two Times, POST PAID, \$3.00

Cheaper Way of Sending Circulars.

DURING the recent Miners' Convention in San Francisco it was noticed that some firms dealing in mining machinery issued circulars that were supposed to be distributed throughout the hall; but of that, probably the janitor of the hall who removed the debris could tell better. It is also noticed that some firms in San Francisco and elsewhere now and then get up circulars that they mail, mostly to men who moved from the place a year ago.

It was supposed that everybody understood what a waste of money is always involved in issuing circulars—whether distributed by hand or sent by mail; and while it is evident that those who get out circulars really want to advertise, it is equally evident that they don't know how to get at what they do want. As there appears to be a few (mostly believers in "mining directory" lists) who still think that a circular is a good thing and forget that the circulars that they send out, even when received, are always accorded the same fate that they themselves give to any circular that they receive, namely, throwing it away unread, it is deemed advisable to suggest to them a way in which they can have their circulars do them some good.

To those who have mining machinery for sale, or who want to reach the mining world, and feel disposed to cling to the ancient notion of circulars sent by mail at random to probable or possible customers, it is suggested that they can, without doing violence to their established notions, secure better results in a better way. The following tells them how it can be done, being an illustration of how to do effective circular work at a greatly reduced cost. There are very few circulars that contain more than can be prominently displayed in one page of this paper :

| | |
|--|----------|
| 7,500 good circulars, well printed on fine paper, cost, say, | \$18 75 |
| Envelopes for same, | 6 75 |
| Addressing them, | 5 50 |
| Postage (sealed envelopes), | 150 00 |
| Total, | \$181 00 |

Thus we find that to get 7,500 circulars into the postoffice costs \$181.00. This is on the supposition that the 7,500 names to whom the circulars are addressed are those of men likely to be customers of the concern sending the circulars, which is very unlikely, as no one firm can secure a live list of possible customers that would equal in value a list containing the same number of subscribers of a good live paper that is bought and paid for and seen every week and passed around until in many cases it is worn out from the number of readers through whose hands it goes. Now, instead of spending \$181.00, which is mostly thrown away, how would it do to take the same circular and put it on one page of the **MINING AND SCIENTIFIC PRESS**, the cost of which in place of \$181.00 would be \$42, or less than one-fourth of \$181.00, with a hundred times the greater likelihood of value? The manufacturer or dealer in mining machinery who will spend \$181.00 in an attempt to get his business before 7,500 people, could save \$139.00 by putting that same circular on one page of this paper and be sure to get it before 7,500 definite, known men, thus securing a certainty instead of an uncertainty and at less than one-fourth the cost of the old way.

If a circular is so good a thing as some seem to imagine, here is a chance for them to make money and save money at the same time and to get what they want at very little cost, and in place of firing a scattering shotgun, they can shoot with a rifle and concentrate all their ammunition that way.

In figuring on the cost of these circulars it is assumed that each one is sent sealed, which involves a two-cent stamp; but even were they sent unsealed they would still cost one cent apiece for postage, which would make them cost \$106.00. Herein we show how lovers of circulars can substitute certainty for uncertainty and at far less cost to themselves. The force of these remarks lies in their personal application.

San Francisco, Cal.... **MINING AND SCIENTIFIC PRESS**, 330 Market St.

THE GUTTA PERCHA AND RUBBER M'F'G CO.

30 and 32 FREMONT ST., SAN FRANCISCO.

Spadone's Concentrator Belts. Patented.

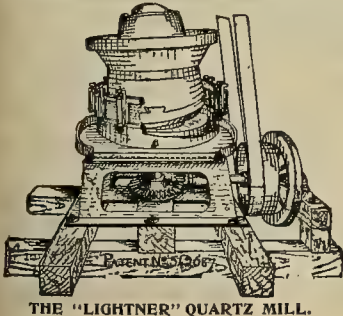
The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman of practical experience.

Illustration (Fig. 1) shows a cross-section, and (Fig. 2) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. We avoid this Mechanical Defect by our Spadone Curved Edge Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.



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|------------------|--------------------------------|--------|
| NO. 1 works 3 | tons per day with 1 1-2 H. P.; | Price. |
| NO. 2 " 4 to 7 | " " " 2 1-2 " | \$225. |
| NO. 3 " 10 to 15 | " " " 3 1-2 " | \$425. |
| | | \$600. |

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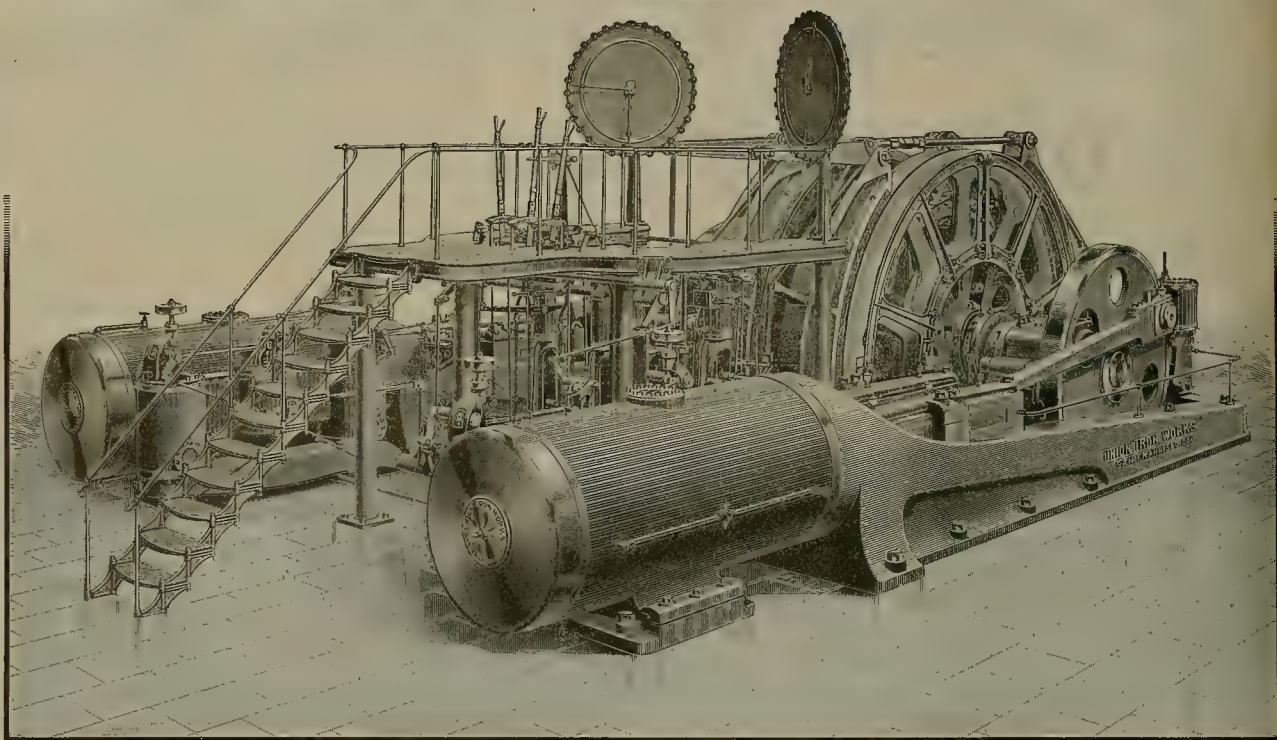
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Direct Acting
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BUILT FOR THE

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Embodying all that
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practical working
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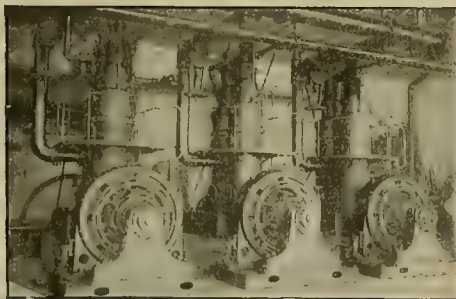
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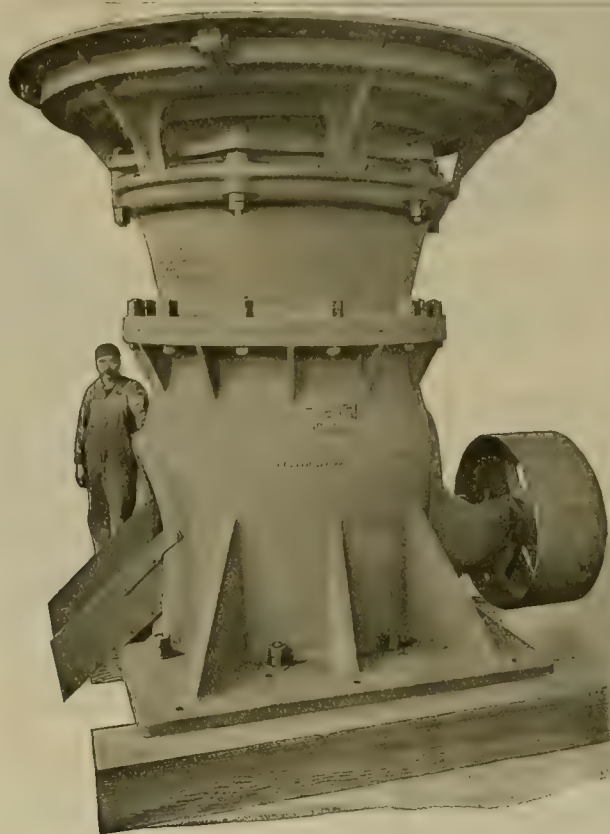
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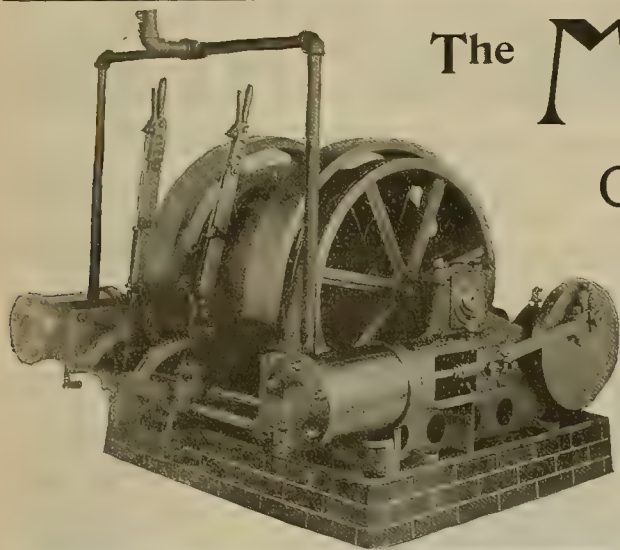
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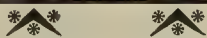
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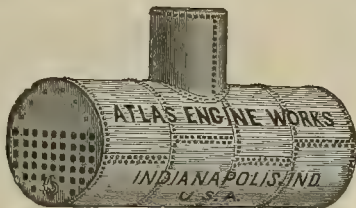
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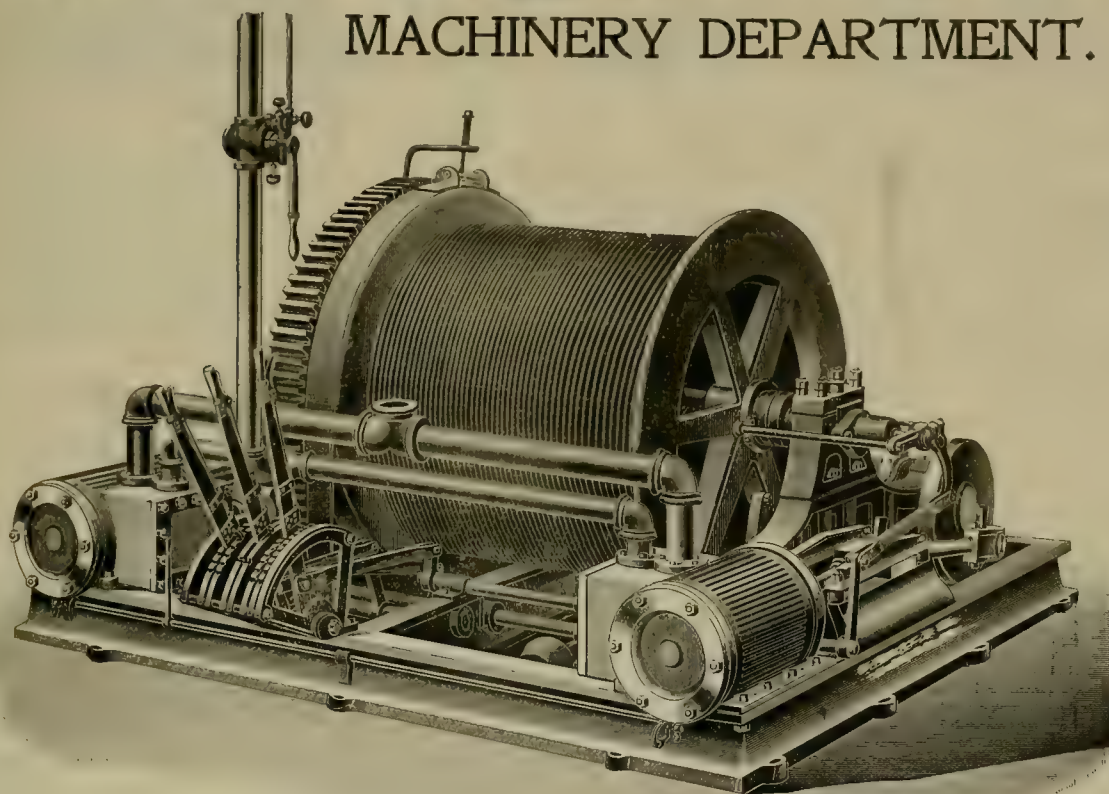
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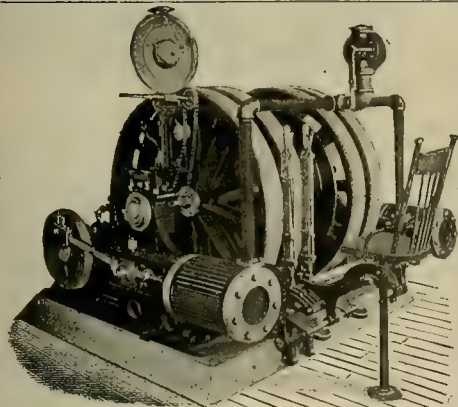


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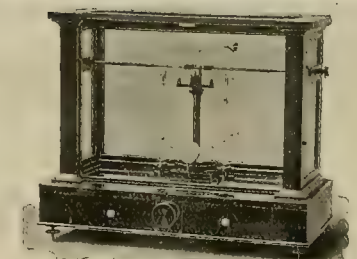
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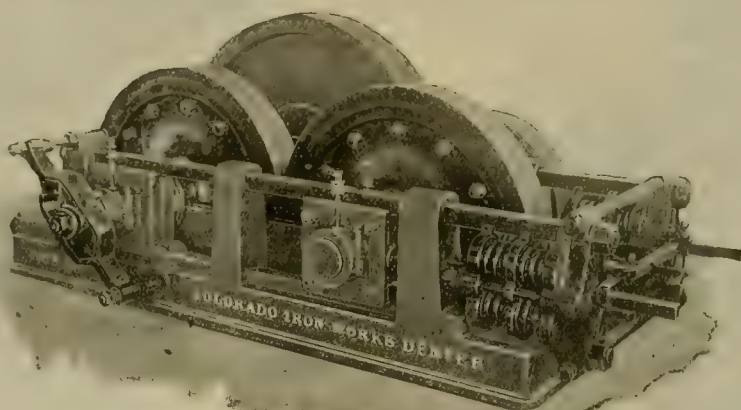
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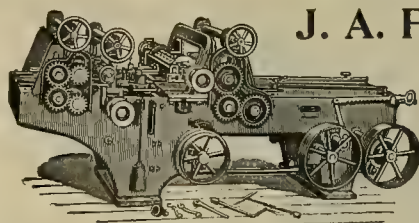
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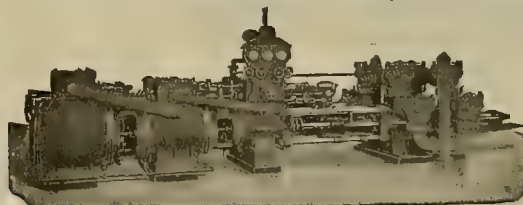
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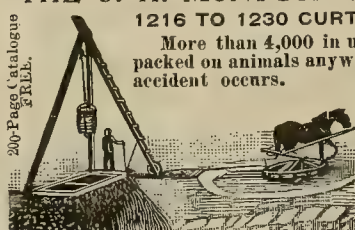
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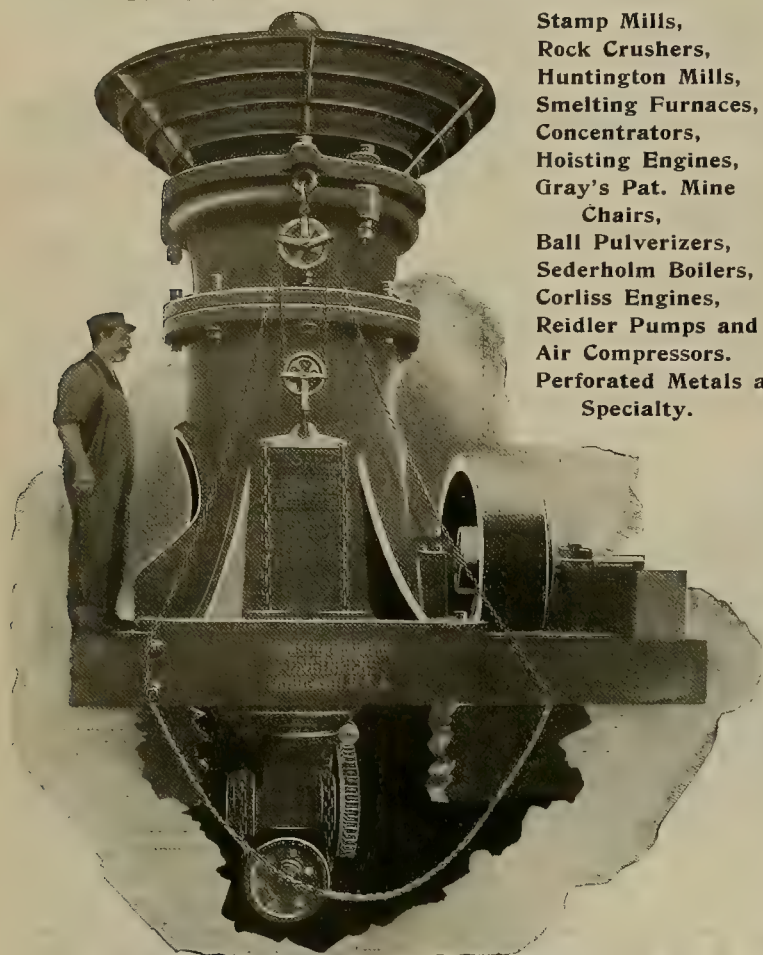
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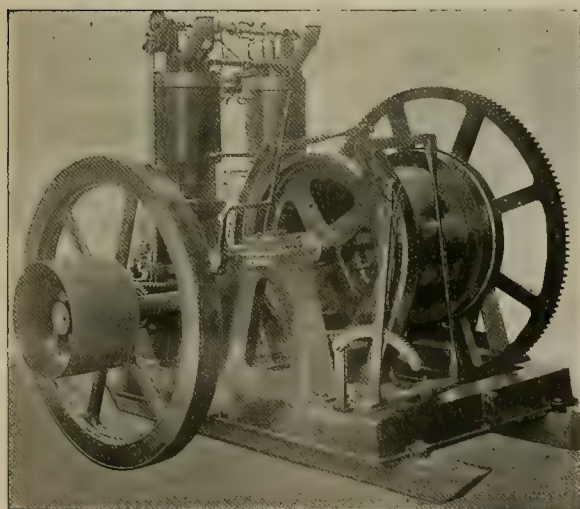
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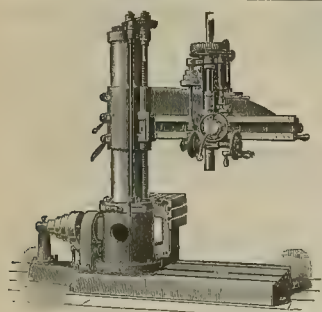
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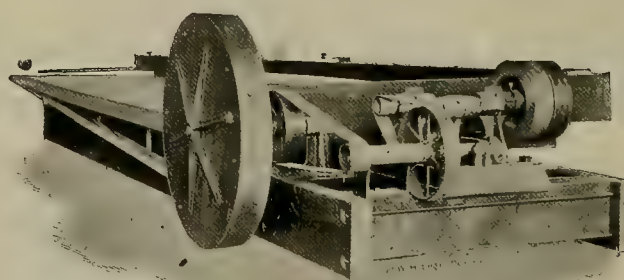
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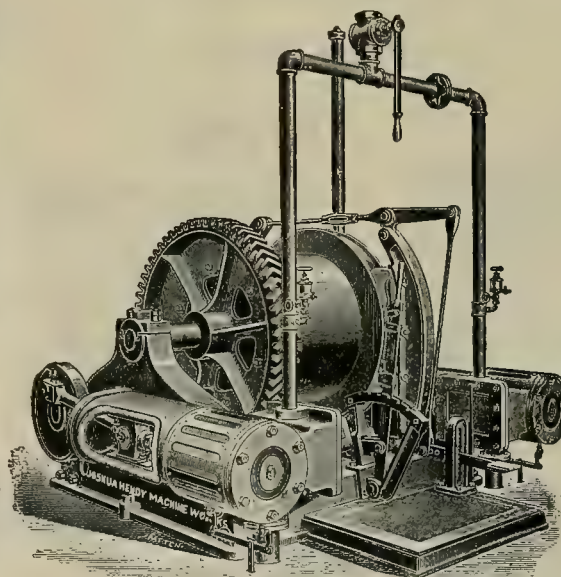
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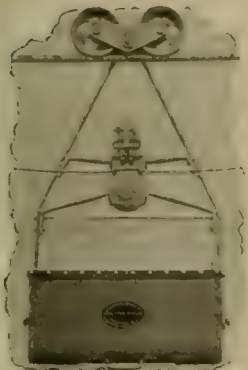
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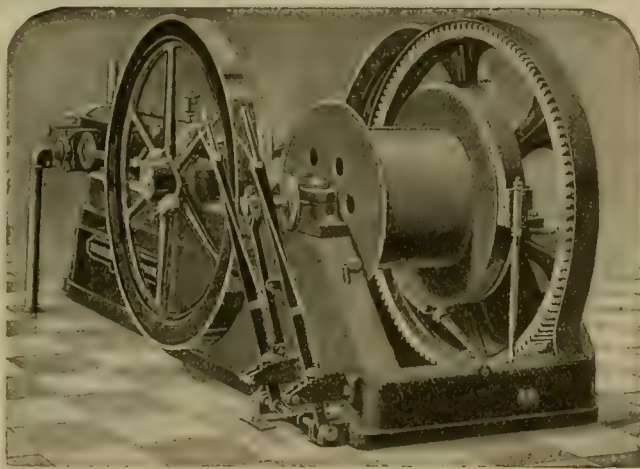
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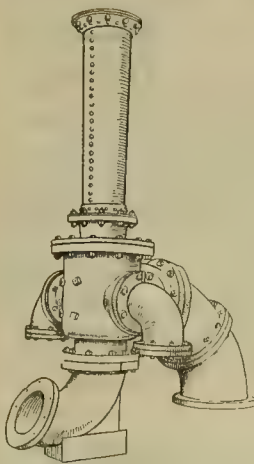
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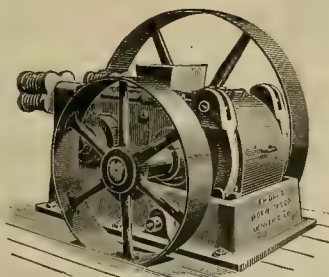
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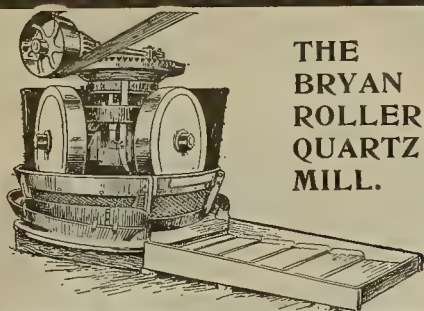
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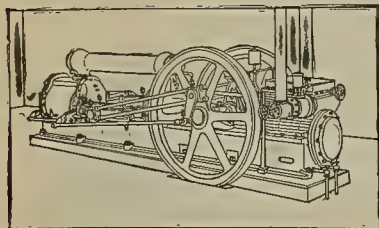


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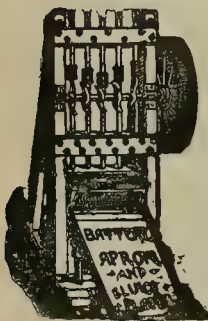


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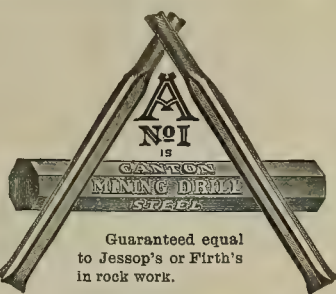
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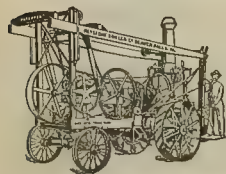
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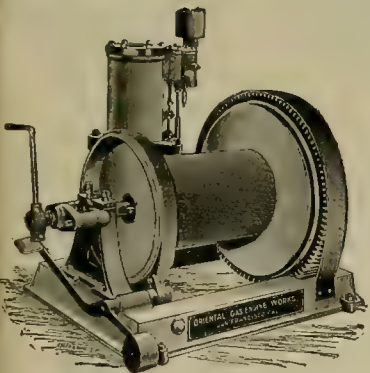
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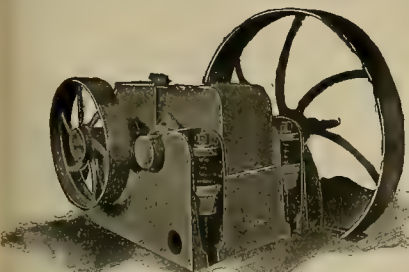
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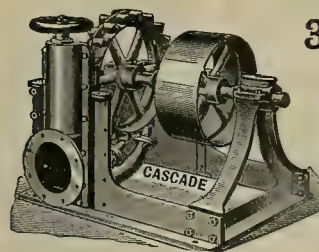
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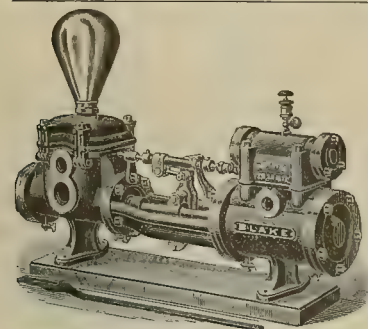
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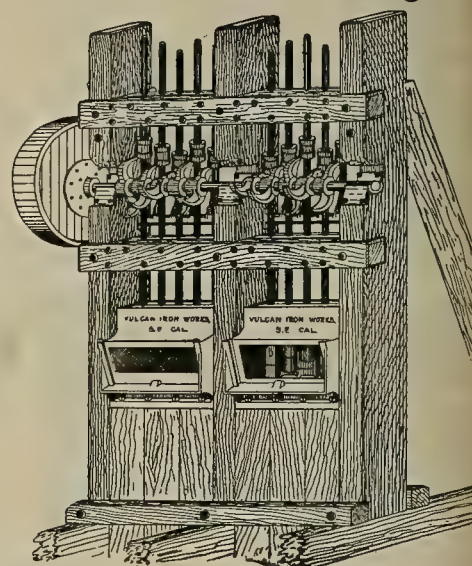
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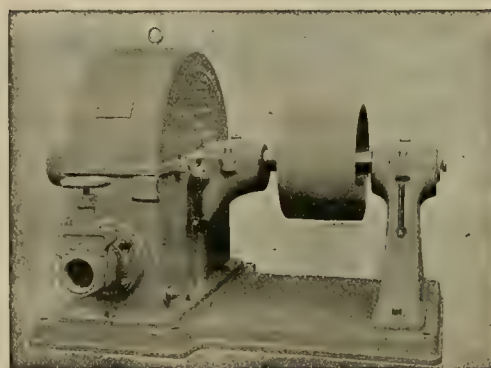
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Pelton wheels afford the most reliable and efficient power for such service and are running the majority of stations of this character in the United States, as well as most foreign countries. Highest efficiency and absolute regulation guaranteed under the most extreme variations of load.

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121 AND 123 MAIN STREET, SAN FRANCISCO, CAL.

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—AND—

***** CHROME CAST STEEL *****

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HARVEY'S DINING ROOMS
And Lunch Counters Offer Good Food Well Cooked and Decently Served at REASONABLE PRICES.

THE altitude of the plateaus and mountains crossed renders the trip cool and pleasant after the desert is passed. No matter which way you go the desert must be crossed and there is less of it on the Santa Fe than on other lines. It is a popular mistake to suppose it is a hot line. Close connections are made in Chicago and Kansas City for all Eastern cities.

Ticket Office, 628 Market St., San Francisco, Cal.

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The Eastern Oregon, } Mining
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AND ALL EASTERN CITIES.
Through Cars and Magnificent Service.

Send six cents in stamps for illustrated book
"Wonderland," to T. K. STATELER,
Gen. Agt., 638 Market St.,
San Francisco.

Colorado's Mining Industry.

There have been a number of interesting and instructive pamphlets issued on this subject by the U. P. D. & G. Ry. and the South Park Line, Colorado's progressive railroads, which reach the principal mining centers of this vast mineral section. They are all carefully and conservatively prepared and will be mailed upon receipt of request and necessary postage. The various publications are as follows:

- La Belle Gold Fields, 2c.
- Gunnison Gold Belt, 2c.
- Hints to Prospectors, 2c.
- Ward Mining District, 1c.
- Pine Creek, 1c.
- Puma, 1c.
- Breckenridge Gold Belt, 1c.

Address
T. E. FISHER,
Asst. General Passenger Agent,
DENVER, COLO. Room B.

Colorado Midland Railroad

Reaches the Grandest Scenery in the World:
Ute Pass, Hagerman Pass, Hell Gate, Pike's Peak, Mount Sopris, Mount of the Holy Cross.

The Most Beautiful Summer Resorts in Colorado:

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The Most Famous Mining Camps:

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AFFORDS THE BEST ROUTE TO THE GREAT NORTHWEST.

Is the only line operating through Pullman Palace and Tourist Sleeping Cars from Denver to Portland, Oregon.

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MERCUR (UTAH), KOOTENAI, KLONDIKE,
Are best reached via
THE OREGON SHORT LINE RAILROAD.

IRRIGATED LANDS OF IDAHO.

Thousands of acres of the choicest lands of the West are located along the line of
THE OREGON SHORT LINE RAILROAD
In Utah, Idaho and eastern Oregon. Splendid opportunities for the Investor, the Farmer and Fruit Raiser.

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GOLD IN COLORADO!

Colorado has within its limits some of the greatest gold mines that has ever been discovered. In Cripple Creek in 1892 there were a few prospectors looking over the hills; in 1895 the camp turned out over \$8,000,000 in gold. Leadville, the old bonanza camp and the mineral product of which made Denver what it is to-day, is becoming a big producer of gold. New inventions for working low-grade gold ores, together with the discoveries made to work rebellious ores, have opened up a field for the miners such as they have never enjoyed before, and Colorado has inducements to offer such as no other district in the world possesses; the record of the State in gold production for the last three years speaks for itself. Among the other prominent camps in the State are Telluride, Ophir, Rico, Silverton, Mineral Point, Durango, La Plata, Ouray, Saw Pit, Ironton, the Gunnison district and many others. New finds are being made and new camps are springing into existence every day. The Denver & Rio Grande Railroad, which is the pioneer road of Colorado and which has always been the miner's friend, reaches all the mining camps in Colorado. For elegantly illustrated descriptive books, free, of mines in Colorado send to

W. J. SHOTWELL, - - - General Agent,
314 California St., San Francisco, Cal.
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General Passenger Agent, - - DENVER, COLO.

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NEW, RICH MINING DISTRICT.

Best reached by way of the
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from CISCO or THOMPSONS stations.

Daily stage from Thompsons to Moab—here outfits can be secured at very reasonable rates—thence by wagon or saddle to LA SAL MOUNTAINS, twenty miles distant.
The formation is igneous and all the metamorphic rocks abound. Veins of quartz, quartzite, porphyry, granite and spar are well defined. The district promises a great future.
Send to F. A. WADLEIGH, Salt Lake City, for pamphlet.

THE POPULAR AND COMFORTABLE
ROUTE TO THE
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You may pay for Experience

but the man who's wide-awake, gets it at some one else's expense.

If you're going to pump—tell us. What we tell you may save many regrets as well as many dollars.

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PUMP, BELL, BRASS AND MACHINE WORKS,
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IMPROVED Gold Pans.



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Patent NON-SHRINKING TANKS
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The only Tank that will stand the Desert and Hot Climate.
Write for Catalogue and Estimate on any kind of Tank Work.

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Chemical and Cyanide Vats a Specialty.

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The National Feed Water Heater.

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Delivering Water to the Boiler at 210 degrees F. Thirty Sizes from 5 to 4000 Horse Power. Made of the Best Seamless Drawn Brass or Copper Tube, with Hard Brazed Joints. Unsurpassed for SIMPLICITY, EFFEC-TIVENESS and RELIABILITY.

HENSHAW, BULKLEY & CO., Agents, - San Francisco, Cal.

—: Send for Catalogue. :—

DEWEY, STRONG & CO., Patent Solicitors, 330 Market St., San Francisco, Cal.

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 1, 1898.

SILVER.—London, 27½d; New York, 59½; San Francisco, 59½; Mexican Dollars, 47½; 47½. New York exchange, sight, 15; telegraphic, 17½ cents premium.

LEAD.—New York dispatch, steady, \$3.67½ bid, \$3.70 asked. The firm naming the settling price for leading miners and smelters at the West quotes Lead \$3.50.

Local, pipe, 6@6½c; sheet, 6½@7c; pig, 5½c; bar, 6c.

COPPER.—New York reports Lake 12.80@12.90.

IRON.—American, soft, \$21.75 and \$23.75 per ton; Scotch, \$24.25.

SPELTER.—6½@7.

TIN.—Pig, 19½, 19½ ton lots; Bar, 20@25c single.

ANTIMONY.—9½, 10.

BABBITT METAL.—10-12-14-16c; best 24c.

QUICKSILVER.—Unchanged. Local, \$42; export, \$37.00 @ 37.50; carload lots, special rates.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½c; less than one ton, 17½c. No. 1* 60%, carload lots, 13½c; less than one ton, 15½c. No. 1** 50%, carload lots, 11½c; less than one ton, 13½c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9½c; less than one ton, 11½c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 725 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington.....\$8 00 Coos Bay.....\$5 00 Seattle.....6 00 Southfield.....7 50

Cargo lots, Eastern and foreign: Wallaseid.....\$7 50 Cumberland.....\$9 00 Brynmor.....7 50 Cannel.....9 50 Pennsylvania, hd., 14 50 Welsh Anthracite. 12 50 Scotch.....8 00 Rock Springs.....7 60

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.08 per gal.; bbl., \$1.03; pure No. 2, cs., \$1.08; 80c; Bunker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.06; less than 200 gals., \$1.10; in bbls., 4c per gal. less than case; Baker's Crystal, \$1.25; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 44c; cs., 49c; raw, bbl., 42c; cs., 47c; lots of 5 bbls., 1c less; Lucol, boiled, bbl., 39c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17½c; Astral, 17½c; Star, 17½c; Eocene, 19½c; Extra Star, 21½c; Elaine, 22½c; Water White, bulk, in tanks, 11½c; Mineral Seal, iron bbls., 21c; wooden bbls., 23½c; cs., 26c; Mineral Spermin, 27c; Deodorized Stove Gasoline, bulk, 18c; do., cs., 18c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½c; do., in cs., 16½c; Lard Oil, Extra Winter Strained, bbl., 56c; cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatsfoot Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs., 60c; Spermin, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31c per lb.; carloads, 29c; in 10-lb. tins 37c; sulphuric acid, 2½c per lb. 66° B.; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2½c per lb.; blue vitriol, 4½c per lb.; borax, refined, 5@6c per lb.; chlorate of potash, 9½@10c; roll sulphur, 2½c; alum, \$1.90@2.00; flour sulphur, French, 2½@2½c; California refined, 1½@1½c; nitric acid, in carboys 8c per lb.; caustic soda, in 10-lb. tins 15c per lb.; Cal. s. soda, bbls., 65c; sks., 60c @ 100 lbs; chloride of lime, spot, 2.10 @ 2.25; salt peter, 15c; chlorate of potash, 25c; caustic potash, 12c.

CANDLES.—Electric Light Candles—6s, 16 oz., 7½c; 6s, 14 oz., 6½c; 6s, 12 oz., 5½c; 6s, 10 oz., 4½c; Granite (Mining) Candles—6s, 16 oz., 8½c; 6s, 14 oz., 7½c; 6s, 12 oz., 6½c; 6s, 10 oz., 5½c. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8c; colored, 9c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.40; cut, \$2.25; 10 to 20d, wire, \$2.45; cut, \$2.30; 8d, wire, \$2.50; cut, \$2.35; 6 and 7d, wire, \$2.60; cut, \$2.45; 4 and 5d, wire, \$2.70; cut, \$2.55; 3d, wire, \$2.85; cut, \$2.70; 2d, wire, \$3.10; cut, \$2.95. In carload lots, 10c per keg less.

CORDAGE.—

1¼-in. cir. (7-16 dia. and upward).....9½ Manila.

12-thread (¾ dia.).....9½

6 and 9 thread (¾ and 5-16 dia.).....10½

Bale Rope (3 and 4 strand).....9½

Bale Rope (2, 6 and 8 strand).....10½

In quantities not less than 10,000 lbs.

San Francisco Stock Board Sales.

SAN FRANCISCO, Dec. 1, 1898.

9:30 A. M. SESSION.

200 Andes.....09c 100 Ophir.....67c

100 Belcher.....23c 100 Overman.....03c

400 Con. Imp.....02c 100 Sierra Nevada.....\$1 20

200 Crown Point.....13c 100 Union Con.....25c

100 Hale & Norc's.....\$1 40 300 Utah.....12c

100 Mexican.....26c

2:30 P. M. SESSION.

300 Mexican.....31c 550 Confidence.....69c

600 Gould & Curry.....17c 1600 Sierra Nevada.....\$1 35

500 Con. Cal. & Va.....\$1 40 100 Utah.....15c

200 Savage.....19c 700 Bullion.....06c

100 H. & N.....\$1 50 500 Union Con.....27c

100 Crown Point.....18c 100 Challenge.....17c

PACIFIC EXPLORATION COMPANY

Finds buyers or working capital for meritorious

mines or good prospects. Correspondence invited.

W. E. Holbrook, Pres't. L. F. Haskell, Sec'y.

29-30 Chronicle Building, S. F.

Personal.

A. D. WHEELER is Mgr. Hiya mine, Florence, Idaho.

M. E. COUL is Supt. Philadelphia gravel mine, Columbia, Cal.

E. P. JENNINGS becomes Supt. Highland Boy mine, Bingham, Utah.

F. X. LA BONTÉ has been appointed Supt. National mine, Redding, Cal.

R. HANLEY, Supt. Niagara mine, French Gulch, Cal., is in San Francisco in ill health.

C. M. EDSON, Toledo, Ohio, part owner and Sec. Pocahontas M. Co., Dayton, Cal., is in San Francisco.

E. H. SWEETSER, Los Angeles, Cal., is examining mining properties in Shasta Co., Cal., with a view to purchase.

W. A. CARLYLE has been appointed Gen. Mgr. LeRoi M. Co., Rossland, B. C. N. Tregear is retained as Supt.

LEW E. AUBURY of Los Angeles, Cal., is consulting mining engineer for the American Exploration Co., 11 Broadway, New York.

MR. HENRY W. NEWHALL, of the Newhall-Curtis Advertising Co., Los Angeles, Cal., has returned from a business visit to Honolulu.

A. B. FRENZEL of New York City is at Ogden, Utah, near which place he is examining properties in which tin is said to have been found.

MR. ROBERT MCF. DOBLE who has engineering charge Mt. Whitney Water Power Co., Visalia, Cal., has offices at 202 Sansome St., San Francisco.

J. W. C. MAXWELL succeeds the late H. C. Pichoir as secretary of the North Bloomfield Gravel M. Co., with offices at 320 Sansome St., San Francisco.

S. A. EASTON, Supt. of the Cumberland mine at Silver City, Idaho, has resigned to accept a like position with the Delano M. & M. Co., Boulder, Colo.

J. EDWARDS of New York City and C. N. Stewart of London, England, reached San Francisco this week. They were en route to Lower California to examine mining properties and shipwrecked near Hieronimo Island, at midnight Nov. 19th. They lost their effects and were saved by a Chinese yacht in search of abalones.

Recently Declared Mining Dividends.

Argonaut, California, \$20,000; Nov. 26.

Lillie G. M. Co., Colorado, \$33,750; Nov. 25.

Strong G. M. Co., Colorado, \$25,000; Nov. 25.

Apple Ellen G. M. Co., Colorado, \$25,000; Nov. 25.

Elkton Con. G. M. & M. Co., Colorado, \$20,000; Nov. 25.

Golden Cycle M. Co., Colorado, \$15,000; Nov. 25.

Associated G. M. Co., Colorado, \$11,000; Nov. 25.

Modoc, Colorado, \$10,000; Nov. 25.

Montreal M. & M. Co., Colorado, \$7500; Nov. 25.

Parrot Silver & Copper Co., Montana, 30 cents a share, \$68,955; payable Dec. 1.

Republic G. M. & M. Co., third dividend, 3 cents per share, \$30,000; payable Dec. 10.

Tiger-Poorman M. Co., Idaho, 2 cents per share, \$20,000; payable Dec. 20.

Big Seven, Montana, September and October dividends, each \$30,000.

Morning Star M. Co., California, \$4 per share; payable immediately.

Mead G. M. & M. Co., California, at the rate of 40 per cent per annum; payable immediately.

Bunker Hill & Sullivan M. & C. Co., Kellogg and Wardner, Idaho, \$21,000; payable Dec. 5th.

Recent Mining Incorporations.

Holler M. Co., San Francisco; capital stock \$50,000; subscribed \$50; J. Holler, J. Winterburn, E. M. Wilson, W. Hoffschneider, A. Hoffschneider.

Gold Bug Con. G. M. Co., San Francisco; capital stock \$100,000; subscribed \$50; W. E. Lester, A. Waterman, H. B. Goodwin, H. M. Gorhan, S. S. Jones.

Commodore G. M. Co., San Francisco; capital stock \$50,000, all subscribed; T. Mein, R. M. Mein, J. A. Chestnut, E. M. Williams, F. J. Fletcher.

Mountain Beauty M. Co., Los Angeles; capital stock \$250,000; subscribed \$225,000; E. H. Little, J. A. Shelhamer, E. H. Caner, H. A. Perkins, F. J. Eddy.

Polasky Gravel Mine, San Francisco; capital stock \$25,000; subscribed \$50; W. Strader, H. W. Gray, T. C. Sterrett, J. F. Holling, R. W. Wihl.

Golden Gate Exploration Co., San Francisco; capital stock, \$75,000; subscribed, \$5000; G. R. Tuttle, A. Furrer, A. Linderman, C. von Reischach, T. Fox.

Miocene G. M. Co., San Francisco; capital stock, \$100,000; subscribed, \$50,000; A. M. Butte, S. E. Starrett, W. H. Butts, E. P. Lynch, E. J. Banning.

Mines or prospects operated on contract to purchase, 10% or under lease on fixed royalty or percentage, MONEY loaned, mines, MINING companies organized, their property experted, financed and managed, MINES, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated, EXAMINE mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

EDW. N. BREITUNG, Marquette, Mich. Cable address Edine. Code, Leber's Reflector, McNeil's A B C Universal Commercial. U. S. A.

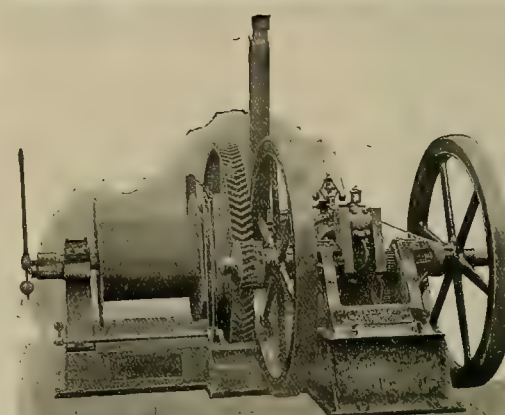
Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.



FRESNO, June 25, 1898.

Hercules Gas Engine Works, San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gasoline engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LODE M. & D. CO.,

Per N. W. Moody, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET,

SAN FRANCISCO, CAL.

Commercial Paragraphs.

THE Jeanesville Iron Works Co.'s Denver office has shipped one of their large improved sinking pumps to the Moon-Anchor gold mines, and a high-lift station pump to Leadville.

THE Gates Iron Works of Chicago, Ill., is in receipt of an order from Australia for nine sets of the Gates Standard high-grade 36-inch rolls, weighing 33,000 pounds each. This order is from a mining company to whom the Gates Iron Works have supplied a number of their large breakers, six having been shipped to them this year.

THE Vulcan Iron Works of San Francisco have recently filled a second order from the U. S. government for a Vulcan ice making plant for the Philippine islands, same being a duplicate of ice making plant now in operation at Manila. The Vulcan Iron Works have equipped the steamer Senator of the Pacific Coast Steamship Co. with a Vulcan ice and refrigerating plant, and are now installing a similar plant on the steamer San Jose of the Pacific Mail Steamship Co. These works are also filling an order for an ice machine for the Indian school at Fort Mojave, and are supplying the Mentone factory of the Union Ice Co. with ammonia fittings, mineral wool, etc., for the extension of their freezing capacity.

THE American Type Founders Co., formerly owners of the Hercules Gas Engine Works, has sold all its right, title and interest, together with patents covering the Hercules Gas, Gasoline and Oil Engines, to W. R. Van Brunt, O. N. Owens and Theodore Poindexter. The buyers have incorporated under the name of the Hercules Gas Engine Works, and will continue the business. It is the intention of the new owners to inaugurate improvements in their plant and their line of manufacture. T. Poindexter is president and manager; O. N. Owens, vice-president and superintendent; W. R. Van Brunt, secretary and treasurer. Messrs. Poindexter and Owens have been identified with the Hercules engines for many years; Mr. Van Brunt is a well-known business man of San Francisco and connected with the Spreckels Bros.' line of steamers. The new company will temporarily continue its offices at 405-407 Sansome St., San Francisco.

Obituary.

SUPT. MILNER of the Dexter mine at Tuscarora, Nevada, died at that place last week of typhoid pneumonia.

A Tour of Old Mexico.

The Gulf Road is arranging for a high-class, personally conducted tour of old Mexico, to start from Denver January 24, 1899. This excursion, which will cover a month, will comprehend all that is of scenic and historic interest in the sister Republic, penetrating far south of the city of Mexico and off the beaten paths of the tourist.

The trip will be by special train of luxurious sleeping cars, observation cars and dining cars for the entire distance, and nothing that might contribute to the pleasure or comfort of our patrons will be omitted.

The party from Colorado and west thereof

will be under the personal charge of the Assistant General Passenger Agent of the Union Pacific, Denver & Gulf Railway.

The cost for this unusually fascinating trip, \$350 from Denver or other points in Colorado en route, is very low, considering that it covers all legitimate items of expense. One could not individually make this trip for twice that amount.

If you are contemplating a trip this winter we should be glad to give you more detailed information and to furnish you with a complete itinerary.

T. E. FISHER, Asst. Gen. Pass. Agt. Gulf Road, Denver, Colo.

Acetylene Gas.

A handsome new illustrated catalogue will tell you where and by whom the new light is being used, and what the verdict is. Mailed upon application. PACIFIC ACETYLENE GAS CO., 115 New Montgomery St., San Francisco.

J. D. BETHUNE, (Late Associate Justice Supreme Court.)

Attorney at Law, Mining Law,

PRESCOTT, ARIZONA.

A Valuable Gold Property for Sale.

UTAH

Mines—Dividend Paying

and Investment Stock.

W. E. HUBBARD & CO., 15 W. 2d St. So. Street, SALT LAKE CITY.

Quicksilver

FOR SALE IN LOTS TO SUIT.

Agents for Redington Quicksilver Mine.

REDINGTON & COMPANY, Wholesale Drug-gists, 23-25-27 Second Street, San Francisco.

TUBBS CORDAGE CO.

(A CORPORATION.)

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Duplex Rope, Tarrad Manila Rope, Hay Rope, Whale Line, etc., etc. Extra sizes and lengths made to order on short notice

611 and 613 Front St., San Francisco, Cal.

ANTIMONY.

We buy Antimony Ore in any quantity and pay prompt CASH for same. Write us and let us know what you have.

Chapman Smelting Works Co., (INCORPORATED.) 422 Battery Street.....San Francisco, Cal.

The Best Time to Advertise :



In the MINING AND SCIENTIFIC PRESS is when you want More Business.

Assessment Notices.

MARINA MARISCANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of November, 1898, an assessment (No. 15) of 2 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 24th day of December, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 10th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
CHARLES BUOVONE, Secretary.
Office—217 Sacramento street, San Francisco, California.

CONSOLIDATED ST. GOTHARD GOLD MINING COMPANY.—Location of principal place of business, 113 Crocker building, San Francisco, California; location of works, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of November, 1898, an assessment (No. 16) of Ten Cents (10c.) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 113 Crocker building, sixth floor, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 14th day of December, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 30th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. F. HOLLING, Secretary.
Office—113 Crocker building, sixth floor, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of November, 1898, an assessment (No. 85) of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of December, 1898, shall be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 29th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
ALFRED K. DORBROW, Secretary.
Office—Room 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

ARRASTRAVILLE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of November, 1898, an assessment (No. 2) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 218 Jackson St., San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of December, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 17th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. MIDDLETON, Secretary.
Office—218 Jackson street, San Francisco, California.

DELINQUENT SALE NOTICE.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 11) levied on the 3d day of October, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------|-----------|-------------|---------|
| Peter Heinrichs..... | 71 | 500 | \$50.00 |
| J. Young..... | 270 | 200 | 20.00 |
| Jos. Rohrer..... | 279 | 50 | 5.00 |
| Kathe. Young..... | 280 | 50 | 5.00 |

And in accordance with law, and an order from the Board of Directors, made on the 5d day of October, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, No. 237 Twelfth street, San Francisco, California, on MONDAY, the 5th day of December, 1898, at the hour of 5:30 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
F. METTMANN, Secretary.
Office—237 Twelfth street, San Francisco, California.

ANNUAL MEETING NOTICE.

The Annual Meeting of the Stockholders of the EUREKA CONSOLIDATED DRIFT MINING COMPANY will be held at its offices, Nos. 1209-1211 Claus Spreckels Building, San Francisco, at 1 o'clock MONDAY, December 10th, 1898.

J. J. CRAWFORD, Secretary.

DIVIDEND NOTICE (No. 1).

MEAD GOLD MINING AND MILLING COMPANY.—The Board of Directors of the Mead G. M. & M. Co., at their regular monthly meeting, held on the first day of Dec., 1898, declared a regular quarterly dividend at the rate of forty (40) per cent per annum on the par value of the stock of the corporation, payable immediately at the office of the company, 411 Claus Spreckels Bldg., San Francisco. Transfer books close Nov. 28, '98.

G. GALL, Secretary.

Skeleton Mining Report.

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DELINQUENT SALE NOTICE.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich gulch, Shasta County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the 22nd day of August, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|-----------------------|-----------|-------------|----------|
| C. Rehn..... | 75 | 2,000 | \$200.00 |
| C. Rehn..... | 79 | 500 | 50.00 |
| C. Rehn..... | 81 | 499 | 49.90 |
| C. Rehn..... | 82 | 1 | 10 |
| M. Schiffmann..... | 8 | 100 | 10.00 |
| G. F. Ochs..... | 9 | 250 | 25.00 |
| G. F. Ochs..... | 105 | 200 | 20.00 |
| G. F. Ochs..... | 170 | 100 | 10.00 |
| E. S. Heller..... | 10 | 100 | 10.00 |
| A. Schiffmann..... | 12 | 50 | 5.00 |
| C. Warnke..... | 153 | 250 | 25.00 |
| L. Hehenmann..... | 15 | 200 | 20.00 |
| T. J. Sullivan..... | 18 | 500 | 50.00 |
| E. Schulz..... | 41 | 200 | 20.00 |
| E. Schulz..... | 133 | 50 | 5.00 |
| F. Forbes..... | 43 | 500 | 50.00 |
| C. Rubenke..... | 19 | 100 | 10.00 |
| N. Stand..... | 29 | 50 | 5.00 |
| J. Green..... | 104 | 200 | 20.00 |
| W. J. Rustemeyer..... | 109 | 500 | 50.00 |
| W. J. Rustemeyer..... | 116 | 500 | 50.00 |
| W. J. Rustemeyer..... | 117 | 500 | 50.00 |
| G. Schmitt..... | 47 | 5,000 | 500.00 |
| G. Schmitt..... | 48 | 2,000 | 200.00 |
| G. Schmitt..... | 49 | 2,000 | 200.00 |
| G. Schmitt..... | 51 | 1,000 | 100.00 |
| G. Schmitt..... | 221 | 500 | 50.00 |
| G. Schmitt..... | 61 | 500 | 50.00 |
| J. G. Iis..... | 142 | 4,150 | 415.00 |
| S. M. Fernandez..... | 146 | 100 | 10.00 |
| F. Wagoner..... | 156 | 1,000 | 100.00 |
| J. E. Stevens..... | 156 | 500 | 50.00 |
| H. Page..... | 203 | 1,000 | 100.00 |
| H. Page..... | 205 | 1,000 | 100.00 |
| H. Page..... | 206 | 1,000 | 100.00 |
| W. Pattison..... | 207 | 200 | 20.00 |
| W. J. Smith..... | 218 | 700 | 70.00 |

And in accordance with law, and an order from the Board of Directors, made on the 22nd day of August, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, room 57, 916 Market street, San Francisco, California, on FRIDAY, the 25th day of November, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
GEO. W. FLEISSNER, Secretary.
Office—916 Market street, room 57, San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed to MONDAY, December 5th, 1898, at the same place, at 10 o'clock A. M. By order of the Board of Directors.

GEO. W. FLEISSNER, Secretary.
Office—916 Market street, room 57, San Francisco, California.

DELINQUENT SALE NOTICE.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Riverside County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 10th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------------|-----------|-------------|---------|
| W. H. Bailey, Trustee..... | 260 | 2,000 | \$30.00 |
| W. H. Bailey, Trustee..... | 261 | 2,000 | 30.00 |
| W. H. Bailey, Trustee..... | 262 | 10,000 | 150.00 |
| C. A. Bailey..... | 133 | 1,000 | 15.00 |
| C. A. Bailey..... | 135 | 1,000 | 15.00 |
| C. A. Bailey..... | 136 | 1,000 | 15.00 |
| C. A. Bailey..... | 138 | 500 | 7.50 |
| C. A. Bailey..... | 169 | 2,000 | 30.00 |
| C. A. Bailey..... | 210 | 4,522 | 67.98 |
| R. L. Cheney, Trustee..... | 245 | 5,000 | 75.00 |
| R. L. Cheney, Trustee..... | 246 | 5,000 | 75.00 |
| R. L. Cheney, Trustee..... | 247 | 5,000 | 75.00 |
| R. L. Cheney, Trustee..... | 248 | 5,000 | 75.00 |
| R. L. Cheney, Trustee..... | 249 | 5,000 | 75.00 |
| R. L. Cheney, Trustee..... | 250 | 5,000 | 75.00 |
| R. L. Cheney, Trustee..... | 251 | 2,500 | 37.50 |
| R. L. Cheney, Trustee..... | 252 | 1,000 | 15.00 |
| W. H. Bailey, Trustee..... | 256 | 3,300 | 49.50 |
| W. H. Bailey, Trustee..... | 259 | 7,300 | 109.50 |
| W. H. Bailey, Jr..... | 147 | 1,000 | 15.00 |
| W. H. Bailey, Jr..... | 148 | 1,000 | 15.00 |
| W. H. Bailey, Jr..... | 149 | 1,000 | 15.00 |
| W. H. Bailey, Jr..... | 150 | 1,000 | 15.00 |
| W. H. Bailey, Jr..... | 151 | 1,000 | 15.00 |
| W. H. Bailey, Jr..... | 152 | 2,500 | 37.50 |
| W. H. Bailey, Jr..... | 208 | 4,000 | 60.00 |
| W. H. Bailey, Jr..... | 209 | 522 | 7.98 |

And in accordance with law, and an order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, Room 508 Safe Deposit Building, San Francisco, California, on TUESDAY, the 1st day of November, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
R. L. CHENEY, Secretary.
Office—Room 508 Safe Deposit Building, San Francisco, California.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed to THURSDAY, December 1st, 1898, at the same hour and place. By order of the Board of Directors.

J. W. PEW, Secretary.
Office—310 Pine St., Room 15, San Francisco, Cal.

POSTPONEMENT.

The day of sale of the above delinquent stock has been postponed to THURSDAY, December 15th, 1898, at the hour of 1 o'clock P. M., at the office of the company. By order of the Board of Directors.

J. W. PEW, Secretary.
Office—No. 310 Pine street, room 15, San Francisco, California.

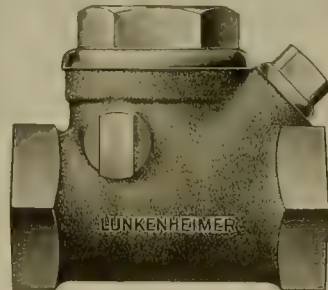
THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from the Wintz Mining & Improvement Co., to mine near Pleasant Valley, El Dorado Co.; to deposit tailings on a flat below the mine; from Joel Bean, in the Cleveland Mine No. 2, near Scales, Sierra Co., to deposit tailings in Rock Creek; from J. B. Jones, in the Haskell Valley Mine, near Buck's Ranch, Plumas Co., to deposit tailings on a flat below the mine; from Thos. Gomez, in the Snowy Side mine, near Buck's Ranch, Plumas Co., to deposit tailings in Willow Creek; from N. E. Frills, in the New York Mine, near Buck's Ranch, Plumas Co., to deposit tailings in Willow Creek; from J. C. Horner, in the Chaplain Mine, near Buck's Ranch, Plumas Co., to deposit tailings in Willow Creek; from Llewellyn A. Hoeflich, in the Rocky Bar Mine, near Nelson Point, Plumas Co., to deposit tailings in worked out pits; and from C. W. Ayers, in the Orleto Gravel Mine, near Jamestown, Tuolumne Co., to deposit tailings on a flat below the mine, gives notice that a meeting will be held at room 69, Flood Building, San Francisco, Cal., on December 12, 1898, at 1:30 P. M.

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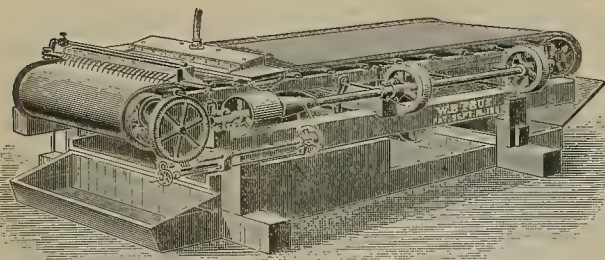
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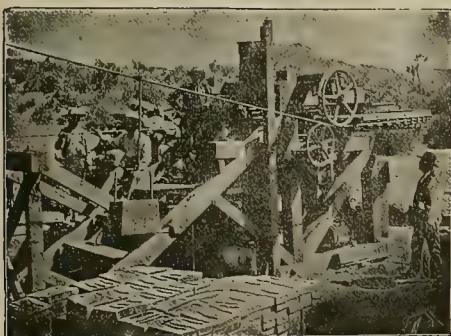
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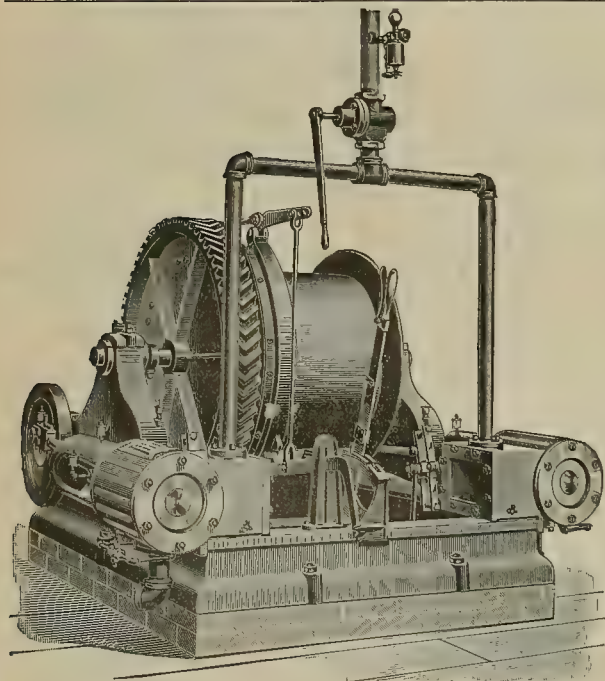
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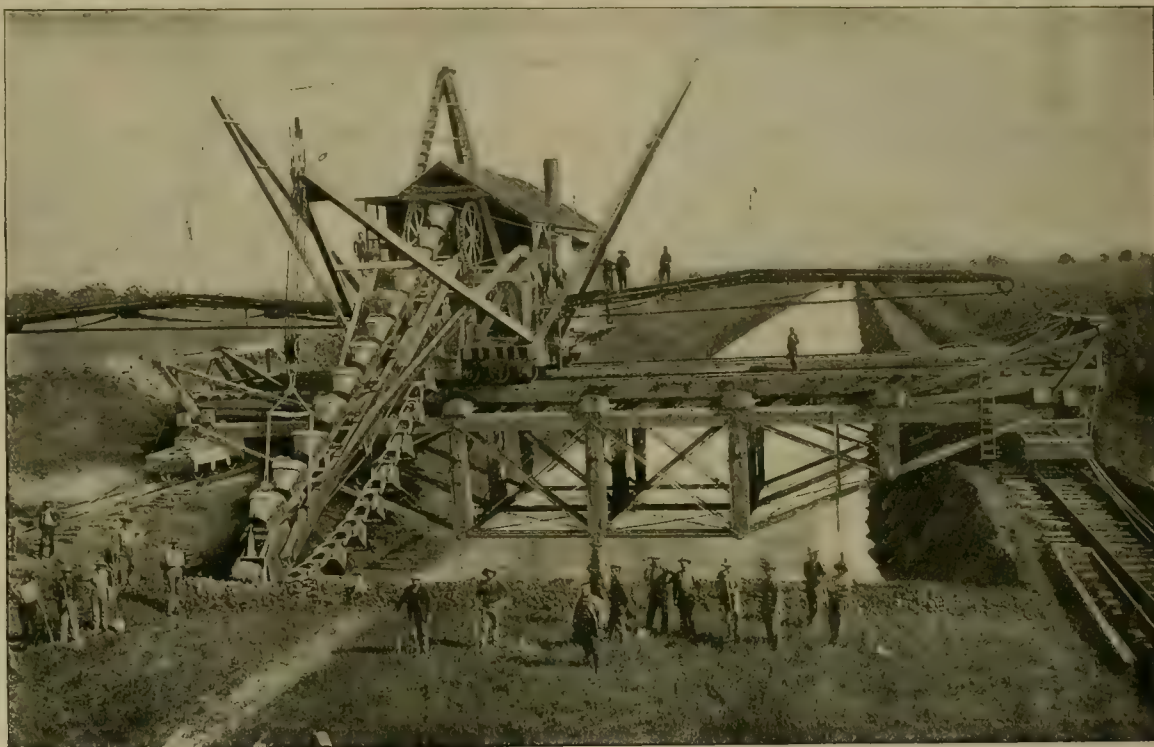
No. 2005.—VOLUME LXXVII.
Number 24.

SAN FRANCISCO, SATURDAY, DECEMBER 10, 1898.

THREE DOLLARS PER ANNUM.
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Excavation of Irrigating Canals.

The need of irrigation in California, manifested by such serious drought as that of '98, lends interest to the progress in that direction of many large enterprises. A recent one of some magnitude in Colusa Co. attracts attention, because of its extent and the appliances used in effecting results. The main canal for the Central Irrigation District was cut in sections. Herewith is illustrated the excavator used by the San Francisco Bridge Co. in constructing six miles of that canal, 60 feet wide on the bottom, 100 feet wide on the top, and from 10 to 20 feet deep, the average depth being 15 feet. From the bottom of the canal to the top of the spoil banks was 35 feet in some sections. The top soil was loam, the middle and bottom strata hard, cemented gravel and hardpan. This hardpan, as usual, was impervious, and the water table of that section of country for most of the year lay two feet above the bottom line of the projected canal, thus rendering impossible any effort to drain the bed. It was this fact that led to the designing of the machine here shown at work. It will be noticed that owing to the impossibility of supporting it on the bottom of the ditch, because of the water there, the machine is held up on either side by a railway track on the canal banks. The machine as shown has a daily capacity of 4000 cubic yards, delivering the excavated material on each side about 12 feet farther outward from the



EXCAVATING IRRIGATION CANAL, COLUSA CO., CAL.

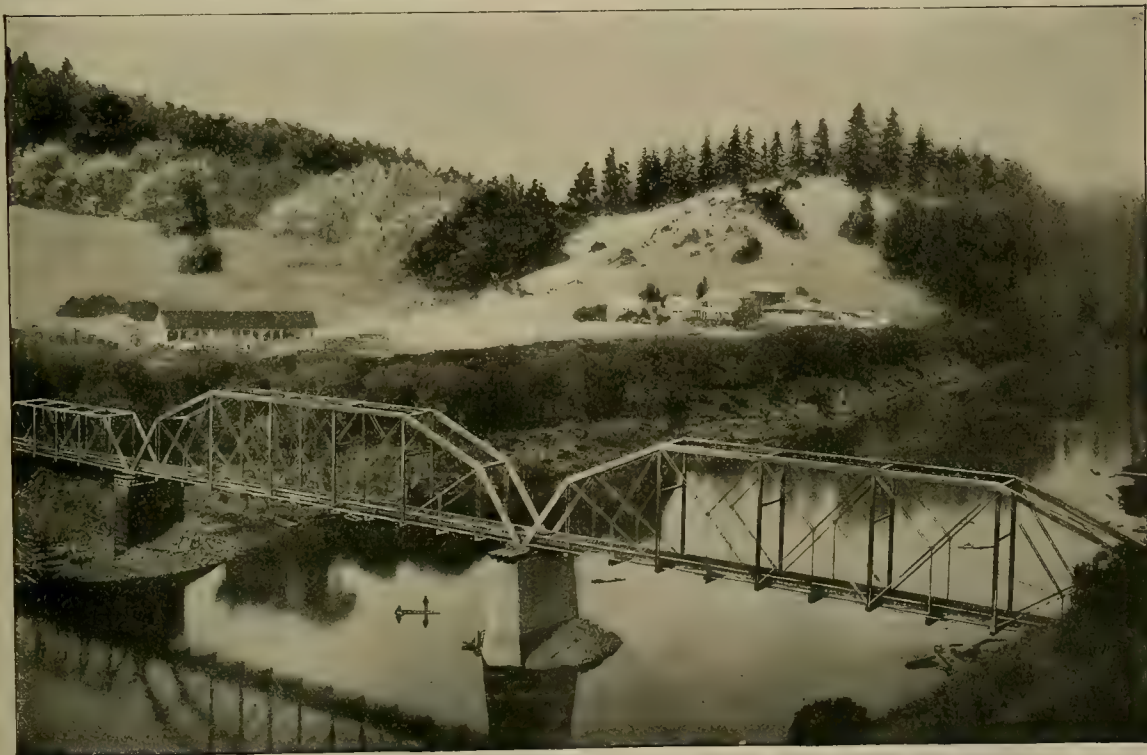
edge of the banks or sides of the canal. The excavator traveled transverse to the ditch on a car supported by a bridge which spanned the canal, the spoil being carried on each or either side by a belt conveyor. As the machine passed the center, a tilting boom in the hopper delivered the

excavated earth first to one conveyor and then to the other, the whole machine continuing to be carried forward longitudinally with the ditch as dug by means of the cars on which it rested on the banks. The movements of the machine were all under the control of one leverman, observable in the illustra-

tion standing on the platform to the left of the bucket, from that position controlling levers to raise or lower the bucket chain, to move the car to the right or left, moving it forward on the side tracks and operating the engine. The car, bridge and machinery of the excavator weigh about 600,000 lbs. As the canal excavation progresses the rear track is taken up and relaid in front.

Some of the irrigation and canal work in California, more especially in the central and southern part of the State, is, like that above noticed, remarkable for its magnitude and the novel nature of the apparatus for construction, in many cases specially devised. Another canal built by the same company for the Stanislaus & San Joaquin Water Co. is sixty miles in length and carries water for the irrigation of 50,000 acres of land in Stanislaus and San Joaquin counties.

Besides thus creating artificial waterways, the San Francisco Bridge Co. also builds steel railways over the natural water courses of the State. On this page is also portrayed a steel bridge built for the N. P. C. R. R. Co., over the Russian river at Duncan's Mills, Sonoma Co. At the spot depicted there is in times of flood, a rise of 40 feet, and a current of ten miles per hour. This fact, coupled with the limited appropriation, required the utmost economy, and unusual strength in piers and superstructure, a combination which appears to have been dealt with successfully.



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J. F. HALLORAN.....Publisher

San Francisco, December 10, 1898.

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SOME mining suits are as interminable as cases in chancery. At Washington, D. C., this week, argument was begun in the Supreme Court of the United States in the La Abra Silver Mining Company case, which has been before the court, in one form or another, since 1870, when an award of \$683,000 was made in favor of the company against the Government of Mexico and the money paid into the United States treasury. The payment never was paid, owing to charges of fraud in the proof supplied by the company in the prosecution of its case. The purpose of the present proceeding is to foreclose the claims of the company against the money paid in by Mexico. It is an appeal from the Court of Claims, in which tribunal the decision was against the mining company.

THE "absolute zero of temperature" lies 273° below the melting point of ice, Centigrade, or 460° Fahrenheit. This temperature has not been reached. It is unlikely that it will ever be reached, but an approach has recently been made to it by liquefying hydrogen gas and allowing it to boil at the atmospheric pressure. The temperature reached in this manner is about 243° Cent. It is thought that Professor Dewar, who has recently succeeded in liquefying hydrogen in quantity, will be able to produce a still lower temperature by causing the liquid hydrogen to boil in a vessel connected with an air pump, so that the pressure is reduced. For just as raising the pressure raises the boiling point of a liquid, as exemplified in the boiler of a steam engine, so lowering the pressure lowers the boiling point.

WHENEVER a considerable gold property is bought nowadays it is fashionable to ascribe the purchase to "the Rothschilds." So, whenever transpires the transfer of a copper property it appears customary to credit the Standard Oil Co. with desire or intent to "control all the copper mines in the United States." That were a big contract, too big even for the hundreds of millions of the great oil monopoly. Unlike oil production the copper product of this country is not susceptible of control by any aggregation of capital. When statements are put out by the daily press it is probable that behind or under the assertion is the manipulator of stock. For the past six weeks assertions have been made regarding control of the copper output that can only be credited to an effort to "boom" certain copper stocks. A few figures are in order. There are 100,000 shares in Calumet & Hecla. According to the daily press, Mr. Rockefeller "is offering \$800 per share for all of it." That is \$80,000,000. The Boston & Montana has 150,000 shares. For that \$500 per share is alleged to be offered, or \$75,000,000. The Anaconda Copper Co. is set down as being worth \$75,000,000 more in the schedule put out by the press reports: here, so far, is a reported inten-

tion to invest \$230,000,000 in securing a small segment of a great circle. To "corral" the copper producers would, in the same ratio, require an investment of \$1,000,000,000, a sum that is believed to exceed three times over all the combined resources of the Standard Oil Co.

"About --- Face."

Three years ago this paper, in an article discussing the industrial situation, said that whenever San Francisco quit thinking itself "the back door of the nation," but faced the other way, making itself "the front door," that the commercial horizon would be profitably broadened. J. J. Hill, the president of the Great Northern, at Seattle, Wash., this week, said:

"Look to the East and you find some 50,000,000 people who want but a small fraction of anything that you can produce here. On the other hand, look to the West, across the Pacific ocean, and you have 500,000,000 people who want everything you can produce and at your own price."

That is what this paper has been asserting. San Francisco builds great battleships and is splendidly advertised thereby the world round. The Oregon and Olympia have added new glories to the great flag that flies proudly with not a stripe torn nor a star missing. Doubtless, too, when the battleships Wisconsin and Ohio, now building here, are called upon, they will in that day of trial add new luster to local fame. The same skill that so grandly aids in the triumphs of war should be equally manifest in the achievements of peace. One sure way to get and hold commercial relations with the Pacific countries is an American merchant marine, and on this coast is the material. Everything is ready—the ability—the opportunity. Shall it be said that the inclination is wanting?

Minority Rights in Mining Partnerships.

A California subscriber asks: "In a case of several co-owners in a mining property, can the parties owning the lesser amount of the claim bring suit and force a sale of the whole property, and have the money divided?" This is a question of fact, the facts in the case not being stated. As an abstract proposition, if the party desiring partition or sale or both can prove in court the justice or equity of such wish, an order of sale is possible. As in all such queries a definite opinion of specific value can only be given by one in full possession of all the facts. On this general subject in the case of Dougherty vs. Creary, 30 Cal. 301, the Supreme Court of California says: "The conduct of the partners holding the major portion of the property in a mining concern is to be most jealously scrutinized when complaint is made, by the minority in interest, of oppression. It might, and often would, work great inconvenience and damage to the minority in interest in a mining partnership, if the majority were allowed to do as they might deem to their own advantage, regardless of the rights and interests of the minority; but, notwithstanding the danger of the abuse of power in such cases, what may be necessary and proper for carrying on the business of mining for the joint benefit of all concerned must be determined by those owning and holding in the aggregate the major part of the property; and if the powers which are thus attempted to be exercised are not necessary and proper for the success of the enterprise, those whose interests are imperiled or disastrously affected thereby have the right to resort to the courts for redress and protection."

It has often been seriously stated that at Washington, D. C., in the treasury department are two experts, one steadily engaged in the effort to produce an ink that cannot be successfully obliterated, the other in a more uniformly successful effort to "wash out" the ink so produced, and leave the inked surface in a condition that shows no trace of such treatment. Whether this be so or not, it is evident that between the safe maker and the safe breaker—the metallurgist and the burglar—there has been a somewhat similar contest for twenty-five years, the burglar being ahead in the scientific result of success in entering the finest constructed safes. Safe makers have long noted the use miners make of manganese steel, and have experimented

with such material in hopes of producing an absolutely burglar-proof safe made of manganese steel. Recent government tests at West Point, Willets Point and Newport have indicated the lines to be followed in such manufacture, with the result that manganese steel safes are now being produced that so far no burglar has been able to break or blow open. Each safe consists of but two pieces, the body and the door, and the joints are made so tight as to preclude the possibility of the introduction of any explosive. The triumphs of metallurgy are not confined to the successful or economical treatment of ores, and if, as appears certain, the metallurgist has finally vanquished the burglar in the long trial of skill, it is but one more feather in the cap of such progressive scientist.

IMPORTS of manufactures into the United States in the fiscal year 1898 were 30% less than those of 1888, although the population had increased 25% meantime. The Treasury Bureau of Statistics, which, as presented on page 560 of last week's issue, showed the growth in the exports of manufactures from 1868 to 1898, has prepared a similar table, showing the imports of manufactures in the same period. While this indicates that the imports of manufactures in 1898 were much larger than those of 1868 or 1878, it shows that in 1898 they were fully 30% below those of 1888. In 1888 the total import of manufactures was \$325,000,000, and in 1898 but \$226,000,000, while the total export of manufactures, which in 1888 was \$130,000,000, was in 1898 over \$291,000,000. The total export of manufactures in 1898 was not only the largest in our history, but for the first time was greater than the imports of manufactures, the total export of manufactures being \$291,208,358 and the total imports of manufactures \$229,991,231. A study of these Government figures, showing the growth of exports of manufactures and decrease of imports of this class of goods, reveals some interesting facts. Imports of iron and steel manufactures, which in 1868 were \$23,000,000 and in 1888 \$49,000,000, were in 1898 less than \$13,000,000, while exports of this class of manufactures increased from less than \$11,000,000 in 1868 to \$17,000,000 in 1888 and \$70,000,000 in 1898. The meaning of those figures is further emphasized when it is remembered that the population of the United States has increased from 36,756,000 in 1868 to 74,522,000 in 1898.

EXPERIMENTS with a view to producing an electric arc light that would give satisfactory practical results in use under water have not met with entire success, but Eastern technical journals report that a recent design of a submarine arc lamp of from 1000 to 2000 candle power by Messrs. Burdick & Hall, meets all requirements. The lamp is described as being absolutely water-tight, with an inner and outer globe, the upper part of the outer globe being hermetically sealed to the metal cylinder containing the feeding mechanism by means of rubber gaskets and rings. The feeding mechanism in this lamp differs from that of the ordinary arc lamp in that it is enclosed in a cylinder both water and air-tight. From the top of the cylinder, through a carefully-packed aperture, issue the two insulated wires, which, for convenience, are bound together into a cable. The lower portion of the lamp is protected by an eight-wire guard. Tests of the lamp at the depth of 25 feet are said to have been satisfactory.

NEARLY every mining commonwealth shows a realization of the importance of appropriate representation at the Paris Exposition of 1900. This week the executive committee of the California State Miners' Association decided to ask the State Legislature when it or if it appropriated money for California's representation to have one-third of such possible sum specially designed for the mineral exhibit. The result of such indeterminate action may not be satisfactory. It were better to settle on some specific amount—\$25,000 should be the minimum, twice that would be none too much—and take proper action to have a bill appropriating that amount for the specific purpose named passed by the State Legislature early in the coming session. That amount of money is necessary if any proper exhibit of the mining industry be made, and in the way indicated is the best manner of securing the necessary funds. The general advisability of such appropriation is too obvious to need argument.

Concentrates.

OWNERS of gold or silver quartz mills in Nova Scotia pay a Government royalty of 2%.

THIS year's dividends paid by the Silver King mine at Park City, Utah, amounted to \$450,000.

A STEEL CABLE 1½ inches in diameter, traveling twelve miles an hour, can transmit nearly 2000 H. P.

THE Calumet & Hecla Mining Co.'s dividend payable on the 29th inst. makes a total to that date of \$55,850,000.

FROM Grand Encampment district, Wyoming, copper ore is hauled sixty-five miles to the Union Pacific Railway at Fort Steele for shipment East.

STATE COAL MINE INSPECTOR GRIFFITH reports the amount of coal produced in Colorado this year to be 3,565,660 tons, an increase over last year of 300,000 tons.

IN his British official mine statistics C. Le Neve Foster reports there copper mining to be a decaying industry, and the lead and tin ore output also decreasing.

IN Georgetown, Australia, a miner is fined for returning to a mine after a blast within a prohibited time, or "for working a claim without a duly registered manager."

A MANCHESTER, England, smelting company is buying Kootenay, B. C., ore concentrates, for spot cash. These concentrates average 65% lead and 30 ozs. silver.

DURING the year 1897 the silver and lead production of the Consolidated Kansas City Smelting and Refining Co. was 11,757,540 ounces and 91,613,916 pounds, respectively.

CONSIDERABLE has been expended in Cariboo, B. C., hydraulic gold enterprises, there have been some substantial returns, and the several companies hope to begin declaring dividends in '99.

WHAT would at one time have been considered a singular combination is that of the Bonanza mine, Colorado, in which the ore richest in iron yields \$3.50 per ton in gold, and \$10 per ton in copper.

THE copper produced per ton of ore at the Rio Tinto mine is from 2 to 3½ per cent, at the Anaconda 4½ to 6 per cent, at the Quincy 1½ per cent, and at the Mountain Copper Co. 7½ per cent.

BRITISH COLUMBIA mining journals argue against the proposed Canadian legislation against alien ownership of mining property in the Dominion on the practical ground that "it will not pay."

FOR the first time since Aug. 8, 1888, Hale & Norcross stockholders this week got a dividend—\$1.50 per share—the result of successful litigation. The dividend amounts to \$168,000, a total of \$5,776,200.

ON Oct. 1 there were 5302 stamps in operation in the Rand, South Africa, district. In September these stamps crushed 695,103 tons ore. For the first nine months of '98 the Transvaal yielded \$57,588,610 in gold.

LESSEES who make good profit from working mines formerly mismanaged furnish practical illustration of the fact that lack of skill and experience of those in charge is a frequent cause of the "closing down" or up of a mine.

"THE first gold quartz mine operated in California" is said to have been the Havilah, now known as the Nashville, eight miles from Placerville, El Dorado Co., worked by Col. Chilton in 1849 with machinery brought across the isthmus.

A DUNEDIN firm, building at a cost of £3000 a gold dredger for an Otago, New Zealand, mining company, figures that by reason of its great capacity if 6 cents worth of gold can be got out of every ton of material that it handles great will be the resultant profits.

IN the Henriette shaft at Fleun, Belgium, at a depth of 3772 feet, ventilators supply 18,000 cubic feet air per minute. Temperature at the shaft bottom is 60° Fahr. when 32° Fahr. at the shaft surface. When first cut, in sinking, the rock temperature is 115° Fahr.

IN Colorado cyanide and chlorination make profitable lower grade ore than smelters treat, and, as elsewhere, the low-grade ore, being so much in excess of richer rock, contributes the largest proportion of the total annual gold yield. It is a case of quantity, not quality.

THIS paper solicits and welcomes the receipt of technical or practical articles on any subject of probable interest to its readers, and any expense attached thereto is at all times cheerfully audited. Sketches, photos, etc., for engraving often enhance the value of such articles.

COLORADO mining papers are beginning to advise owners of mines and prospects who want to sell to deal directly with the purchaser, to ignore the "middlemen," and advertise what they have to sell, the same as everybody else does. It would also aid in such a case to be able to show a clear title.

U. S. VOLUNTEER SOLDIERS in the late war are by law exempt from their share of required annual assessment work on unpatented mining claims. An affidavit setting forth the facts essential thereto must be filed with the recorder of the county in which the claim is situated before Jan. 1st, '99.

THE Tacoma Smelting and Refining Co. has by the purchase of its stock passed into the control of D. O. Mills, Henry Bratnaber, the Alaska-Treadwell Mining Co., the Grand Central Mining Co. of Mexico, the Bunker Hill & Sullivan Mining Co. of Idaho, and the Exploration Co. of London. The plant will be enlarged.

MILLS and smelters in Cripple Creek, Colorado, are reported to have formed a combination and made a uniform rate for ore treatment and raised the price to be paid for gold from \$19 to \$20 per ounce. The treatment charge is to be from \$7 per ton for ore containing one-half ounce of gold to \$14 for ore containing two ounces or more.

A COLORADO assayer writes: "I should like a little information from some of your scientific readers regarding zinc assays. Why do most of the authorities recommend zinc oxide in standardizing rather than metallic zinc? Does titrating a zinc solution warmed to 110° Fahr. (Von Schulz & Low's scheme) give too high results? Why not use oxide of copper in standardizing for copper assay?"

IT is estimated that all the gold mines of the world have this year increased their total production of the precious metal by 80 per cent, compared with the entire production of the world five years ago. The Director of the Mint estimates that this year's increase of production in South Africa, Australia and America will exceed that of 1897 by \$45,000,000.

IT is noted that in 1891 copper was 15 cents a pound, against 13 cents now. On about twenty large properties the paid-in capital is not much greater now than seven years ago, but the selling value of the shares of practically all the copper proper-

ties quoted in Boston is now \$172,401,700, as against \$50,237,000 in 1891, a gain of about 240%; all this with practically no enlargement in the number of dividend-paying properties.

MANY mine superintendents overburdened with expensive water will read with a feeling akin to envy of the superintendent of the Croesus Proprietary mine in West Australia, who, pending the arrival and erection of drainage appliances is daily selling 35,000 gallons of water from his main shaft at two cents per gallon, and who "has orders for 60,000 gallons daily" whenever he is able to supply it. This is better than the average gold mine.

THE dredger built in '93 by the Bucyrus Co. for Mississippi river use has a capacity of 300 cubic yards mud per hour, delivered through 300 feet pipe. Its propelling power is similar to the usual steam stern wheeler. The pump is a centrifugal, 15-inch suction and discharge, run by belt connection with a horizontal compound condensing engine. The dredger was built under direction of Jno. Mills, cost \$69,500, and works to a depth of 30 feet.

SEC. 2319 U. S. Revised Statutes provides that all valuable mineral deposits in lands belonging to the United States, both surveyed and unsurveyed, are free and open to exploration and purchase, and the lands in which they are found to occupation and purchase, by citizens of the United States and those who have declared their intention to become such, under regulations prescribed by law, and according to the local customs or rules of miners in the several mining districts, so far as the same are applicable and not inconsistent with the laws of the United States.

IT is a matter of present discussion among mining engineers as to the desirability of a change in the accepted methods of mine hoisting, but so far those who argue for a retention of the present system seem to have the best of it. The adverse argument is that hoisting engines run too much to speed, and that speed should be reduced and the power expended in hoisting more material with a slower system of endless winding. That idea may prevail in coal mining, etc., but its practical operation would run counter to the generally accepted plan of hoisting in nearly all metal mines.

GILSONITE is a hydrocarbon resembling in appearance bright friable bituminous coal. It has a brown streak, soils the fingers, is light in weight, burns readily, and is soluble in kerosene. It is brittle and about as hard as coal. Wyoming gilsonite differs materially from hydrocarbon found in Utah known as wurtzilite. Gilsonite occurs in well defined veins. An unusually large one is in the Ucomphage Indian reservation. As the mineral occurs in veins, its development possesses some of the features of coal mining and some of the risks of vein mining. The mineral is worth about \$40 per ton at Omaha.

SEC. 11 of the Territorial mining law of Arizona, in effect July 1st, '95, prescribes that the relocation of forfeited or abandoned lode mining claims shall only be made by sinking a new discovery shaft and fixing new boundaries in the same manner and to the same extent as is required in making a new location, or the relocater may sink the original discovery shaft 10 feet deeper than it was at the date of commencement of such relocation, and shall erect new or make the old monuments the same as originally required. In either case a new location monument shall be erected and the location certificate shall state if the whole or any part of the new location is located as abandoned property.

IN 1890 the United States produced 9,202,703 tons pig iron, worth \$151,200,410; in '97 this country produced 9,652,680 tons pig iron, worth \$95,122,299. In 1890 the United States produced 55,000,000 ounces silver, worth \$62,000,000; in '97 this country produced 54,000,000 ounces, worth \$32,000,000. In 1890 the United States produced 144,000 tons lead, worth \$13,000,000; in '97 this country produced 208,000 tons, worth \$15,000,000—a large falling off in current values for the three metals named. The other three metals—copper, gold and aluminum—show an increase in aggregate value of amount produced. But one metal—gold—remains the same—\$20.67 per ounce, whatever the date.

TIME was when the largest part of the circulation of this paper was in the State of California. Now, though its present circulation in that one State alone is twice what its entire circulation used to be, yet even that is but a small segment of the wide circle of its readers. During the last month this was particularly emphasized. During November there were received the names of 297 new subscribers from the region west of the Missouri river. Of these 59 were from Colorado, 48 from Montana, 45 from California, 28 from Arizona, 24 from Utah, 21 from Idaho, 12 from Washington, 18 from Oregon, 16 from British Columbia, 9 from Mexico, 4 from Chili, 6 from South Dakota, 3 from the Philippines, 2 from Tientsin, China, 2 from South Africa. There now is scarcely any region where metal mining is carried on that is not reached by this paper.

AT San Francisco on the 7th there was filed in the U. S. Circuit Court a mining suit involving property in Tuolumne and Mariposa counties, Cal. The Merced G. M. Co., a Montana corporation, is the complainant. The accredited respondents are Dorward, Babney & Corcoran of Coulterville, Cal., who appear as representatives. The Merced Co. owns thirty mining claims near Coulterville, Cal. When the claims were purchased the company also bought a ditch forty-five miles long, with water rights and the right to the water of the south fork of the Tuolumne river. For a time the company used steam power to work its claims, and the respondents allege that they considered that the ditch and its water rights had been abandoned and filed new locations, hence the present litigation.

IN the Philippines more work is done in the copper mines than in any of the other mineral fields. The natives have long had the art of working in copper, and about fifty years ago a company of Europeans was organized to work the copper mines, but the Spanish laws were so oppressive upon production that they have done very little development. The natives smelt the copper in a crude way and make copper utensils for their own use and for sale to the Christian settlements, but among the Spaniards there has been nothing done in the way of manufacturing copper. The copper ore is rich, though refractory, containing 16 per cent copper, 24 per cent sulphur, 5 per cent antimony and 5 per cent arsenic. For a short time about half a century ago some rich copper mines were worked by Assit, in the island of Masbate, but they were obliged to quit on account of excessive taxation.

THE "specific heat" of any substance is the ratio of the quantity of heat required to raise the temperature of any given weight 1°, under specified conditions, to the amount

demanded to raise the temperature of an equal weight of water 1° when at the lower of the two fixed standards of temperature—usually taken as that of melting ice, or the "freezing point." The specific heat of any substance thus determines what rise or fall of temperature will follow the introduction, or the abstraction, of any given amount of heat. Recent exact experiments in the specific heats of copper, iron and aluminum give the following figures:

| | Between 181° and 150° C. | Between 73° and 100° C. |
|---------------|-----------------------------|----------------------------|
| Copper..... | 0.0888 | 0.1040 |
| Iron..... | 0.0914 | 0.1162 |
| Aluminum..... | 0.1833 | 0.2175 |

Liquid oxygen was employed to obtain the lowest of the temperatures. The right hand column gives the specific heat at ordinary temperatures.

A "POCKET" in quartz is gold concentrated in a quartz ledge. It may occupy a few inches or a few feet lengthwise of the ledge and the chute may run down lengthwise many feet. Beyond a few inches or a few feet lengthwise of the ledge the rest of the ledge may not contain a color of gold, or it may pocket in other places, which it often does. Pockets are generally found near the top of the bedrock. But many have been found 50 or 100 feet and even deeper. A pocket may contain a few dollars or many thousands, generally governed by the size of the ledge and the amount of iron in and around the ledge, caused by an iron stringer striking the ledge, where the pocket is found. Without the presence of iron, there cannot be a pocket. But iron in a quartz ledge is no evidence of a pocket or of gold. Pockets may occur in any formation—slate, granite, serpentine, porphyry, or any other—but probably no one ever saw one, or heard of one, where the upper or hanging and lower or foot wall of the ledge were of the same formation. There must be contact to make a pocket.

UNDER the rulings of the land department of the United States contests may be initiated by an adverse party, or other person, against a party to any entry, filing or other claim under laws of Congress relating to the public lands for any sufficient cause affecting the legality or validity of the claim. There is no limit to the number of entries that any one person may contest or protest. Under the rules of July 9th, '94, protests or contests as to the mineral character of any of the lands embraced in a railroad list of selections suffice to cause a hearing to be ordered in the local land office, after giving due notice to the railroad company and the person furnishing such information. There is no particular form necessary in the wording of the protest, but it should properly contain as full a statement of the facts, showing the land to be more valuable for minerals than for agriculture, as the protestant can make. The fact, for instance, that it is covered in whole or in part by a mining location, and that it is being worked for its minerals, is important. The better practice is to make verified protest, and corroborative evidence, while not absolutely necessary, adds, of course, to its weight.

AS THE constant of a riveted, uncoated metallic flume is 141.42, and of an ordinary wooden flume 76.7, and 141.42 ÷ 76.7 = 1.844, velocity or discharge for such wooden flume multiplied by 1.844 gives the velocity or discharge of a metallic flume, uncoated, if the flumes are of equal dimensions and grades. The positive coefficient of asphaltum coated flumes is 158.10, and 158.10 ÷ 76.7 = 2.061. Hence, the velocity or the discharge of a coated flume of equal dimensions and grade with a given wooden flume would be 2.061 times greater than that of the wooden flume. As between a coated and an uncoated metallic flume, the coated flume will generate a velocity of 1.118 times the uncoated flume, both being equal in size, shape and grade. The metallic flume will not require as steep a grade nor as great an area, therefore, for the same carrying capacity as a wooden flume. Its great durability, in connection with this fact, suggests that it would, in Arizona, be the more economical of the two. Where lumber is of poor quality and high in price, and steel or iron is cheap, small sheet iron or steel flumes may be economically made semi-circular in cross-section, and thus enclose the greatest area with the smallest possible quantity of metal or metal perimeter.

THE measurement of the velocity of a projectile in its flight from a gun is the division of a certain space passed over by the time which it has taken to do this, space and time being determined by measurement and simple apparatus. Somewhere in the path of the projectile are placed two wire screens, each formed of a simple frame, across which a wire runs back and forth, forming part of an electric battery circuit, in which an accurate timepiece is also interposed. As the projectile, on being fired from the gun, passes through the first screen the circuit of which it is a part is broken and the clockwork is started, the index originally pointing to zero. On passing through the second screen the projectile interrupts the second circuit, with the effect of instantly bringing the clock mechanism to a stop. Knowing, then, the exact distance between the two screens, usually several hundred feet, it follows that by dividing it by the number of seconds or the fractions of a second marked on the clock dial, representing the time which has elapsed during the passage of the projectile from screen to screen, is obtained the number of feet per second which the projectile was traveling. The satisfactory measurement is in the accuracy of the time determination, in which the smallest fraction of a second becomes a factor of importance.

NO ONE can more than give a guess as to the amount of gold and silver at any one time in the world or how much of such metal is held and used by the people of the world as money. Gold and silver which were being used as ornaments or as money in the days of Abraham may yet be in existence, and in some form may now be serving the same purposes as they did nearly 4000 years ago. The ornaments of that day may now be doing service in the sovereigns of Great Britain or the eagles of the United States, and the coins of that day may be doing service at the present time in watch chains, breast pins, sword hilts, in the coronets of kings or in filling the teeth of several million human beings who are compelled to rely upon the work of dentists for the mastication of their food. Pure gold and pure silver are the same the world over, and the output of any one year can be mingled with the output of any other year or years, and the combinations thus made produce no changes in either metal. Pure gold and pure silver remain precisely the same through all ages, and hence neither by look, weight or other mark can the product of any given year be distinguished from the products of 6000 other years during which the human race have been producing these metals. So it is useless for any one to claim accuracy as to the exact amount of either metal now in existence, or as to in just what form or shape such metal may be found to-day.

Dry Crushing at a South African Gold Mine ---(Luipaards Vlei Estate & G. M. Co., Ltd.)

Written for the MINING AND SCIENTIFIC PRESS by GEO. H. FURNER,
General Manager.

The Luipaards Vlei Estate & G. M. Co., Ltd., is freehold owner of the whole farm Luipaards Vlei adjoining Krugersdorp and possesses two home-stead reserves on which are growing 143,000 trees. A revenue of £8000 a year is derived from the estate. There are seven water rights and two dams. The mining area of the company consists of 463 mineral claims and some eighty-six outside claims. Three gold-bearing banket reefs run through the property, but only one, the Bothas, is now being mined. The mineral which is now being treated is entirely pyritic.

The sorting is done at each headgear—the coarse being separated for purposes of sorting, and the fines for the purpose of (in time) evaporating as much of their moisture as possible. The ore is delivered from the trucks to the first of the rock crushers, the product of this crusher is then put through the second rock crusher. Revolving trommels are set here to separate the crushed ore into three grades, one for each of the rollers. Below the stone breakers is a large bin for intermediate storage of the sized ore; this bin discharges into trucks, which are run to an electric elevator. This appliance is certainly one of the first electric lifts at work

no dust, the elaborate appliances which are in place for dust prevention are at present lying idle.

For driving this plant the high pressure half of a tandem compound engine, 300 H. P., is in use. This engine drives the mill and crusher house counter shafting, also two 100 H. P. dynamos for generating the power required for working the electric pumps, hoisting engines and motors for cyanide works, fitters' and blacksmiths' shops. A separate engine runs the electric light plant and a 100 H. P. auxiliary engine serves as a standby.

A compressor is at work of 10-drill capacity. Four 100 H. P. boilers and heat economizer supply steam to the plant.

The ore from the finished product bin is conveyed into the first treatment tanks by an endless belt. Here it receives a short treatment of from two and one-half to three days, the amount of solution allowed being one-half the weight of the ore. During this treatment 70 per cent of the gold contents of the ore are extracted.

The ore is then transferred by mechanical haulage to the second tier of tanks. In these it is allowed to remain for about four days without further washing; the object being to allow of the air permeating the entire mass of the ore while in contact with the cyanide, thus ensuring a sufficient supply of oxygen necessary for the solution of the gold by the potassium cyanide.

The treatment is completed by a succession of weak washes, amounting to one-half of the weight of the ore, and a final water wash equivalent to the amount of moisture carried away in the residues (12½ per cent of the weight of the dry ore). The reason

treated; this with a gold extraction of 82 per cent. The present consumption is under one-third of a pound per ton.

The reason of this abnormally low consumption is that the cyanide solutions going on to the dry ore are only slightly reduced in strength, and there is never any reason for running to waste large quantities of solution too weak to be worth conserving, as in the case of mill tailings where strong cyanide solutions going on as first washes become diluted by the mass of moisture in the ore.

Again, the cyanide wash pumped onto the dry (and therefore air-containing) ore has access to the gold at once with a plentiful supply of oxygen available. The action is therefore much more rapid than in the case of wet tailings where the cyanide has gradually to displace the moisture in the ore particles by the slow process of diffusion, becoming diluted in the meantime. The action is further retarded in the case of wet tailings by the absence of sufficient oxygen, unless artificially supplied.

One of the strongest points in favor of dry crushing is the immense saving in water.

It not being necessary to run to waste any portion of the washes draining down from the tanks, the only source of loss is the moisture carried away with the residues. This only amounts to twenty-one tons moisture for each charge of 170 tons ore, or twenty-five gallons per ton of ore treated.

Compare this with 300 gallons of water per ton of ore treated (figures given as pertaining to the most recent practice of economy in the water used in the reduction and treatment of ore by wet crushing).

Even with the small tonnage treated here per month the cyanide working costs will compare favorably with the wet crushing plant treating a much larger tonnage of sand and slimes. The average cost per ton for the last three months, treating 3400 tons monthly, has been three shillings and four pence per ton.

Lode Tin Mining in the Malay Peninsula.*

By W. H. DERRICK.

The Pahang Corporation holds in Kuantan, Pahang, one of the Federated Malay States, a concession of 100 square miles. Tin, both lode and alluvial, have been found over the greater part of the concession, but the payable lodes lie in an area of ten square miles. These lodes run approximately east and west, and are from 50 to 2000 feet apart, range in thickness from 2 to 10 feet, and produce from 1 to 15 per cent of tin oxide to the ton. The lodes underlie both north and south, at angles ranging from 10° to 40° from the vertical; they have generally one well defined wall, but seldom two. The granite country rock is overlaid by varieties of clay schist, with the tin lodes running down right through the slate into the granite. A few isolated hills of calcspar remain, although at one time this rock must have covered the slate, as the latter is everywhere seen intersected with veins of spar.

The principal metals found in the lodes are tin, copper, iron, and arsenical pyrites, blende, and galena. Of these metals, tin and copper only have been discovered in workable quantities; the latter usually carries from 25 to 30 ounces of silver to the ton, and appears to be quickly giving place in depth to tin.

The mines now being worked by the Pahang Corporation were, so report says, continuously worked by Malays and Chinese for more than 100 years, the large surface excavations made by them, some of which are 1000 feet long, 200 feet wide and 150 feet deep, testifying to this being a fact. The open-cast system was the only one adopted by the old miners, and as timber was seldom made use of to secure loose ground, the sides of the workings were sloped or terraced to keep them from falling in. This, and not the thickness of the lodes, accounts in many instances for the great width of the old workings. Under native management (at least within recent years) the mines were not a financial success, owing apparently to want of capital, and, consequently, of proper machinery, as well as the native objection to do anything in the shape of dead work, their mode of operation being to follow any payable ground from the surface down as far as they were able to without steam pumps and timber.

Explosives of any description were never made use of, owing to a strange superstition firmly believed in by the Chinese, viz.: that the use of explosives frighten away the metal in a mine. In consequence of this, any very hard ground could not be worked. The ore obtained was crushed by wooden stamps shod with iron and worked by small overshot and undershot water wheels. The only dressing appliance used was a long-tom, the tail losses from which were very heavy. These tails were assayed and found to contain as much as 7 per cent of tin oxide. They are principally composed of coarse grains of tin and quartz adhering together, and which only required finer crushing to allow the tin to be readily separated out.

For working the mines the Pahang Corporation make use of Chinese, Javanese, Malay and Tamil

*Condensed.



GENERAL VIEW OF DRY CRUSHING WORKS OF THE LUIPAARDS VLEI G. M. CO.,
KRUGERSDORP, SOUTH AFRICA.

in South Africa; its performance is singularly cheap and satisfactory, and merits the respectful attention of our mechanical engineers.

The ore, now roughly about 1½ inches fine, is then served into a crusher; this has a corrugated face, and the smaller roll is faced with manganese steel. The crusher delivers its product in an ingeniously automatic manner to a revolving screen. The ore is then delivered onto a traveling rubber belt about 18 inches wide, moving at a rate of 300 feet per minute, and having a capacity of forty tons per hour. This serves the ore into the well of a bucket elevator, having an 11-inch belt also traveling 300 feet per minute; the buckets being every foot apart. The ore is thus delivered to the top story of the mill house, into a pair of revolving trommel screens. Here it is divided into three grades; the coarsest going back into the first set of rolls, the second grade to the finer rolls, and the finished product into its own bin. At present the first set of rolls breaks the ore to a fineness of about ½ inch. The product is delivered by the same belt to the revolving trommels. An exactly similar procedure is followed with the second set of rolls; the same traveling belt and the same screen serving for them.

Before the crushed ore is passed through the first roller it is subjected to the action of a magnetic separator; a look at the stuff, thus removed from being fed into the roller, shows how necessary a precaution the separator is to allow the mill doing fair work. The size of the finished product as it issues from the revolving trommel after leaving the finer rolls is 200 mesh per square inch. The product is then conveyed by a separate rubber traveling belt to the vats, the distributor belonging to the belt allowing of an extremely even and convenient distribution of the sand into every part of each vat. As the ore now mined is sufficiently moist to make

of the final water wash is to expel the residual cyanide solution which would otherwise be carried away to the dump and unnecessarily increase the cyanide consumption, and also to balance the loss in the sumps from the moisture discharged with the residues.

This second treatment secures an additional extraction of from 10 to 15 per cent, or a total extraction of from 80 to 85 per cent.

The following are the treatment results obtained during the past seven months (March to September) from oxidized and pyritic ore crushed through the various sizes of screens as undernoted:

| RESULTS OF TREATMENT. | | | | |
|-----------------------|-----------------|-------------------------|-----------------------|-----------|
| Nature of ore. | Size of mesh. | Ore value per ton. Dwt. | Residue per ton. Dwt. | Per cent. |
| Oxidized..... | 1-10 inch | 9.9 | 1.1 | 88.9 |
| Oxidized..... | 1-8 inch | 8.1 | 1.1 | 85.6 |
| Oxidized..... | 1-8 inch | 7.8 | 1.2 | 84.0 |
| Pyritic..... | 100 per sq. in. | 9.25 | 1.77 | 80.0 |
| Pyritic..... | 200 per sq. in. | 1.1 | 1.2 | 85.0 |

Points in Favor of Dry Crushing.—The points in favor of cyaniding dry crushed ore are simplicity and cheapness of treatment combined with a high extraction, in proof of which some of the special features may be summarized.

The whole of the mill product is sent into the tanks and treated at one operation with highly satisfactory results, thus doing away with the classification into sands and slimes (unavoidable in the case of wet crushing) with the separate and costly treatment necessary for the latter product.

The main item of expense in the working of a cyanide plant, viz., the consumption of the cyanide of potassium itself, is much less in the treatment of dry ore than in the case of wet tailings.

The amount of cyanide consumed during the treatment of 22,533 tons at Luipaards Vlei Estate has been 8900 pounds, or only 0.39 pound per ton of ore

labor, Europeans being employed for supervision work only. With the exception of ore dressed, all work is let out on contract. Stopping is paid for by the truck of 16 to 18 cwt., prices delivered at the battery ranging from 1s 9d to 6s per ton, according to the nature of the ground stoped, and the distance of the mine from the battery, which in some cases is as much as two miles, the mines being all connected with the batteries by tramroads.

Contractors pay for all tools and materials, dynamite, fuse, detonators, candles, etc., and put in timber as required. If the quality of the ore delivered at the battery drops below a certain percentage (which is fixed at the time of letting the contract), the contractor receives nothing for such ore. This ensures the company against the delivery of waste. Each contractor's parcel of ore is stamped separately, and is constantly sampled and assayed as it passes through the mill. Driving and sinking are let by the fathom, and prices range from £1 10s to £4 for drives, 7x5 feet; £2 10s to £5 10s for winzes, 6x5 feet; £5 to £30 for shafts, 12x4 feet—these dimensions being all clear of timber. Contractors, as in stoping, pay for all stores and put in timber as required, the timber, of course, being supplied free by the company. Drills are sharpened for contractors free. At one time this work was charged for, but it was found men wasted much time by using blunt tools rather than pay to have them resharpened.

The distances driven per month, by a gang of six men working in eight-hour shifts, vary from 10 to 40 feet according to the nature of the ground. Shaft sinking ranges from 10 to 20 feet per month in hard slate when twelve men are employed working six-hour shifts. The Chinese miner makes good progress in moderate and soft ground, but is usually a poor miner in really hard rock, and on this account he can not compete with white labor. If time alone was the sole consideration in mining, this might be so, but when expense also is taken into consideration, it is far otherwise, a fact which is very apparent when one considers that white labor, when employed on actual mining work, is about ten times as expensive as native labor; in other words, a white man has to drive or sink ten times the distance done by a native in order to compete with him, whereas in any but hard ground his progress would probably not much exceed that of an ordinary skilled Chinese miner.

The average cost of mining, including cost of drives and winzes (but not permanent shafts), timber, hauling and pumping charges and European supervision, is 5s per ton. The Pabang Corporation have two batteries of 40 and 20 head of stamps respectively. The stamps are of the usual Californian type, weight 850 pounds, and, driven at a speed of ninety blows a minute, they crush about 2½ tons per head per day. Vertical, high-pressure, non-condensing engines supply the motive power. At present some 2500 tons of tin stone are being treated per month for a yield of eighty-five to ninety-five tons of tin oxide—an average of about 3½ per cent per ton. The ore is only crushed fine enough to pass through screens having eighty to 120 round burr holes to the square inch.

The dressing appliances first introduced were concave and convex buddles from 12 to 25 feet in diameter, frames and tossing gear; but, notwithstanding the cheap labor available for working these, they are replaced by modern machinery with the best results. For calcining, the ordinary reverberatory furnace is used, and, with wood at 10s per cord, cost of roasting, including labor, is 4s per ton of concentrates treated.

The dressing coolies cost 18s per month. Native engine-drivers, carpenters and blacksmiths, £2 to £3 per month. Europeans, for supervision work, £20 to £30 per month. The total dressing cost, which includes stamping, European supervision, native labor, stores and roasting charges, is 5s 6d per ton of stone crushed. The standard to which the oxide is dressed always exceeds 70 per cent of metal, the impurities being oxide of iron, a little silica, and from 1/16 to 1/8 per cent of copper. The total battery losses range from five to eight pounds to the ton.

Lagging in a Mine Shaft.

To THE EDITOR:—In your issue of the 12th ult. is an article upon the use of structural steel for sustaining a mine shaft, which is to be lagged with 4 inch plank. My observation and experience convinces me that many shafts are lagged too heavily. If a shaft is sunk through compact, hard, unchanging rock, no lagging is required. If through hard, blocky rock, lagging of sufficient strength as to restrain such blocks, with a 6-foot rise of sets 1½ to 2 inches, should meet the requirements; if of massive, seamy ground, or of heavy, clayey, swelling ground, 1 to 1½-inch, and if of simply disintegrating ground, 1 inch should be sufficient.

The duty of shaft frames for deep work should be to carry, with stability, such erections as become necessary for the underground work, as guides, pumps, pipes, etc. If a shaft is cared for as hereafter suggested, no extraordinary strength of shaft pressure is required, and under some conditions no strength without such care is adequate.

The purpose of lagging in a shaft should be to

safely restrain everything between sets, but when an unusual stress is thrown upon the lagging it should not be so thick and strong but it will readily show it by bulging, and when, in the judgment of the superintendent or foreman, depending upon the form of organization, the pressure is becoming so great as to convey too much stress to the sets, sufficient of the lagging should be removed as to enable the taking out of the pressing material and the lagging replaced. In all shafts subject or liable to pressure the lagging should be cut the length of the sets and no longer, unless it becomes necessary to drive. In no instance should stress be allowed to accumulate upon the lagging to such an amount as to show bending or crushing stress upon the shaft frame, and as the exigencies of work induces to a neglect of the shaft as long as possible, light lagging is preferable, as, while fulfilling its requirements, it gives early notice of danger to the sets.

I have seen a mining shaft where, through a heavy body of clay, the pressure throughout could not have been less than 1000 pounds per square foot, and where solid 12-inch timbering was continuously pushed in—very gradually, of course—by the swelling of the clay, like so much cardboard, which was changed to 12 inch sets and 2 inch lagging, and gave but comparative after trouble; occasionally the lagging had to be relieved. Its thickness of 2 inches showed be too much; 1½-inch would have been better.

CALIFORNIA MINER.

The Refining of Base Lead Bullion Containing Silver, and High in Gold.*

NUMBER VI.

By G. H. BLAKEMORE.

Effect of Copper in Retorting Process.—In the description of the desilverization process it will be remembered that after the kettle has been charged from the "softener" the lead is allowed to cool back until it "rings" around the edge some 3 inches. This cooling causes a considerable amount of copper dross to be given up by the lead in addition to that extracted in the softening process. If this copper is left in the lead, it has a rather serious effect in the retorting process. The dross formed in the retort from alloy containing much copper will often contain more gold than the bullion itself. As the proportion of dross on the 475 charges was about one-seventh of the weight of the bullion, it can easily be calculated out what gold was tied up by being thus thrown into the dross. The following assays will make my remarks clearer:

| Bullion Assay Per Ton. | | Dross from Same Per Ton. | |
|------------------------|----------|--------------------------|----------|
| Ag. Ozs. | Au. Ozs. | Ag. Ozs. | Au. Ozs. |
| 1614.9 | 78.7 | 1799.95 | 392.15 |
| 1212.9 | 37.1 | 2410.05 | 335.15 |
| 1355.6 | 17.0 | 1552.00 | 223.25 |
| 978.1 | 10.2 | 1644.89 | 311.10 |
| 272.6 | 31.2 | 2179.25 | 344.55 |
| 1246.4 | 11.1 | 2257.35 | 304.10 |
| 1108.2 | 10.2 | 2620.10 | 390.20 |
| 1716.9 | 66.3 | 1727.15 | 313.30 |
| 1558.1 | 29.1 | 1755.10 | 245.25 |
| 1340.0 | 52.6 | 2041.60 | 210.20 |
| 934.0 | 4.5 | 1334.20 | 210.90 |
| 1113.6 | 7.5 | 1422.05 | 278.65 |
| 821.2 | 0.8 | 1544.65 | 198.60 |
| 1250.8 | 1.9 | 2254.55 | 355.65 |
| 1014.9 | 4.7 | 961.05 | 133.75 |
| 111.0 | trace. | 1655.5 | 91.55 |

The last six of these instances are the most remarkable, the end one of all actually having only a trace of gold left in the bullion, all the gold having gone into the dross, and nearly all the silver. These assays were made from carefully taken samples and there is no doubt as to their correctness.

When the precaution has been taken of allowing the softened bullion in the desilverizing kettle to cool and so eject more copper, it is noticeable that more zinc is produced from each retort working on alloy made from the more copper-free bullion, and what is more important still, the amount of gold and silver recovered in the retort bullion is considerably increased, the value of the retort dross being correspondingly reduced. Where only 50 per cent of the gold that goes into the refinery in the base bullion may be recovered in dore bullion through copper being allowed to remain in before zincing, the recovery reaches 85 to 90 per cent after the copper is taken out, the differences in both cases going back to the blast furnaces tied up in by-products induced by the presence of copper in the bullion. Copper is a most difficult metal to get rid of, and in spite of all efforts, will be finally found in the dore bullion. I think that the cause of the retort dross being high in gold and silver is due to the presence of a copper-zinc-gold-silver alloy being formed that the lead has very little or no action on. The copper is, of course, the inducing agent of the alloy. My reason for thinking this is that on several occasions when the drosses have been extremely high in gold and silver a thin, white, hard and brittle skin of what appeared to be matte was to be seen on the face of the retort bullion after it had been poured and cooled. Occasionally it would be 1 inch thick. The alloy was very

*Australasian Institute Mining Engineers.

heavy and it broke with a conchoidal fracture. An analysis of it gave as follows:

| | Per Cent. |
|--------------|-----------|
| Copper | 39.00 |
| Zinc | 55.80 |
| Lead | 3.00 |
| Gold | 2.630 |
| Silver | 9.847 |
| Total | 100.286 |

I only observed this alloy once, so cannot say if the analysis is representative of its usual composition, but having never noticed any previous mention of such a combination, it may be of interest.

The retort dross is either "sweated down" on a concentrating cupel with lead and litharge or else put into the softening furnace after the copper and tin skimmings have been taken off. If the latter, it is kept in for about three hours and well stirred up with the lead. This method extracts a good deal of the gold and silver, but it cannot be considered satisfactory.

Refining for Dore.—This is done in English cupel furnaces, the retort bullion being first concentrated in water-jacketed cupels up to a grade of 50 or 60 per cent of combined silver and gold contents. The cupel furnaces are like the rest of things in connection with the refinery, built to suit the work to be done. The concentration cupels are better if they are larger in size than the refining cupel, and the capacity of the latter should be not less than 1000 pounds for the size of plant that has been discussed. If the concentration cupel has been made large enough to hold about 1500 pounds it presents a nice large bath of lead on which to sweat down "retort dross" or slag from melting down silver or any small quantities of incidental rich by-products that are produced in a refinery.

The concentrating cupel should be water-jacketed; some refineries simply use an inch pipe with water circulating through it and embedded in the composition of the cupel at the level of the litharge in the cupel when in work. At other places the Steitz water-jacketed cupel is used. The jacket in the latter is separate from the cast-iron bottom, on which it simply rests. The part of the jacket facing the litharge is sometimes made of copper in preference to boiler iron, the claim for the copper plate being that it is not attacked by the molten litharge when the latter has cut away all composition back to the jacket. A concentrating cupel will last several weeks; but in time the bottom begins to "throw up," "shelve" or "float up" (the terms are synonymous) and then it may go in a few hours or still last for days. The principal points which produce a lasting concentrating cupel is to have it well water-jacketed and to have it thoroughly dry before using it. The component parts of the composition or filling of the "cupels" or "tests" vary in different refineries.

The following are some I have personally tried and no particular advantage can be claimed for any of them:

| | Parts. |
|--|--------|
| No. 1.—Ground marble (limestone) | 7 |
| Cement | 2 |
| Fireclay | 1 |
| No. 2.—Carbonate of magnesia (magnesite) | 4 |
| Limestone | 4 |
| Cement | 1 |
| Fireclay | 1 |
| No. 3.—Limestone | 8 |
| Cement | 1 |
| Fireclay | 1 |

Sometimes a cement composition is used in the concentrating cupel and this usually lasts very well, but it depends considerably on the quality of the cement used. When a cement test commences to "float up" it is done in a few hours as a rule.

As before stated the retort bullion is first concentrated up until the contents of the cupel assay about 50 to 60 per cent of silver and gold combined, i. e., supposing dore bullion is being made of the same content of silver if silver is being produced. When this assay is reached, five or six bars of the rich bullion—about 450 pounds—are ladled out, and more retort bullion worked up until the test is full once more, when more of the concentrated bullion is withdrawn. When enough "concentrates" have been made to produce about 1000 pounds of dore, the refining cupel is started and the concentrates "run up." In concentrating, a man can usually work up from twenty to thirty bars, or from 1800 to 2700 pounds of retort bullion in each shift, if everything goes smoothly. The amount of concentrates produced of course depends entirely on the assay value of the retort bullion. I omitted to state that the concentrating test has a water-jacketed litharge gutter to prevent the litharge cutting the front of the cupel down, but in the refining cupel there may or may not be, according to taste, a water breast. With a water-jacketed breast the work of concentrating and refining may be entrusted to a much less skillful man, which I need not point out, is a decided advantage. The gutter in the concentrating breast is best about 1½ inches wide and about ½ of an inch deep.

As the charge in the refining cupel begins to approach fineness the heat must be raised considerably to prevent it "setting." When the charge is fine it presents a really beautiful sight. It is exactly like a flawless mirror; every tiny detail of the firebrick roof is clearly delineated in its depths. A sample is assayed (by the wet method for promptness) before

the charge is ladled out, to determine its fineness. This is not so necessary if the charge is dore. If the latter, it is ladled out into moulds about 12x10 inches by $\frac{1}{2}$ inch deep; if silver it is ladled out into 1000-ounce moulds, which have a loose plate placed in the middle of the mould for the purpose of dividing the bar into two pieces, sizes which are convenient in the after remelting and casting into market bars. If silver is being ladled out, one man uses the ladle and another man stands by with a rod flattened at one end. As the bar is filled, the man with the rod pats the top of the silver and so stops the spurring which would otherwise take place through the oxygen which has been absorbed by the silver being squeezed out on the solidification of the latter. Dore bullion does not vegetate like the pure silver, and no precautions are necessary when baling it into the flat moulds.

(To be Continued.)

Power Transmission Plants in Operation.*

By CHAS. F. SCOTT.

Beginning with the plant at San Bernardino and Pomona, Cal., which began operation in '92, using 10,000 volts and transmitting thirty miles, a constantly increasing number of plants have been installed operating at 10,000 or 15,000 volts. In some cases there has been little or no trouble experienced with the transmission lines, while in other cases the experiences have been less satisfactory. The principal trouble seems to have been a poor grade or an insufficient size of porcelain insulator. In other cases the insulators, sometimes porcelain and sometimes glass, have given almost perfect satisfaction.

The superintendent of a power company which has been running fifteen months with about 15,000 volts reports that they "have had absolutely no trouble whatever of an electrical nature." Some insulators were broken because they had been used as targets by small boys or hunters, but only the outer petticoats were broken, and no short circuits occurred, although in some cases insulators were in use for months with most of the outer petticoats chipped off. The distance of transmission is twelve miles. Porcelain insulators are used.

In another plant which has been in operation about a year and a half, employing 15,000 volts for a distance of nearly thirty miles, there have been but three shut-downs on account of line difficulties. These were due to the breaking of insulators at a point where the line was spiraled. In one case the repair was made in half an hour, and in the other case a few minutes interruption to the service was sufficient for repairs.

The line is regularly patrolled, and if a defective insulator or pin is found, the generating station is notified by telephone and the line is shut down for a few moments at noon. In one case two poles were burned by a defect in the insulators on the top of each. The poles burned to the ground, leaving the line hanging clear without any one at either the generating station or sub-station being aware of the fact.

Troubles have arisen on some lines by the burning off of pins by the passage of sparks from the outer edge of the insulator to the pin. These sparks make small holes in the pin no larger than a needle point; but after continuous sparking for some time the pin becomes entirely charred. An iron pin suggested itself as a remedy, but additional strains and liability to break-down are liable when a conductor is placed within the insulator. The burning off of pins has occurred where small porcelain insulators are porous and the outside glaze is imperfect, while the glaze on the inside is good. When the porcelain is filled with water the current readily passes through it to the lower rim of the insulator and then sparks across to the pin. In one place which has been running for about three years some 250 pins burned off. The early insulators have been replaced by larger and better ones, and this defect has disappeared.

A 10,000-volt line which runs for a dozen miles or more within a few hundred yards of the Pacific coast has burned cross-arms on nearly every pole. The cross-arms near the ends of the line, which are away from the coast, are not burned. Usually the burning appears as a mere blackening of the cross-arm for a short space between the insulators, on one side of the arm. In some cases the charring is deeper and appears on both sides. The side on which almost all of the burning occurs is the one toward which the winds come from the ocean, bearing the mist of salt water. The wire shows discoloration, and the iron braces for holding the cross-arms are in a few cases eaten through. Moreover, the cross-arms were green and full of sap when erected. The early porcelain insulators were porous, and have now been replaced, and the pins are of iron. The charring has ceased almost entirely since the new porcelains were put up.

It may be observed that in the plants which are herein referred to, and in the experimental tests, no mention has been made of insulators with cups con-

taining oil for reducing the surface leakage. Insulators of this kind were used in the Frankfort-Lauffen experimental transmission line at 30,000 volts. Practically, however, the surface insulation is adequate without oil cups, and the principal duty of the insulator is to prevent the current passing over the surface and jumping to the pin or cross-arm—a matter with which the oil would have nothing to do.

Telephone lines are in use in a number of plants placed on the poles which carry the transmission wires. The telephone lines are usually placed some distance below the transmission wires and are crossed at frequent intervals. The telephones in general work very satisfactorily.

There appears to be practically nothing in power transmission in Europe using high potentials outside of Switzerland. The installation in Paderno in Switzerland is operating at 15,000 volts, the highest voltage which has been used in that country. The damp weather is one of the limiting factors. The insulators used are porcelain with a triple petticoat.

Forty Thousand Volts in Commercial Service.—The highest voltage which is used for transmission is in the Provo plant of the Telluride Power Transmission Company in Utah, which transmits power thirty-five miles to the Mercur mills at 40,000 volts. Raising transformers are three in number and are connected in the star form. Each transformer has a capacity of 250 K. W. The middle points of both the high-tension and low-tension circuits are grounded. In general design these transformers resemble the transformers used in the high-tension tests at Telluride; the design and construction having been under the direction of the same man in both cases. The line extends from Provo at an elevation of 4500 feet to Mercur, at 2000 feet above Provo, and the line reaches an extreme height of about 10,000 feet above the sea level. Three miles of the line are strictly mountain construction. The lightning protection is afforded by choke-coils and Wurts non-arcing metal arresters. The insulators are of glass. The design was based on the tests at Telluride and they were made especially for this plant. The insulators are held on special pins of oak which are thoroughly paraffined. The lower part of the insulator is 5" above the cross-arm.

In dry weather there has been no difficulty whatever in operating. The insulators do their work as effectively as could be expected if the voltage were only a few thousand volts. When everything is dry, the line will operate without difficulty, even if some of the insulators are off and the wire rests upon the cross-arm. When it rains there is sometimes trouble. It is indicated in the station by the ammeters giving quick swings, showing momentarily strong currents. Sometimes this is apparently a short-circuit and blows a fuse. In every case when there has been trouble on the line it has been in rainy weather, and broken insulators have been found which located the trouble. It is certain that in most cases these have been previously broken by bullets, and in other cases it is probable that the insulators were likewise broken. It is believed therefore that had there been no intentional breakage of insulators there would have been no trouble upon the line since the plant began operating in February last. A few of the insulators near the station are not far from the overflow and are in a moisture equivalent to a rain all the time without doing any damage. Snow has often backed from the cross-arm up against the bottom of the insulator and around the first petticoat. It is usually found that the part of the insulator around and near the wire does not receive deposits of moisture or frost, but remains dry, the particles being repelled. At this plant current for about 700 H. P. is carried through three fuses of copper wire 0.01" in diameter. Iron wire is used on a branch line for transmitting about 100 H. P. for about three miles.

This plant has been in operation in winter and in summer, "in thunder, lightning or in rain," the sole supply of power for the enormous DeLamar mines and mills, at Mercur, and is a happy and fitting consummation of the high-tension tests described in the beginning of this paper.

Limitations of High-Voltage Transmission.—The important commercial question is: To what distance can power be transmitted? The relation between distance and voltage is well known. The same weight of copper can transmit with equal efficiency the same power to any distance, provided the voltage is increased directly as the distance is increased. The limiting commercial ratio between voltage and distance is easily found. If the distance be three miles per 1000 volts and the loss 16%, the cost of copper is about \$20 per H. P. The interest on the latter investment is about \$1 per year. A distance in miles equal to three times the number of thousand volts may therefore be covered without an excessive annual charge per H. P. for copper. The limits to the voltage which are practicable depend principally upon the insulator and upon the loss between wires.

The Insulator.—The two fundamental requirements are dielectric strength sufficient to prevent puncture, and a size and form which will prevent the passage of the current around the insulator. A given insulator will be adequate for a higher voltage where the atmosphere is comparatively pure and

dry than it will be under other conditions. The rapid progress which has been made in the design and construction of insulators during the last few years will doubtless provide an insulator which will accommodate the highest voltages that can be used due to other limitations. The insulator, therefore, while remaining the critical point in a transmission system, will probably not determine the limit of practicable voltages.

Loss Between Wires.—The loss between bare wires at high voltages seems to determine a positive limit, beyond which the voltage cannot be increased. This loss is subject to variation due to diameter of wire, distance between wires, and wave form of the E. M. F., but the variations which may occur under favorable commercial conditions locate the point of increase of loss about 50,000 or 60,000 volts. Under favorable conditions this may be raised somewhat, but it is not probable that any material increase can be made.

Amount of Power.—The amount of power to be transmitted involves some interesting commercial limits. There are certain elements in a transmission which do not vary greatly with the amount of power transmitted. Thus, the charging current to the line will be practically the same whether the wire will transmit 1000 or 100 H. P. If the charging current happens to represent 300 H. P., it would be insignificant in one case, but for the smaller output it would require generating apparatus several times that necessary for the actual power.

It is not mechanically practicable to use wires as small as would be sufficient, in so far as conductivity is concerned, for transmitting a small power. For example: a No. 7 copper wire, which is as small as is ordinarily used, if employed in a three-phase circuit fifty miles in length, will transmit over 1000 K. W. at 40,000 volts with 10% loss. If only a few hundred kilowatts were to be transmitted, the cost per K. W. would be excessively high, and, on the other hand, a lower voltage could be used without undue loss. In some cases, indeed, where a high voltage is used for small power, as for example on a branch circuit, an iron telegraph wire would have ample conductivity. In other cases an aluminum wire could be used to advantage, as an aluminum wire of the same conductivity as a copper wire has only about half the weight, and possesses greater mechanical strength in comparison to its weight.

It may also be noted that high-voltage transformers cannot be economically built for small output, as the insulation spaces required are so large. The cross-section of the copper is often not more than 10 or 20 per cent of the area of the opening in the iron. The cost per K. W. increases very rapidly when the size of transformer falls under a few hundred K. W.

Cables and Conduits.—The overhead transmission line has been considered, and its limitations are the insulating strength of the insulator and the losses through the intervening medium. In a cable or a conduit the insulation must be provided continuously instead of at points 100 feet apart. Rubber-covered cables are made for 10,000 and 20,000 volts, but it is quite possible that it will not be commercially practicable to make cables for much higher voltages. The effect of continued electric stresses on the insulation of the cable, which is an unknown factor, may prove to be a very important one. A conduit composed of a pipe containing oil, in which the wires are separated by glass tubes, has been proposed. Many mechanical difficulties arise in constructions of this kind; the cost is high and the action of continued high voltages on solids and liquids opens a field which is little known. A suitable insulation on the wires on high-voltage lines may enable higher voltages to be used than can be used with a bare wire.

Liquid air, with its high insulating properties and the low temperature and consequent high conductivity which it would give to a conducting wire, may enable us to use air insulation in a new way.

Difficulties and Precautions.—High voltages have been referred to in this paper with perhaps undue familiarity. Familiarity with high voltages is not one which breeds contempt. A voltage which can produce sparks several inches in length, which can be felt through several feet of air, which causes hissing sounds, which produces luminosity and which in a confined room generates strong odors of ozone, is one which creates profound respect. Dangers and difficulties accompany it and the highest intelligence, vigilance and excellence must be employed to avoid accident and ensure success. While ordinary types of construction do not seem to reach their limitations until some 50,000 volts is reached and pressures of this order have been and are in regular use, nevertheless they are not to be used indiscriminately or where they can be avoided. There are difficulties enough in handling 15,000 and 20,000 volts. As the pressure is raised the liabilities to trouble increase at an alarming rate. It is, however, a fact that these voltages have been and can be used, and also that no new or modified methods of transmission will be required before 50,000 or 60,000 volts can be employed for distances up to 150 or 200 miles.

THE Government report places the production of coke in the United States in 1897 at 13,283,984 tons, against 11,788,773 tons in 1896.

*Transactions American Institute Electrical Engineers.

Industrial Notes.

—In an order for 1200 freight cars given a Chicago firm is a specification for 5,500,000 ft. Pacific coast fir and spruce.

—An expert report on the Philippines finances says there are \$45,000,000 in circulation on a silver basis, and an export trade in '97 of \$41,000,000.

—Quicksilver exports from San Francisco for the first eleven months of '97 were 4913 flasks, worth \$174,405; for the same period in '98, 5769 flasks, worth \$311,533.

—Representatives of the Pacific Mail Steamship Co. are at Washington, D. C., trying to get a five-year contract for carrying the mails between San Francisco and the Philippines.

—Men are stringing four aluminum wires "about the thickness of a leadpencil" from Stockton to Blue Lakes, Cal., for the company that proposes to ultimately run its line into San Francisco and supply that city with light and power.

—J. J. Hill, Pres. Great Northern Ry., has bought the tax certificates on the old Union Pacific road between Tacoma and Portland. Prior to '93 the Union Pacific spent \$2,000,000 on this line and the abandoned work and property has been since held for taxes.

—Eastern papers say that "the longest telephone communication successfully established in the world" is now in operation between Boston, Mass., and Little Rock, Ark., 1900 miles. Similar facilities have for some months been established between San Diego, Cal., and Boise, Idaho, 2300 miles.

—Consul Williams writes from Manila that during the three months ended Sept. 30, 1898, the value of the declared exports from that consular district to the United States were: Hemp, 4000 bales, \$57,508.35; hats, 19,808, at 20 cents, \$3960.00; cigars, 34 cases, \$1329.92; grass cloth, \$156.41; total, \$62,950.27.

—There was about \$3,500,000 in the Spokane, Wash., banks last week, and the bankers did not know what to do with it. There has not been a bank statement for two months, but when the last was made the banks were carrying about 65 per cent. Soon, by reason of the Le Roi sale, about \$4,000,000 more money will be thrown into the Spokane banks.

—At Topeka, Kansas, on the 8th inst., the board of directors of the Santa Fe Railway Co. made formal approval of the purchase of the San Joaquin Valley line, by which the Santa Fe will run trains into San Francisco. The chairman of the board said that the war had opened greater possibilities for the West, and that San Francisco will be a much more important point to the road than it has ever been.

—The town of Republic, Wash., claims to be the banner town in the United States for sending registered matter through the mails. Up to Nov. 11, in the present quarter, there were 350 registrations. For the same period one city with 110,000 population had only 345 to its credit. So great has been the registration that the postoffice authorities upon one occasion sent a letter of inquiry, thinking an error on the part of the postmaster had been made. The figures astonished the department.

—On the 7th the Secretary of War sent to Congress the reports of the engineers who have been examining the Sacramento and Feather rivers, Cal., with the idea of their improvement. The report finds that it is possible, by means of wing dams and dredging, to make a channel with 7 feet to Sacramento, 4 feet to Colusa and 3 feet to Red Bluff, at a cost of \$280,000 for the first section and \$25,000 for the last two sections. It is decided that in the Feather river no work is advisable until the flow of debris is stopped.

—The new executive committee of the Cal. State Miners' Association met on the 7th in San Francisco. The Secretary was authorized to expend \$200 in furnishing an office. It was decided not to have the Association headquarters in the new ferry building. It was ordered that county associations that have failed to pay the required 75% to the State Association be immediately called upon for such amount. A motion was carried that the coming State Legislature be asked to set apart one-third of its Paris Exposition appropriation for the purpose of a mineral exhibit there.

—A tariff for shipments over the Siberian Railroad as far as Irkutsk has been published. Irkutsk is the great trade center of Siberia, and the western terminus of the Chinese caravans over the desert, which have forages brought a large part of the tea consumed in Russia. The new tariff on tea from Irkutsk to Moscow is 2½ rubles per pod, with a separate charge of 3 kopeks per pod for crossing the Yenissei and 2 kopeks for crossing the Oka—great rivers where the bridges are not yet completed. This is at the rate of \$3.30 per 100 pounds. The rate on high class freight in the other direction is about the same. The distance from Moscow to Irkutsk is about 3400 miles.

—At Phoenix, Arizona, it is estimated that enough water is wasted from Salt river each winter to irrigate 1,000,000 acres in the Salt river valley. It is proposed to store these winter floods, to be drawn from as needed during the summer months, by constructing a reservoir in the mountains sixty miles north-east of Phoenix. The U. S. Government has granted the Hudson Reservoir & Canal Company the Tonto basin, to be used as a storage reservoir. It proposes to build a dam at the head of the canyon where the river emerges from the basin, creating a lake eighteen square miles to a depth of 100 to 200 feet. It will be necessary to build a dam 200 feet high and some 600 feet in length at the top, al-

though the canyon is only 200 feet wide for the first 100 feet from the bottom. The Territory of Arizona has granted the company the use of the channel of the Salt river to convey the water to the valley below. To construct this storage reservoir, the largest in the world, will cost about \$2,500,000.

—The total value of the imports in Apia, Samoa, in 1897, according to the American consul-general, was \$329,630, of which nearly half (\$157,695) was from the Australian colonies. The United States sent goods to the value of \$53,415. The exports amounted to \$239,198, of which \$125,350 went to Europe, \$54,305 to the United States, \$51,473 to Australasia, \$14,223 to Hawaii, etc. Of copra (native product) 10,691,520 pounds were exported from Samoa. The consul-general adds that a large percentage of the goods from Australia are of American origin. It is stated that all goods originating east of California are sent to the Atlantic seaboard, thence to Sydney, and from Sydney to Apia, and are delivered there cheaper than they can be obtained directly from San Francisco.

—For the ten months ended October 31, the Oil Producers' Trustees of Los Angeles, Cal., sold 223,647 barrels of crude oil, for which they received \$165,164.76. The largest quantity sold in any one month was 83,007 barrels in March, and the lowest average net price per barrel paid to producers, members of the trust, was 51.28 cents in May. The highest net price was that of October when the producers received, all expenses deducted, 82.06 cents per barrel for their oil. The Times says that the present production of the Los Angeles field is 2300 barrels a day. Consumption, including shipments to points outside of the city, averages 3000 barrels, a shortage of 700 barrels a day. Local consumption is about equal to production.

—The Chief of the Bureau of Yards and Docks, in his annual report, says: "If it be important that this country equip a first-class naval station or yard in this vicinity, near the limit of its boundary, which the Bureau believes, then another site should be sought, which combines the essential requirements of such yard in near-by population, supplying enough skilled labor, a market with supplies conveniently and quickly available, and direct railroad connection with a trunk line for quick and economical transportation of material." The logic of events during the last seven months has demonstrated that more than half of the United States navy will always be kept in the Pacific. Expansion has come to stay—not only in territory, but in commerce.

—In Congress yesterday Senator Morgan submitted a report on the present situation of matters with reference to the Nicaragua canal, the report being a result of the meeting of the Senate committee on the canal. In the report it was asserted that the recent action of Nicaragua in granting a concession to another company than the Maritime Canal Co. was unjustifiable and was an act of unfriendliness to the United States to which this country should not submit, as all three parties interested—the United States, Costa and Nicaragua—should have been consulted before such a change was made. Senator Morgan gave notice of an amendment to the canal bill, authorizing the issue of \$5,000,000 worth of bonds, guaranteed by this Government, for the redemption of all outstanding stock and cancellation of all indebtedness.

—"The scarcity of labor all over the Republic is becoming a serious question to the railroad companies that are building new lines and extending old ones, and the contractors are getting very anxious, as there is no relief in sight," says the *Mexican Financier*. "All the roads in the Republic are complaining of the scarcity of labor, and one or two have been compelled to stop work completely, as they had no men to go on with construction. The International is feeling the scarcity in a marked degree, and work on their branch to Monterey is being greatly delayed. The National is also experiencing difficulty in securing men on its Urupuan extension, and the Central cannot get enough men for its Tampico division, which is undergoing extensive repairs and betterments. The average amount per day paid for men is 75 cents, though in a number of places \$1 per day is offered and paid whenever men can be gotten to accept the price. The rate can be appreciated when it is known that any number of men can be got to work on farms and haciendas at 25 cents per day, and the same men will not work on a railroad for less than \$1 per day. The reason is that in the latter position they are required to work hard and steady."

—A contributor to a Russian magazine has published an article setting forth the necessity of organizing a Russian steamship line on the Pacific ocean, in order to establish communication between Siberia and the United States, to connect with the Siberian railroad. The same author goes on to say: "Foreigners have already established three new steamship lines, having Vladivostok as a terminal point. One of these—the American-Japanese—has for its western terminus San Diego, the most southern port of California, and will work in connection with the Atchison, Topeka & Santa Fe Railroad. The steamers will also call at Honolulu. The second—the English-Canadian—will work in connection with the Canadian Pacific Railroad Co. and sail from the cities of Vancouver and Victoria. Two of its large steamers, about 5000 tons each, will run regularly from these cities to Hakodadi and Vladivostok. The line is controlled by the Canadian railroad and the Empress Line. The reason for its establishment is said to be the rapid development of the Russian Pacific coast and the Siberian railroad and the demand for American products, among others wheat, flour, timber and materials for railroads and factories. The third line belongs to the North German Lloyd of the Bremen

Steamship Co. It has not yet selected its terminus; its directors are hesitating between San Francisco and Los Angeles. The longer Russia remains inactive in this direction, the smaller are her prospects of occupying the place which is due her in the transcontinental and oceanic traffic. This inactivity will greatly influence the future well being of the great Siberian railroad." Passengers and mails can reach Vladivostok via the Vancouver route in thirty days from St. Petersburg, while it required thirty-five days via the Trans-Siberian route, 1151 miles of which is made in partially closed conveyances on rough roads, traveling night and day. By the usually traveled route the trip requires forty-five days. The Trans-Siberian railroad will be about 3644 miles in length when completed; 2015 miles are completed from St. Petersburg side and 478 miles from the Pacific coast, or Vladivostok end, leaving 1151 miles to be built. The construction is going on at the rate of 331 miles per year.

Personal.

J. HANLON is Supt. Crown Point mine, Phoenix, Arizona.

W. H. STORMS, Supt. Agnes mine, Sonora, Cal., is in San Francisco.

F. W. WILMANS, Supt. Star mine, Sonora, Cal., has returned from San Francisco.

D. R. OLIVER, part owner Bonanza mine, Sonora, Cal., has returned from San Francisco.

D. KEITH becomes Gen. Mgr. Star Con. mine, Tintic, Utah. W. Lawrence is slated for Supt.

GEO. MAINHART, Supt. Omaha Con. mines, Grass Valley, Cal., has returned from San Francisco.

A. M. McDONALD, Supt. Republican mine, Jacksonville, Cal., has returned from San Francisco.

C. H. KALSRUHR of Cincinnati, Ohio, Pres. Phoenix M. Co., Nevada City, Cal., is inspecting the mine.

JOHN W. MACKAY, accompanied by W. R. Eckart of San Francisco are at the Grand Reef mines, Globe, Ariz.

JOHN F. KIDDER of Grass Valley, Cal., has been reappointed State Debris Commissioner. The salary is \$3600 a year.

E. ROBERTS of Boston left Salt Lake City last week en route to Angels, Cal., to examine properties upon which he has an option in that neighborhood.

VICTOR M. CLEMENT succeeds Hartwig A. Cohen in the management of Capt. De Lamar's mining interests at Mercur, Utah, and De Lamar, Nevada.

R. B. WATSON, Supt. Marsac, Utah, mill and refinery has resigned to take charge of a big copper-silver mining and milling property at Ramos, San Luis Potosi, Mexico. He is succeeded by G. D. Blood of Berkeley, Cal.

Recently Declared Mining Dividends.

Calumet & Hecla, Michigan, \$10 per share, \$1,000,000; payable Dec. 23.

Swansea, Utah, 10 cents per share, \$10,000; Dec. 10.

Grand Central, Utah, \$31,250; Dec. 10.

Silver King, Utah, \$37,500; Dec. 10.

Yellow Aster M. Co., California, for October, \$10,000; payable immediately.

Nugget G. M. Co., Colorado, 2 cents per share, \$20,000; Dec. 10.

Tamarack M. Co., Michigan, \$4 per share, \$240,000; payable Dec. 23.

Olive G. M. Co., Ontario, 1 cent per share for October and 1 cent per share for November; payable Dec. 15.

Hale & Norcross, Nevada, \$1.50 per share, \$168,000; Dec. 6.

Recent Mining Incorporations.

Columbus Con. G. M. Co., San Francisco; capital stock, \$300,000; subscribed, \$700; G. Ghiglieri, L. Oliveri, D. Brushi, C. Garbani, G. Demartini, G. Bovo, C. Dondoro.

Boston and California G. M. & M. Co., San Francisco; capital stock, \$600,000; subscribed, \$300,000; N. Hansen, G. Gall, L. M. Gall, J. C. Jens, A. M. Jens.

Exposed Treasure M. & M. Co., Los Angeles; capital stock, \$100,000; subscribed, \$37,750; A. N. Davidson, J. A. Osgood, M. L. Wicks, A. M. Davidson, M. J. Conway, J. E. Davis, E. G. Fay.

McKinley-Spartan Con. M. & M. Co., Stockton; capital stock, \$50,000; subscribed, \$32,975; W. B. Shuler, J. W. Empfield, P. Miller, J. M. Meseroll, E. L. Rehm.

Bonita G. M. Co., San Francisco; capital stock, \$100,000; W. Angus, C. S. Neal, G. L. Bresse, G. E. Crothers, F. G. Crothers.

Uncle Sam M. Co., San Francisco; capital stock, \$100,000; subscribed, \$70,000; B. L. Davis, O. Hoffman, J. W. Richards, C. P. Grimwood, F. H. Gould, W. Mooser, G. G. Frazer.

The Caledonia M. Co., San Francisco; capital stock, \$200,000; subscribed, \$50; F. V. Bell, F. H. Smithson, J. J. Kerrigan, I. H. Ward, C. A. Reynolds.

The Black Sand M. Co., San Francisco; capital stock, \$100,000; all subscribed; L. Bowles, A. B. Fay, J. H. Sayre, H. Laurence, J. F. Long.

The Sylvester Quartz M. Co., Sacramento; capital stock, \$50,000; subscribed, \$30,000; F. H. Atkinson, G. H. Clark, S. E. Shear, J. M. Avery, J. B. Fountain.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 23, 1898.

615,124.—CERAIN HANGER—Rebecca Alexander, Fresno, Cal.

615,211.—HYDROCARBON BURNER—J. P. Call, Redondo, Cal.

615,058.—FOOT REST—W. E. Cummings, Los Angeles, Cal.

615,153.—GOLD SEPARATOR—A. T. Fox, Sumner, Wash.

615,167.—BOOT AND SHOE HEEL—C. G. Hainline, Anderson, Cal.

615,177.—GRAIN PEARLING MACHINE—J. C. Holloway, S. F.

614,957.—NECK YOKE, ETC.—J. Journeay, New Hope, Cal.

615,085.—CONSTRUCTING FLUMES—Martin & Ormand, Riverside, Cal.

615,194.—SHUTTERS—J. Parkinson, Los Angeles, Cal.

615,100.—CARBURETOR—E. D. Parrott, Goldendale, Wash.

614,976.—RAILWAY RAIL—J. W. Peterman, Banta, Cal.

614,888.—HOSE COUPLING—J. C. Poetz, Spokane, Wash.

614,907.—VEHICLE PROPELLER—J. F. Venner, Brownsville, Or.

615,120.—PRESSURE REGULATOR—J. C. Witt, Phoenix, A. T.

614,921.—TREE PROTECTOR—C. Zimmerman, Santa Rosa, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PNEUMATIC BOOT AND SHOE HEEL AND CUSHION.—C. G. Hainline, Anderson, Cal. No. 615,167. Dated Nov. 29, 1898. This invention is applicable to boots and shoes. The object is to combine the elasticity of a rubber or other elastic heel with the additional elastic support provided by a body of air contained in a suitably closed cavity within said heel. It consists of a rubber heel having an open-topped chamber formed in the upper part, with a peripheral margin adapted to be cemented directly upon the sole of the shoe, so that a body of air is hermetically sealed within the chamber to form an independent elastic cushion. A groove or channel is made around the outer periphery of the heel and nails may be driven through said channel to secure the heel, leaving a central projecting elastic surface of contact with the ground, interior to the line of nails.

GRAIN PEARLING MACHINE.—J. C. Holloway, San Francisco, Cal. Assignor of four-fifths to J. F. Cunningham and Charles E. Grosjean, of same place. No. 615,177. Dated Nov. 29th, 1898. This invention is designed to carry out the operation known as pearling barley and other grains. It consists of a mechanism in which a continuous feed and discharge may be effected in which it differs from other machines hitherto employed for the purpose, in which the grain to be treated is worked in independent charges, each charge being completed and moved before a new charge is introduced. This apparatus comprises cylinders separated from each other to provide a confined passage for the grain, one of said cylinders having end heads and an imperforate circumference, and the other having an abrading or roughened surface opposed to the surface of the first named cylinder. The inner cylinder is mounted upon a shaft and the heads of the outer cylinder turn loosely with relation to the inner cylinder having inwardly turned flanges which enclose its ends. Openings are provided for the passage of the grain to and from the space between the cylinders which are rotated in the same direction at different rates of speed. A supply hopper connects with the openings at one end, and a stationary casing encloses each of the apertured heads, the casing at the opposite end having a discharge opening through which the grain may pass. A body of grain is thus kept moving slowly between the cylinders at all times, the supply from the feed end being regulated by the rapidity with which the grain is discharged from the opposite end.

Commercial Paragraphs.

"ENCLOSED ARC LAMPS" is the title of the latest pamphlet issued from the General Electric press. It deals with the different types of enclosed arc lamps manufactured by the General Electric Company for direct and alternating current circuits, indoor and outdoor lamps, marine lamps, miniature lamps, power circuit lamps, series enclosed lamps, and single-globe and double-globe lamps. Each type is well illustrated, and the object of its design and its advantages set forth in language unhampered by abstruse technical expressions. It is written for the information of the general consumer as well as the electrician. Printing and illustrations are, as usual, excellent. The pamphlet will be sent to persons interested on application to any of the sales offices of the General Electric Company.

Current Mining Cases.

Prepared for the MINING AND SCIENTIFIC PRESS.

A locator may relocate his mining claim, including additional vacant ground unclaimed by others, under a different name, and convey it by the designation of the last name. *Shoshone Min. Co. vs. Rutter*, 87 Fed. Rep. 801.

"Sand" is a mineral, within the meaning of Act May 8, 1876 (P. L. 142), and an indictment lies for its removal from above ordinary low-water mark of an island in the Susquehanna river. *Commonwealth vs. Hipple*, 7 Pa. Dist. R. 399.

An assignment by one partner to a creditor, as security for a pre-existing individual debt, of all his interest in the mining leases and partnership property, does not avoid the partners' lien on the property. *Ervin vs. Masterman*, 16 Ohio Cir. Ct. R. 62; *Townsend vs. Same*, Id. 77.

The terms "vein" and "lode," as used in the various Acts of Congress relating to mining locations, apply to all deposits of mineralized matter within any zone or belt of mineralized rock separated from the neighboring rock by well-defined boundaries. *Hayes vs. Lavagnino*, 53 Pac. Rep. 1029.

The Revised Statute of the United States, Section 2320, providing that "no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located," does not require the locator of a mining claim to be the original discoverer of the vein or lode. *Hayes vs. Lavagnino*, 53 Pac. Rep. (Utah), 1029.

In a suit to determine the right of possession of a mining claim it is incumbent upon the locator to show that the location was made upon a vein or lode of quartz with knowledge on his part, before the location was made, of the existence of mineral there. *Hayes vs. Lavagnino*, 53 Pac. Rep. (Utah), 1029.

The Revised Statute, Section 4112a, providing that oil or gas leases or assignments thereof shall not be valid unless recorded as therein provided, does not prevent the taking effect or enforcement of the partners' lien upon such property, though the title may be held in the name of an individual. *Ervin vs. Masterman*, 16 Ohio Cir. Ct. R., 62.

A stipulation in a coal lease that the lessees shall mine and ship each year as much coal as will produce \$5000 yearly at the rents designated, unless prevented from doing so by unavoidable accident, or occurrences beyond their control, releases lessee's liability for rent when coal on the premises becomes exhausted. *Bannan vs. Graeff*, 40 At. Rep. (Pa.), 805.

Seams containing mineral-bearing earth and rock, discovered on a claim before its location, were similar to seams that had induced other miners to locate claims in the same district, and which by development had proved to be a part of a well defined lode or vein containing ore of great value. *Held*, a sufficient compliance with Revised Statutes, Section 2320, requiring the discovery of a lode or vein within the limits of a claim before a valid location thereof can be made. *Shoshone Min. Co. vs. Rutter*, 87 Fed. Rep., 801.

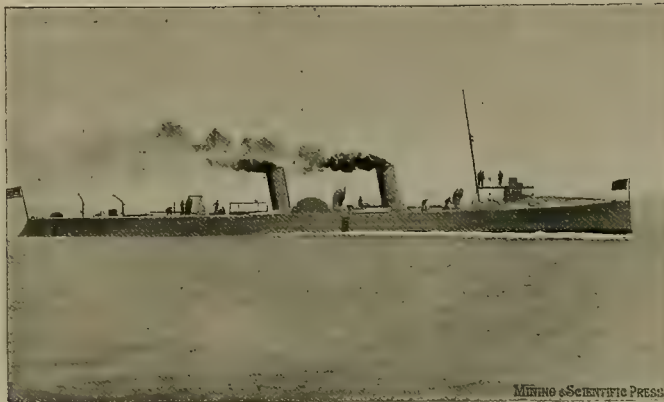
Under Acts of Congress, July 26, 1866, and May 10, 1872, relating to the location of mining claims, any deposit of mineral matter, or indication of a vein or lode, found in a mineralized zone or belt, within defined boundaries, which a person is willing to spend his time and money to follow, in expectation of finding ore, is the subject of a valid location, and, when the metallic vein matter appears at the surface, leads may be made. *Hayes vs. Lavagnino*, 53 Pac. Rep. (Utah), 1029.

Co-owners of an oil and gas lease of certain lands agreed to form a partnership for the sinking, equipping, and operating oil wells thereon, the necessary funds to be raised by assessments upon the members, and each member to receive and sell on his account and at his own pleasure his share of the oil produced; and in pursuance of this agreement a firm name was adopted,

and the business carried on accordingly. *Held*, that this arrangement constituted a partnership, to such an extent as to allow parties to transfer their share without consent of their co-partners, and without working a dissolution, partaking in the nature of a mining partnership; and hence that the partners' lien might be enforced as in the case of an ordinary partnership. *Ervin vs. Masterman*, 16 Ohio Cir. Ct. R., 62.

The Torpedo Boat Farragut.

The torpedo boat Farragut, herewith depicted, built by the Union Iron Works of San Francisco, at her official trial trip last Saturday made 30.18 knots over the official course, 419½ rev-



TORPEDO BOAT FARRAGUT.

olutions—30 knots, 417 revolutions were required. This attained speed of thirty-three miles per hour makes the Farragut the fastest of her class. The same men that built the Oregon built the Farragut; the big battleship, whose fame is now world wide, has motive power weighing 1009 tons, developing 11,111 H. P.; that of the little torpedo boat is 120 tons, but develops a H. P. of 5600.

In connection with this record of California mechanism, it is interesting to note that the United States navy now has thirteen of those little craft, and several more whose official trial and subsequent acceptance have been delayed. The nearest in speed to the Farragut is the Porter, with a record of 28.68 knots. She is of 165 tons, and cost \$144,000. The Farragut is 240 tons, and cost \$227,500.

Side-Dumping Ore Cars.

The accompanying cut is from a photograph of an all-steel construction side-dumping ore car, manufactured by the American Engineering Works of Chicago, Ill. These cars are equipped with Anaconda self-oiling wheels and axles. The car box, as



SIDE-DUMPING ORE CAR.

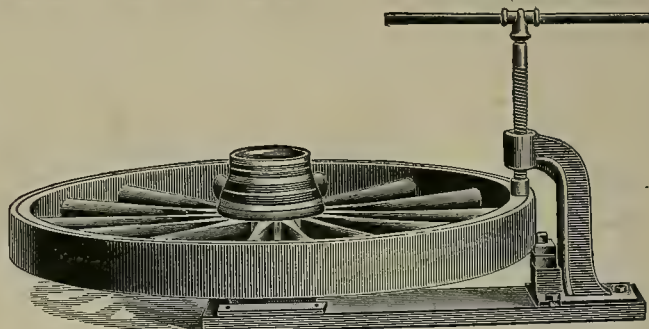
shown in cut, is 48 inches long, 36 inches wide and 24 inches deep; height from top of rail to top of car 44 inches when equipped with 14 inch wheels; shipping weight 1200 pounds; frames are made of 5-inch channels; ends and

sides of box No. 10, bottom and door ½ inch hard-finished steel plates, fastened in the corners with 2x2 angles, re-enforced around the top with 1½ inch angle, which also is used in re-enforcing the door. The body of the car swings on cast iron trunnions, which are fastened to the box with 5-inch intervening channels, and the frame of car by ½ inch plates. Car dumps at an angle of 45° or more, as may be desired. It is operated by lever, as shown in the cut. When the latch is thrown forward it unhooks from the body, at the same time unhooking the door. Draw bar is made of wrought iron, running clear through and fastened to the frame at both ends. The photograph shows bumpers, which have been put on special cars for run-

ning in trains of twenty or thirty. Generally the car is furnished without bumpers. This same type of car can built in any size or style to suit requirements.

New Tire Remover.

Blacksmiths often wish to remove a tire from the wheel without cutting



NEW TIRE REMOVER.

the tire, but they find it difficult to do this without injuring the wheel. And this is particularly so in the case of

Chicago has a tire remover herewith illustrated. The pressure is exerted by a screw, the end of which turns in a round block resting on the felloe. A square block is provided, upon the edge of which the tire rests. On this block are four shoulders of different widths, the object being to turn to the front the shoulder having the right width of the tire. The body is malleable iron and is strong enough for any pressure that the work may require.

L'Electricien announces what it styles "an important discovery, which will shortly revolutionize lighting by electricity." It is incandescence in the air. Patents have been taken out, in various countries, by Ganz Bros. of Budapest, who are now endeavoring to perfect this new mode of lighting. An aluminum tube, three-twelfths of a millimeter, receives the current through two small platinum wires, the tube becoming effulgent on the passage of the current. No glass bulbs are needed, and the light, it is claimed, is more effulgent, while the cost is appreciably less. Aluminum tubes have undergone incandescence during a period of 700 hours, without showing any physical or chemical changes. The only difficulty was that aluminum is not a conductor of current in its cold state. The difficulty has, however, been overcome by the heating of the tube, which is run automatically. A small coil of platinum wire is brought into touch with the aluminum tube, and as soon as the current passes, this coil immediately becoming heated, communicates its warmth to the tube, from which it is released automatically. It would seem, from experiments made so far, that the new system is satisfactory.

To prevent the engines of a vessel from "racing" when the screw rises above the water, an electrical regulator has been invented which consists of two vessels of mercury connected at the bottom by a tube and mounted fore and aft in the ship. The vessels are half full at normal depth. When the

ship pushes forward so as to raise the screw, the rods connected with the resistance are submerged one after the other, so that an electro-magnet is brought into play, the whole resistance being short-circuited when the screw is entirely out of the water. The electro-magnet operates a throttle valve in the main steam pipe, which is thrown open by another magnet. By this arrangement the steam is turned off and on. From experiments it has been shown that the mercury vessels need not be more than 34 inches apart on a ship 300 feet long.

At Paris a stone saw of the circular kind, 7 feet 6 inches in diameter, is set with 200 diamonds let into the metal and disposed of in such a way that eighty stones are set into the points of the saw teeth, eighty more into the faces of the teeth near their points and forty more into the side of the teeth. The saw rotates at the rate of 300 revolutions per minute; its tangential speed is of 120 feet per second, and it cuts into the stone at the rate of a foot per minute for the hard-faced stones; for soft building stone the saw makes but twelve revolutions per minute, advancing 40 inches into the stone during that time. The stones are mounted on a chariot, the movement of which can be regulated to suit the advance of the saw. Blocks up to 6 feet high by 4 feet wide can be cut like so much wood.

Mining Summary.

ALASKA.

New regulations have been adopted for hydraulic mining in the Yukon. The areas are to be from one to five miles in length and will be granted only by public tender. Exception is made, however, in the case of parties from the Klondike who have already applied. They are treated as pioneers, and not only get their concession without competition or payment of bonus, but are exempted from dues. These dues are \$150 a year per mile frontage and obligation to perform assessment work yearly to the value of \$5000. On all commissions, however, the usual royalty will be collected on an output of over \$25,000 a year. It is expected this royalty will be reduced to 2 per cent. Other conditions are that the applicant furnishes proof of having resided in the Yukon and file a certificate that he has examined the ground applied for, prospected it and ascertained that it is not suitable for mining by ordinary placer methods.

ARIZONA.

C. Polhamus last week received good assays on ore from the Refugio mine in the Mesquite district.

Tucson Citizen: The sale of the San Xavier mines, owned by Goldschmidt & Manning, to some of the owners of the Kansas City Smelting Works is announced, the reported price being \$200,000. The mines are near Tucson and a good deal of development work has been done on them. The ore, though not of high grade, lies in large bodies. About 10,000 tons of it have been shipped to El Paso and the Kansas City Smelting Works.

Yuma Sun: O. F. Place is developing the Buckeye mine, in Yavapai county.—The Gopher G. M. Co. has started work on Chaparral properties with twenty men.—The Swindler mine is proving to be a copper property.—Good ore is being taken out of the Bedrock mine, in Peeples valley, and hauled to the Yarnell mill.—A depth of 300 feet has been reached in the Red Rock mine. A stamp mill has been secured; twenty men are employed.—A. O. Brodie is developing his Crown Point mine with twenty-five men.—In Pinal county the Mammoth G. M. Co.'s payroll contains 100 names.—A shaft is being sunk on the Georgiana copper mine, near Florence. It is in good ore.—The shaft on the ledge of the Grand Reef mine, Cochise county, has been sunk 475 feet, and a tunnel is being driven to strike the 400 level. It is being developed on a big scale, with the aid of improved machinery, and, when thoroughly exploited, mammoth reduction works will be erected.—Cochise county's greatest gold producer is this year all the ore of the Commonwealth was shipped, but now a 20-stamp mill crushes all except the very richest.—In Mohave county, the ledge of the Blackfoot, owned by B. Collins, will be crossed by a tunnel at a depth of 450 feet.

—Near White Hills, C. Latin and partners have found placer ground, which they are working with dry washers.—Twenty-five men are working on the Azurite, in Pima county.—A body of ore is being developed in the Santa Maria mine, near Arivaca.—Copper sulphides have been found in the company's property at Rosemont.—The Blue Jay mine is producing high grade ore.—At the Cardinoff mine, in the Ojo district, A. J. Shotwell of Denver will build a 40-ton reduction plant soon.—The Silver Bell smelter, operating on ore from the mine of that name, near Tucson, reduces twenty-five tons of copper-silver ore daily, and produces about three tons of copper bullion and matte. About seventy-five men are employed.—The Red Cloud mine, in Yuma county, is developed by five shafts, the main one being 590 feet and the others from 150 to 300, all being connected by stopes and drifts. From the third level four winzes have been sunk to a depth of 490 feet. The water level is struck at a depth of 555 feet. H. P. Griswold is taking out ore above and below the third level. The ore body is from 2 to 14 feet in thickness and the pay streak carries 60 per cent lead and over 100 ounces in silver to the ton.—P. Singleton of the Yellow Aster mine, Randsburg, Cal., has bought a mining property near Yuma, which yields good assays as development progresses.—The Clifton mine, near Yuma, has three shafts to a depth of 300 feet and a 125-foot tunnel. There are two veins on the claim, running parallel and averaging 5 feet in width. The ore taken from this property averages 55 per cent in lead, and much of it carries 350 ounces of silver per ton.—The Ajo copper mines, in Yuma county, have been secured by Eastern mining men, and work is to be inaugurated there soon, under the supervision of C. C. Bean. The ore of these claims also carries gold values.

CALIFORNIA.

Amador.

Secretary Baker of the Alma G. M. Co. says there is a probability of reopening the Alma mine soon.

Sutter Creek Record: Twenty stamps started at the Balliol mill at Sutter Creek last week.—The Keystone 40-stamp mill at Amador City is running full capacity.—At the Wildman-Mahoney mine the Mahoney's forty stamps are dropping and twenty are crushing at the Wildman. The Emmerson shaft is down 340 feet.—At the Douglas mine in Volcano district they began a station at the 400 level.—At the Lincoln mine, Sutter Creek, the old shaft, which is 800 feet deep, has been cleaned and retimbered to 400 feet. The mine employs twenty men and \$3000 per month is disbursed. Supt. Voorheis expects to erect a big mill on the property next spring.

Jackson Republican: From the Spagnoli mine, near Jackson, ore amounting to several thousands of dollars has recently been taken out.—Sinking continues at the Zella. Supt.

Detert expects to go 700 feet deeper, and, if the prospects are not satisfactory, work on the upper levels will be started.

Jackson Dispatch: The new shaft at the Kennedy mine is under way. A large force is employed.—At the South Eureka mine, Supt. Parks is opening the 1600-foot level, which will be driven from the north shaft. It will take five months to complete the work.—Near Pine Grove the Fisher mine has been yielding good ore the last two weeks. The mill is running day and night.

Jackson Ledger: At Volcano the old Downs mine is to be reopened.—J. B. Meek has bought the Grizzly Hill gravel mine near Volcano and will begin work as soon as it rains sufficiently.

Butte.

Oroville Register: Near Oroville, the Hammon dredge is at work digging and washing gravel. It is 150 yards from the river in a canal that it has cut for itself. Near this is the Plutos, 46 feet wide and 65 feet long. It will be ready for work in a short time.—A road to the Chambers mine has been built, and machinery is being hauled for the mill, which they hope to have running Jan. 1.

Calaveras.

At the Gwin mine, near Mokelumne Hill, grading has been begun for an additional thirty stamps.

San Andreas Citizen: The California Exploration Co. are extending their electric wires to the Ford mine. The new mill will be operated by electric power.—Near El Dorado the Folsom gravel claim will be worked. Water will be secured from Emery's ditch, and a line of pipe 4500 feet will be laid at once. With the first rains work will begin.

—The ditch for the Lively mine has been cleaned out and awaits rain to operate the plant. The mill has been shut down two weeks, owing to financial difficulties. Indications point to the beginning of work shortly.

San Andreas Prospect: Work is progressing at the Chili Hill gravel mine at Central Hill. Last week the old works were tapped and the water raised 40 feet in the shaft. The connection was expected and no accident happened. The shaft is being unwatered. The developments revealed a large quantity of gravel.—Although the Sheep Ranch mine has been practically closed down for some time, the indications are that work will soon be resumed.

Angels Echo: It is reported in Angels that work in the Thorn mine has been discontinued and that the machinery will be removed. The company who recently took charge of the Collier mine, near Murphys, are making extensive improvements. A 5-stamp mill was started last week. The ledge is from 3 to 6 feet in width and it is said the ore will yield \$35 a ton.

Colusa.

The Empire Quicksilver M. Co., near Williams, is erecting a forty-ton furnace and retorts on the old Abbott mine, leased by the Empire Co.

Del Norte.

At the Blue Ledge mine near Crescent development work will continue all winter.

El Dorado.

Placerville Democrat: The company who recently bonded the Selby mine, near Diamond Springs, are arranging to sink to 1000 feet depth.—A good pay chute has recently been struck in the 300 level at the Larkin mine and five stamps have been added to the mill, making ten stamps.—The dynamo for the Griffith was taken to the mine last week.—The Marguerite mine has uncovered some good ore.

Fresno.

A discovery of 30 per cent copper ore is reported from Clovis. The mine is owned by Bland & Burton.

Kern.

Randsburg Miner: T. Johnson has sold a three-quarter interest in his copper mine at Pilot Knob and is in Kansas City, Mo., closing the deal. He gets a satisfactory price for it, with a large cash payment, and is to remain as Supt. of the property.—F. Goodman represents a company from New York developing the Copper City Camp near Johannesburg. They have a large force at work.—Pebby Bros. of San Francisco are mining near Ballarat.—The Red Dog mill has been running on ores from the Gold Coin and Butte the past week.—Walker & Co. had a nice cleanup from a 6-ton run from their lease on the Butte.—Squires & Perdue on their Alpha claim have an 18-inch ledge of high-grade ore.—The Black Hawk mine is making a 50-ton shipment of ore to the Cuddeback mill. They are now taking out about five tons of good ore a day.—C. Collins' ore dump on the O. K. is assuming good proportions.

Los Angeles Review: In the Windy mine near Randsburg a 30-inch body of ore running from \$300 to \$400 per ton was encountered.—The Wedge has had ore crushed at the Eureka mill that has yielded \$100 a ton. The same mine is also having some low-grade rock run at the Johannesburg mill.—At the Yellow Aster the new mill will be in operation shortly after Jan. 1.—The Butte is preparing for a big mill run on high-grade ore, and shipping several hundred tons of low-grade ore.—The Kinyon is taking out some high-grade ore.—The Little Butte continues in good ore in the lower levels and is milling at their own mill at Johannesburg, and also at Barstow.—Willard & Harrison removed their Cuddeback mill to the Black Hawk mine near Johannesburg. It will be in operation Jan. 1. The Black Hawk people will use it for several weeks.—At the O. K. mine, recently bought by A. R. Collins for himself and New York associates, sinking on the large ore body has begun.—Campbell, Denniston & Woodard, who recently bonded the Rader property near the Yellow Aster group, have uncovered a number of ledges of high-grade ore.—C. A. & A. A. Burcham have started extensive work on some claims they recently bonded in the Argus country.—C. Koehn, who has a lease

on the Ruby claim near Johannesburg, has a force at work sinking and drifting, and is shipping from twelve to twenty tons of \$20 ore to his mill at Kane Springs.—It is reported on good authority that the Yellow Aster output for November exceeded \$70,000.

Mariposa.

(Special Correspondence).—The Big Betsy mine, operated by the Golden Crown M. Co., comprises six claims. The property is in this county, on the Tuolumne county line. The postoffice is Groveland. Work was begun about a year ago. The shaft has reached 300 feet and is reported to be in ore all the way. The average size of the ledge is said to be 14 feet. An assay made from this ore in Chicago indicated a value of \$72.93 to the ton, with a good percentage of sulphurets. Water will be used for power. It will be pumped from the mine and stored in a large reservoir. The company is building a 10-stamp mill, which is expected to be in operation Jan. 15, '99. Compressed air will be used for drills and the pump on the lower level. The pump on the surface throws 500 gallons a minute. The company is composed of business and professional men of San Jose. It is capitalized at 300,000 shares at a par value of \$1 each. The company is organized on a safe basis and its plant and property are free from any indebtedness. The president of the company is W. O. Hilbish; secretary, A. McDonald; treasurer, E. H. Wemple. A. McDonald is Supt. The property is being developed for its stockholders, and not for the market.

Mariposa Gazette: M. Bogart has bought the North Doss mine, near Hornitos.—M. L. Rodgers and assayer King of Mt. Gaines are prospecting the Green Valley mine with intent to buy.

Napa.

In November 1004 flasks of quicksilver were shipped from the Napa county mines.

Nevada.

Work has begun towards putting a dynamo at the Allison Ranch mine, near Grass Valley, to run the air compressor. The line is being surveyed for the poles, and it is expected that the machinery will be ready in three weeks.

Nevada City Transcript: The new bedrock tunnel of the North Bloomfield Co. is being pushed up the channel. A pthole was encountered recently, but within a short time that will have been passed and the extraction and washing of gravel will begin.

Grass Valley Union: The old McCutchan hydraulic mine, near Nevada City, which is being opened by Gray & Bullard, will probably be running by Christmas. Men are building a dam, which is over half completed. The pipe line is about finished and they are putting in 2000 feet of sluice boxes, after which the mine will be ready for the monitor.

Grass Valley Union: The owners of the South Fork mines near Grantville have paid the liens against the property, incurred by the Netherlands Co. while they had the mine under bond. There is a new mill on the mine, which is owned by Fowler & Miller, and there is a possibility of the mine resuming operations in the spring.—Operations have resumed on the Granite Hill mine, near Grass Valley, with E. F. Whiting as Supt.—At the Odin gravel mine, near Nevada City, the shaft is down nearly 500 feet.

Riverside.

The Mgr. of the Good Hope mine, near Perris, has leased portions of the mine to different people, who are working with good results. The cyanide works at the Good Hope and also at the Santa Rosa are in steady operation and good results are obtained.

Riverside Enterprise: The strike made in the Gavilan mine, near Riverside, is proving of a substantial character.

San Bernardino.

The Rose Cyanide Co. sold to the Rose G. M. & M. Co., for \$3500, the cyanide plant in the Morongo mining district.

Free Press: The Index M. Co. is making arrangements to work the Iron Mask, One Horn and Index mines, near San Bernardino.

San Diego.

The Ranchita mine, near San Diego, is working three shifts a day, and the 5-stamp mill is running twelve hours a day. The shaft is down 430 feet.

The San Diego Union says that a smelter for gold, silver and copper ores is about to be established near San Diego of twenty tons capacity. It will be running Jan. 1st.

Shasta.

Morrissey Bros. sold to A. Hurst a half interest in the Mabel V mine, in Harrison Gulch mining district.—A one-third interest in the Rainbow mine, near Shasta, has been sold to J. Stevens of McCook, Nebraska.—The National mine, near Redding, has started its 10-stamp mill.—T. J. Baker has sold a half interest in the Smoky mining claim, near Redding, to B. Ballinger.

Sierra.

At the Plumbago mine, near Alleghany, next Monday the air compressor plant that is to run the mill, hoist, pumps and drills will be started.

Downville Messenger: I. Copeland is pushing work at the Gold Bluff mine, near Downville, with thirty men. Repairing the ditch and flume was finished last week; men are snowshedding tracks and making other improvements for winter. More than 50,000 pounds of freight has been received within two weeks. There are still 7000 pounds to arrive. A second new air compressor was received last week. Mgr. Copeland will soon put in a second pump. The mill is running full capacity, twenty stamps.

Siskiyou.

The Commodore mine at Barkhouse Creek is paying well. The ledge is 4½ feet wide.—The Hollister Co., working the old Spencer mine on Humburg, is running a tunnel to tap the ledge at depth.

Yreka News: The tunnel run by Ironside

& Wadsworth on the Little Wonder is in 150 feet, showing good value. This tunnel at 500 feet will cut the ore bodies 800 feet deep.

Yreka Journal: The New Pinery Co. are working drift diggings in Quartz valley with success.—Good ore has been struck in the Golden Eagle mine at Indian creek.—McCaw & Co. have a large body of ore in their mine at Patterson creek.—San Francisco men will operate the Summerville or Red Hill hydraulic mine on Salmon river.—The American Bar mine near Hornbrook is worked with a large force.—Hunter & Co. of the Cherry Hill mine, near Yreka, have found a ledge 7 feet wide in the new lower level, 2 feet of which is high grade. They are getting out a quantity for crushing in the 10-stamp mill of Fry & Macaulay, in which the Cherry Hill Co. owns an interest.—Ironside & Wadsworth have quartz at Cherry creek, which prospects gold, galena and iron.—The Greenhorn Blue Gravel Co. continues work day and night, with water pumped from bedrock.—The Oro Fino Hydraulic Co., near Fort Jones, has four elevators ready to start as soon as they get water.—Morrison, Carlock & Co. have put up machinery at their mine in Quartz valley, and started operations this week.—The company running a tunnel through Humburg mountain, near Yreka, has suspended work until next spring. The tunnel is in 600 feet.—The Yreka M. & M. Co., operating the old Gold Ball mine at Salmon river, has a large force at work since last September getting out quartz.—About \$200,000 has been invested in Scott valley this season for mining property. The Oro Fino mines of Eastlick Bros. and Wright & Co. were sold to a San Francisco company for \$57,000; Brokaw & Co. bought mining ground in Quartz valley for \$35,000; the Sheba Co. bought the Fry & Macaulay quartz mine on Patterson creek for \$35,000; the Gray Eagle Co. recently bonded a property for \$50,000 in Quartz valley; a New York company bought the Golden Eagle mine at Indian creek for \$35,000.

Yreka Reporter: W. Klein of Sawyer's Bar will work the Casey mine in Eddy's gulch the coming season.—The old Morning Star mine in the Salmon country will, it is said, be started in the spring by a new company. The property has been idle a long time.

Trinity.

The Golden Jubilee Co. near Trinity Center are prepared for winter work. The mill runs when there is sufficient water. The main body of the ledge carries \$5 in free gold and high-grade sulphurets.—W. A. Wagner is doing development work on his mine and is ready to build a mill.—Rubling & Co. have developed a lode of free milling ore near Trinity Center. They have an arrastra and crushing.—The Strode mill at Carrville has been shut down for the winter.—McDonald Bros. & Co., who bought the Bloss & McClary placer mine at Trinity Center, are getting into shape for the season's work. They have enlarged the upper ditch, doubling its capacity, built flumes and laid new pipe. They are preparing to put in an electric plant.

The Mountain Boomer mine, near New River, which was supposed to have been worked out, is operated by a San Francisco company, who are well satisfied with their speculation. The old works have been reopened at a depth of 240 feet with an upper tunnel, where a 30-inch ledge has been uncovered which runs \$40 in gold to the ton. A second tunnel is being run 650 feet below the old one.

Shasta Courier: J. Early and partner, who have been leasing at the Brown Bear mine, Deadwood, have taken out about ninety tons of \$37 rock. Leasers at the mine do well. The new tunnel is in 150 feet. Its length will be 4200 feet, and it will cut several ledges. A new steam engine will drive the power drills. The old mill will be retained for leasers, and, if the tunnel justifies, a new mill will be erected. J. Melton of Placerville, Cal., and C. Watt of San Francisco are the principal owners.

Weaverville Journal: The Altona Quicksilver M. Co. at Cinnabar are working steadily with seventy men. Work will continue through the winter.—At the Integral mine twelve men are employed. The tunnel is in about 200 feet. In crosscutting for the vein of cinnabar Supt. Laws struck an ore body of gold-bearing quartz 50 feet wide averaging about \$4 a ton.—The Nash deep gravel mine at Abrams has been fitted up and is ready to be run as soon as water comes.—At the Frue & Norton mine a tunnel is being run by contract.—Hill & Lorenz have closed down for the winter their tellurium mine. The mine is situated on Union creek, a branch of Coffee creek, and carries very rich tellurium ore. Just before closing down ore was taken out going as high as \$2000 a ton. The ore is packed from the mine and shipped for reduction.

Tuolumne.

F. Sutton has bonded the Street mine at Tuttle town to F. L. Wooster of San Francisco.—Work will be commenced at once. In the Hazel Dell mine a strong body of ore has been found.—The shaft on the Excelsior has been driven 140 feet.—The new canvas plant at the Confidence has been completed.

Jamestown Magnet: The Confidence mine at Confidence is in active operation, a 20-stamp mill running night and day.—The Buchanan is being reopened under the management of Supt. Moorehead. A tunnel will be run to the shaft, which is filled with water, tapping it at the lower levels.—The Dreissam mine is a small but rich vein; it has six stamps in operation.—At the Hard Times mine development is in progress and a 5 stamp mill is in operation.—At the Excelsior mine, near Sugar Pine, sinking is carried on. When a depth of 300 feet is reached, drifting will begin.—J. Ryan is reopening the Old Gold mine.—Work at the Bown mine, Tuttle town, is progressing. Since last February the shaft has been sunk 480 feet, four stations put in and 1200 feet of drifts run.—At the Uncle Sam mine sinking is in progress.—C. G. Bacon

and associates have begun work on the Cenell ranch, near Columbia. At the Gray Eagle mine a Gates canvass plant will shortly be put in. Peabody & Ogden have discovered a vein 4 feet wide near Columbia that prospects well. The Tuolumne County Water Co. will soon extend their electric line to the mines along the mother lode.

Sonora Independent: The Moody mine and mill at Big Oak Flat are working steadily. It is locally reported that Mr. Moody will put in a 20-stamp mill soon. The Longfellow has put in a new hoist, and it is thought the mill will soon start. The Nonpareil is yielding a good product. J. Hardin made a good strike on his claim near Big Oak. T. Sorrenson is working successfully on the Gold Bug.

COLORADO.

BOULDER COUNTY.

Culberson Bros., who secured a lease on the Antietam and Independent properties near Eldora have begun operations. A chlorination mill is being built of fifty tons capacity at a cost of \$80,000, to treat the ore from this mine. The vein is 15 feet wide and averages from \$15 to \$22 per ton in gold.

Boulder News: The Delano mill at Boulder is treating thirty-five tons a day. Of this amount fifteen tons is taken from the Kiklonga, the company's own mine; the Ingram furnishes five, the Teagarden five, the Logan two and a half and the remainder from miscellaneous sources. The company buys the ore, deducting \$9 per ton and 5 per cent off for treatment.

CLARK COUNTY.

Idaho Springs News: J. Owen sold the Gum Tree property near Idaho Springs to New York capitalists for \$57,000.

Idaho Springs Gazette: Near Silver Plume the Smuggler mine is producing ore running \$19 in gold and heavily in silver, with a good percentage of lead. C. Hanson had a mill run recently from the old Corry City that returned \$390 per ton. Other leasers are also coming into good ore in this property. The Stevens mine has twenty-two leasers. They are all in ore, which runs from 60 to 70 per cent lead, from twenty to thirty ounces silver and from \$2 to \$10 in gold. The Seven-Thirty, Pelican-Dives, Bismarck, Eagle Bird, Zephyr and Illinois mines are all being worked under the Pelican-Dives Co., and most of them are producing good grade of ore. The bulk of the ore is being taken out of the Bismarck, Pelican-Dives and Seven-Thirty.

At Georgetown the Kirtley has several sets of leasers working. The ore from this property runs 500 ounces silver per ton.

The Aliunde and Colorado Central mines, owned by the Aliunde Co., are producing good ore. A strike recently in the Aliunde shows a streak of 6 inches to 1 foot of high-grade ore. W. Moore has leased his Empire City lode at Empire to a company who will sink the shaft 1000 feet.

CUSTER COUNTY.

Veins of nickel ore of good quality are said to be found in the Gem mine, near Silver Cliff, which run 45 to 64 per cent nickel to the ton, and it is associated with copper.

DOUGLAS COUNTY.

Castle Rock Journal: The Grant mine at West Creek will shortly reopen with H. D. Bell as Mgr. The property has come into possession of Pennsylvania people who expect to push work.

EAGLE COUNTY.

The May Queen Leasing Co. made a fifty-ton shipment of low-grade ore.

EL PASO COUNTY.

The total tonnage for the output of ore from the Cripple Creek district for November amounted to 36,450 tons, with a valuation of \$1,447,500. An estimate on the production of the Legal Tender mine at Victor for November places the tonnage at 2700 tons. The royalties paid by lessees on the Fluorine on Copper mountain to the Montreal Co. are \$945.24. Of this amount \$750 will be shortly paid out in dividends. The Victor mine is outputting eighty tons daily. The Gold Coin ships 700 tons of ore every week. The Birch lease on Mary McKinney ground last month output \$30,000. The Creston lease on the Jack Pot is outputting forty tons every twenty-four hours. The average value of the ore is \$60 a ton.

Victor Record: Twenty tons of ore was shipped to Denver recently from the Zenobia at Victor, ten tons of which is of about 7½ ounce grade, seven tons will return values of 15 ounces or thereabouts, while about three tons of high-grade mineral will, it is believed, prove to be worth about \$1 a pound. The settlement check will not be much short of \$10,000. A fifty-ton shipment of two-ounce ore was sent out last week by Langstaff & Co. from the Pueblo. The Vindicator Co.'s workings shipped about 1500 tons and lessees a like amount in November. The Legal Tender output for November ran near 3000 tons. The production from the Modoc mine last month is reported to be fifty-five cars of second-grade and a few of high-grade smelting ore. The first shipment of twenty tons from the Saunders lease on the Silver Tip yielded ten tons at \$191.60 per ton and ten tons at \$56 per ton. At Cripple Creek, in the Gold Sovereign mine, all but two of the lessees are working in good ore; they paid the company \$2000 in royalties last month. Of the shipments, 235 tons averaged \$55 per ton and there were 70 tons left in the bins of last month's output. One carload was \$160 ore.

GILPIN COUNTY.

A gold retort weighing eighty-seven ounces was the result of a cleanup on mill ore from the Pierce mine at Black Hawk. The Gelfer mine in Pine district, owned by M. Stefan of St. Louis, continues to be the leading producer of that district. A portion of the ore is treated under stamps. The rest of it is concentrated at Black Hawk.

GUNNISON COUNTY.

Marble Times: The first carload of Black

Queen ore was shipped from Marble last week. Five carloads are ready to be hauled out. The ore is shipped to Denver.

HINSDALE COUNTY.

Lake City Times: The returns from 16,100 pounds of ore shipped from the Wyoming mine near Lake City amounted to \$1355 net.

LAKE COUNTY.

It is reported in Leadville that the Johnny mine has made a contract with the Rio Grande Railway, a branch of which has been extended to Breese hill, to ship 500 tons of ore per day. Neill & Co., owners of the placer property at Hayden's, have transferred their interest to the Columbine Hydraulic M. Co., who contemplate washing considerable ground next spring.

The Small Hopes M. Co., operators of the 1400-foot R. A. M. shaft, at Leadville, are hoisting on an average 300 cars every twenty-four hours, each car containing 3000 pounds. The bond on the Ballard mines, on Breese hill, was taken up last week. It was for \$10,000. The Big Six property, at Leadville, was leased last week to A. L. Englebaugh, who will at once put on a plant of machinery and sink a shaft 500 feet deep.

LA PLATA COUNTY.

It is locally reported that the Sundown mine and mill, on East Mancos, was sold recently for \$60,000, \$20,000 of which was paid down.

MINERAL COUNTY.

The Commodore and Sunnyside group of claims, at Creede, make daily shipments to the Bimetallic works here. The output of these mines averages 300 tons daily. The dividends declared so far have amounted to \$432,000.

Creede Candle: At Creede the ore output of 1898 shows an increase over 1897 of 55 per cent.

PITKIN COUNTY.

The new mill at Aspen, built to treat the low-grade zinc ore of the Smuggler mine, which runs about ten ounces silver, 10 per cent lead and 25 per cent carbonate of zinc, treats 100 tons every twenty-four hours, with only seven men employed on both shifts. After the ore passes through the big crusher three Chilean mills pulverize it to sufficient fineness for the twelve zinc tables. Ten tons a day is the product that this mill produces; it will run 65 per cent lead and forty to forty-ounces in silver and brings about \$500. The old Smuggler concentrating mill is daily using up 140 tons of ore, running one 11-hour shift, and producing about twenty tons of concentrates per day.

ROUTT COUNTY.

The Tom Thumb mine near Columbine will make shipments of their best ore all winter and hold the lower grades at the mine.

SAN JUAN COUNTY.

The Tom Moore mine at Silverton is a steady shipper of lead ore, aggregating two carloads a week.

SAN MIGUEL COUNTY.

Near Telluride fifty men are working in the Carribean and Montezuma mines, owned by the C. & M. M. Co. Most of them are leasing, but some of them are doing contract work. The product, with the exception of the high grade, is concentrated at the company's 10-stamp plant, and from three to four carloads of concentrates are turned out weekly. The concentrates net as high as \$1200 per carload. A force is at work erecting a wire rope tramway 2400 feet long between the Euclid Avenue mines and the Hogg stamp mill. The Colorado Expl. Co., E. W. Waybright, Pres., secured control of this group of mines and mill, and is getting them in operation as soon as possible. The mill will be overhauled and 850-pound stamps substituted. The Euclid vein is from 4 to 6 feet wide and runs from \$20 to \$30 per ton. J. K. McCoy, lessee of the Gold King mine near Telluride, is taking out enough ore to supply twenty stamps of the Gold King 40-stamp mill. The Gold King carries from 4 to 10 feet of ore that is free milling. It is said that \$3.50 ore from this mine will yield a small margin, due partly to the ore being free milling and easily mined and to cheap power. The mill, hoist and all other machinery are operated by electric power. F. F. Horton, lessee of the Silver King, are developing and backing out stoping ground. Their ore runs about \$500 to \$600 per car in silver and lead and a small value in gold. The Carribean mine at Ophir is turning out ore bearing high silver values, with a fair percentage of gold. The snow sheds have been rebuilt over the tramway and everything is in readiness for winter work. On the Wasatch mine near Telluride White & Co. will push development throughout the winter. The Wasatch carries 2 feet of ore, which yields \$20 per ton in gold. The ore will be stored until spring.

IDAHO.

It is locally reported that a good strike was made in the 600-foot level of the Lucky Boy mine at Custer last week. The ore body is said to be 4 feet wide and is of high grade.

The Fortune mine in Buffalo-Hump camp has been sold to Spokane people for \$25,000. Near Wallace in the Colwyn mine the tunnel is in 450 feet. Another tunnel will be run before spring opens. The new hoist for the Standard M. Co. will work to a depth of 2500 feet. Near Wardner the Lexington is producing some galena. At Mullan the You Like mine will again commence shipping ore to the concentrator.

Idaho City World: At Grime's Pass new discoveries are being developed. Aside from the new discoveries in the Morning Star Co., ore is cut by a tunnel 2200 feet long. The Twin Springs M. Co., which recently bought the Deer Lodge mines for \$100,000, of which \$15,000 was paid down, contemplates erecting soon a 40-stamp mill. In the Gould mine at Hailey an upraise to the surface, a distance of 700 feet, has begun. The Tip Top, owned by J. Q. Packard of Salt Lake City, is being

equipped with a large plant of machinery and a mill.

MICHIGAN.

The eight producing copper mines in Houghton county, are Calumet & Hecla, Quincy, Osceola, Tamarack, Wolverine, Centennial, Franklin and Atlantic. The total dividend disbursements amount to \$73,732,000, with the present rate of distribution about \$5,500,000 per annum. At Houghton, a carload of machinery, including a hoist and compressor for the Union copper mine, arrived last week, and the shaft has been begun on what is believed to be the Arcadian lode. Machinery for the shaft started on the Kearsarge lode at the Centennial is on the ground, including a small compressor for sinking. New machinery for the Adventure will be shipped soon. The shaft at the Tecumseh reached bedrock at a depth of 101 feet.

MONTANA.

E. L. Whitmore & Co. of Butte have taken a lease on the Martha W. mine and adjoining claims near the old H. & H. mine at Winston. They propose to equip the property with machinery and push development. In the Madisonian 6 feet of ore has been uncovered that shows from \$10 to \$142 in gold per ton. Sixty bars of silver bullion, with an aggregate value of \$80,000, were shipped by the Anaconda Copper M. Co. last week. At Libby at the Snowshoe mine the mill has been shut down owing to a scarcity of water. Power drills are being placed in the mine. At Carbonado shipments have begun of coal from the Daly mine. The output will be increased, and it is thought the mine will be one of the heavy producers of the State.

In the Hope mine, at Basin, they are cutting a station and putting in a pump at the 500. They will sink to the 600. If the ore body at that depth is half as good as at the 500, the company will begin work on a 500-ton concentrator, which they expect to have in operation by July. At the Emery mine, near Deer Lodge, ore shipments were resumed last week. The Baltimore mine, near Boulder, has begun shipping ore. The Montana Reduction Co. owns an extensive group of mines and a large mill at Red Butte. A dry amalgam mill had a successful run the past summer and fall, but closed down last week, owing to the water having frozen. The mill has been running for a year on ore from the Bessie. At the same time development has been carried on in the Golconda, which is in 900 feet and in which men are crosscutting. The Monitor group of mines near Butte have been put into a new company under the name of the Monitor Tunnel Co., and will again be worked. The group consists of the Emporium, Alta, Sunlight, Monitor, Fraction, New Oterald and Burner.

NEVADA.

A strike of ore has been made at the Elira near Tuscarora on the 200 level. The new vein is about 3 feet in width and assays high in gold and silver. The company has bought the old Commonwealth hoisting works and machinery, and are removing it to the Elira ground. The shaft will be enlarged to two and a half compartments. Work will begin immediately. The Navajo mill is running on Elira ores and a shipment of fifteen tons of concentrates will be made soon, in addition to five tons of high-grade ore. M. Schri is preparing to ship antimonial ore from Battle Mountain. The Black Eagle of Siegel valley, White Pine county, made a shipment of ore to Salt Lake City showing seventy-five ounces silver and 36 per cent manganese. The Black Eagle is the property of Siegel & Davis. In the same camp the Gold Crown also made a shipment of ore. The ore body is 2 feet and the product silver.

Campbell & Lund are pushing work on the Horseshoe mine at Deer Lodge, and eight men are running drifts from the bottom of a 100-foot shaft. They have a 3-foot vein of fair grade ore. At Como the new mill is running steadily. The percentage of the assay value of ore leaves a fair margin. The water supply is inadequate to run the mill to its full capacity. It is expected that work will be resumed on the Como-Eureka and North Rapidan next spring.

Virginia Chronicle: The Pumping Association on the Comstock is giving employment to a number of men at the C. & C. shaft and in the Sutro tunnel, and miners have been given concessions to prospect the surface workings of the Mexican and Ophir. It is denied that the Dexter M. Co. at Tuscarora has secured an option for a controlling interest in the Young American East mine.

NEW MEXICO.

At the Cochiti mine, near Bland, the shaft is down to the fourth level. The mill crushing is almost satisfactory, causing some delay. They expect to crush 3000 tons in December.

Santa Fe New Mexican: The Legal Tender mine at Silver City is shipping a car of ore per day to the smelter. In 364 days the Pacific mill of Pinos Altos has made 18,837 tons of concentrated tailings, and shipped to the Silver City reduction works 5770 tons of concentrates and slimes valued at \$89,299. The Pinos Altos G. M. Co. has 100 men mining and timbering. Near Hillsboro, the Golden Era group of mines will shortly begin shipments of ore. The Andrews cyanide mill is treating thirty tons of Tripple mine ore per day. The Indiana mine, near Elizabethtown, has \$20 free gold ore. The vein is from 18 to 30 inches wide. The output of the Hillsboro gold mines for the week ending Nov. 24, was 360 tons.

OREGON.

Near Baker City the May Queen will build a 20-stamp mill in the spring.

Near Cornucopia there are in development over fifty claims, the ore assaying from \$4 to \$70 per ton in gold and silver.

Near Grant's Pass, the Browning Bros. have made another discovery, which shows well.

Harmon & Green of Galice creek have been operating their mine two weeks. They have enough water for a full head through a 6-inch nozzle.

Grant's Pass Journal: Grater & Brown bought 180 acres in the Klamath river section and will equip it for mining on an extensive scale. The Sterling M. Co. has finished its clean-up for 1898, which was good, and is making preparations for next season's run.

Jacksonville Times: Senator Jones & Co., who are operating on a large scale in Mt. Reuben district, have applied for patents to several quartz claims. J. Young of Waldo, who has been developing a copper prospect in Preston Peak district for several years, has sold it to W. Grider of San Francisco, who represents a company. A force will be put to work on the property at once.

SOUTH DAKOTA.

The Keystone mill, Deadwood, started ten of its new stamps last week. The other ten will be started soon, and the output of the consolidated Holy Terror and Keystone mines will be doubled.

UTAH.

The Horn Silver, Frisco, shipped four cars of high-grade concentrates last week. The Hercules of Stockton shipped two cars of high-grade silver and lead ore. The Utah of Fish Springs marketed a carload of ore last week that showed 42 per cent lead and 273 ounces silver per ton. The Swansea at Silver City has three new drills installed. With this plant the Swansea will make from 130 to 150 feet per month in a class of rock in which they have been making but 4 to 7 feet a week. The work of putting the shaft another 100 feet, making a total of 850 feet, will begin at once.

Operations at the Sioux mill, Robinson, will not be resumed until after Jan. 1st. Ore, however, is being hauled to the mill continuously, and by the time it is started there will be sufficient ore to keep it running for some time. The Taylor group of claims at Frisco made a trial shipment of high-grade galena. A trial shipment was made from the Solomon group near Frisco, in which some high-grade copper ore has been uncovered.

The Parnell and nine other mining claims near Bingham were sold last week to Boston people for \$100,000, and development work has begun. The property is supposed to be principally copper. In the Confidence mine, near State Line, the shaft is 160 feet deep, and 3 feet of high-grade gold-bearing ore is exposed.

The La Reine at Eureka has installed an air compressor and power drills. In the Jo Bowers Extension, at Diamond, the company has 6 feet of milling ore; a set of jiggers will be introduced soon. The shaft is down 300 feet. The tunnel on the Yankee at Eureka is in over 800 feet, and is mineralized matter. At Diamond, Walker Bros. are arranging to begin work on the Showers group.

Last week's shipments of ore from Park City were:

| | Pounds. |
|--------------------------|---------|
| Silver King..... | 840,150 |
| Anchor concentrates..... | 253,630 |
| Ontario..... | 200,810 |

Total.....1,294,490

Last week Cincinnati, Ohio, people bought 37,500 shares of Linn Mammoth of Tintic for \$3 spot, a total of \$262,500. The purchasers are said to be ready to take the remainder—consisting of 62,500 shares—at the same figure. The Mercur M. Co.'s new incline into Resolute ground has broken into ores of good milling value. Bingham's new strike was made last week in the Frisco, showing thirty-two ounces silver, 32 per cent lead and \$3 gold per ton. A telephone message from Mercur recently brought assurances that in the South Daisy, Mercur, a strike was made assaying from \$9 to \$15 per ton in gold. A shipment of 225 tons of Old Telegraph concentrates was made from the Dewey mill at Bingham last week. The contract to deliver 2000 tons of Old Telegraph second class will be completed this week. Last week's shipments from Tintic were 102 cars of ore and 8 cars of concentrates. The Colorado at Tintic has uncovered mineral that shows \$5 in gold and twenty ounces silver per ton. At Eureka the Eagle and Blue Bell are sacking ore, some of which shows 526 ounces gold per ton, running in small streaks of the ore body. The Albion at Alta made its initial shipment last week.

WASHINGTON.

(Special Correspondence).—Since my last communication a great change has taken place in Republic. Town sites have been patented, and people have moved from their tent abodes into comfortable frame dwellings; store buildings have been improved, and somewhat pretentious hotels are marking the tide of prosperity which has followed the advent of the Republic mine on a dividend-paying basis. The progress of mining development is very satisfactory, and a general feeling pervades the community that a few months hence there will be others on the dividend list.

The Republic G. M. & M. Co. has declared its third monthly dividend, payable Dec. 10th. The mill has been shut down, pending the completion of improvements. An engine and boilers, two storage and six electro-cyanide vats and an extra ball pulverizer have been set up, and the mill is again ready to run on second-class ore. The company will continue to ship its first-class ore to the smelters. The mill has been treating 300 tons per month of second-class ore and for six weeks produced \$100 per day. It is officially stated that it will treat from thirty-five to forty tons per day during the winter.

The No. 3 tunnel has passed into the Republic pay chute, 200 feet of vertical depth below the No. 2 level, disclosing the vein 34 feet wide between the walls. Drifts are being run north and south on the lode with all possible speed, and, while visitors were generally admitted and retarded work to a great extent, all are now excluded, in order that no delay may be occasioned in drifting and making connections with the upper levels. The

assays on the No. 8 level run from \$15 to \$310 per ton, and the average will run about \$160 gold and six ounces silver per ton.

A change of management has taken place in the Lone Pine mine, Patrick Clark succeeding Charles P. Robbins as Pres. One ledge has been crosscut 15 feet, giving values from \$8 to \$40, but the mine has been idle several months. A force of twenty men have been put on and it will be actively developed.

The Tom Thumb mine shows a fine ledge. A shaft was sunk and passed through it 95 feet into the porphyry foot wall. A crosscut was also driven, which showed the ledge 25 feet wide, with face samples running as high as \$12 per ton. A new shaft is down 78 feet and is expected to tap the lode at 125 feet depth.

The north drift of the San Poll mine is in 51 feet, and the face, the full width, is in pay ore. The south drift is in 79 feet and the ledge is improving. It had shown a pinching tendency, but has a width of 21 inches at this point, with values running over \$15 per ton.

The crosscut from the tunnel in the Nob Hill mine is in 129 feet in hard porphyry.

The Ben Hur tunnel is in 138 feet to the vein and runs on about 140 feet. It is divided by the intrusion of porphyry into separate bodies, but shows improvement at the face.

The Little Cove mine is developing satisfactorily. The north drift is in 326 feet. At 300 feet a crosscut passed through 10 feet of quartz, but the average value was not as good as usual, running below \$11 per ton.

The Gold Leaf tunnel is in 260 feet, and confidence is expressed that the ledge will soon be cut.

The management of the Iron Monitor mine has passed into new hands, and a contract has been let to continue the tunnel to the west vein. It has about 80 feet farther to run.

The main tunnel on the Eureka Queen is again being driven ahead and drifting has been stopped for the present.

The Golden Harvest tunnel has run into a pay chute which gives assays from \$11 to \$45. The ledge is about 5 feet wide.

The Trade Dollar tunnel shows a strong ledge over 6 feet wide which assays about \$10 per ton. The mine was recently stocked and capital for development readily subscribed.

The North San Poll M. Co. was recently formed to work the San Poll Fraction, a claim about 800 feet long, on the north end of the San Poll mine. The vein shows a strong 6-foot ledge of quartz at the surface. A well-timbered shaft is down on it 20 feet. The values average about \$10 per ton.

The No. 1 tunnel is in 107 feet, with about 100 feet farther to run to tap the vein. This is being driven for the development of the Alkadar group.

M. H. JOSEPH.
Republic, Wash., Dec. 1st, '98.

Near Bossburg work has resumed on the Scotia properties. The company has nine claims. The development consists of a tunnel 260 feet long. Considerable ore has been developed of shipping quality.—Near Republic the Lake View claim has 18 inches of ore

that assays from \$12 to \$60 per ton. The rock is free milling. One of the owners started for San Francisco this week to buy a mill.—On Mad river in Okauchog county, near Leavenworth, a ledge of platinum is reported found which is said to run seventy-two ounces to the ton.—The Gold Leaf tunnel at Republic is in 260 feet and will be extended 75 feet.—The Golden Harvest has 4 feet of quartz.

WYOMING.

At Grand Encampment there are two mines that will ship steadily. One of them runs from 45 to 50 per cent in copper and \$17 in gold, and the vein is 10 feet wide.

FOREIGN.

BRITISH COLUMBIA.

The change in the management of the Le Rol resulted in a reduction of the shipments from the old standard of 3000 tons to a trifle over a third of that quantity—1100 tons. The output of Rossland camp the past week reached 3500 tons. The shipments from the War Eagle were increased to 2300 tons, while the Iron Mask's total product was 100 tons. The shipments for the past year show an increase. The ore shipments from the mines adjacent to Rossland from Jan. 1st to Nov. 26th were 116,171 tons. The shipments from Nov. 19th to Nov. 26th were 3500 tons.

LOWER CALIFORNIA.

(Special Correspondence)—The Fortuna M. Co., a New York corporation, have for some time been operating the property of the same name near Agua Dulce. Alleged mismanagement of the superintendent got the company into difficulty and the property was seized by the Mexican government. The mines are considered valuable property under capable management. They have been examined recently for the company and it is probable that difficulties will be adjusted and work resumed. It is thought that H. Howard of Los Angeles will be Gen. Mgr. of the property if operations are renewed.

Agua Dulce, Nov. 28th, '98.

A good strike is reported from the mines of the Ibarra G. M. Co. at Calmali at a depth of 600 feet. The owners are San Francisco men. They have ordered additional machinery from that city, which is en route to the mines.

MEXICO.

Nogales Vidette: The Guadalupe mine in the Sahuaripa district, Sonora, has been bonded by Denver capitalists.—A new shaft is being sunk in La Mexicana mine, in the Arizpe district. This property is owned by Newport, Kentucky, capitalists.—From Guaymas last week were shipped to the mint at Culiacan, Sinaloa, twenty-eight bars of silver bullion valued at \$23,000.

SOUTH AFRICA.

The gold output of the Witwatersrand mines in October was 328,648 ounces, worth \$6,793,154. The whole Transvaal produced in ten months of 1898, 3,054,671 ounces, worth \$62,726,649.

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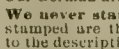
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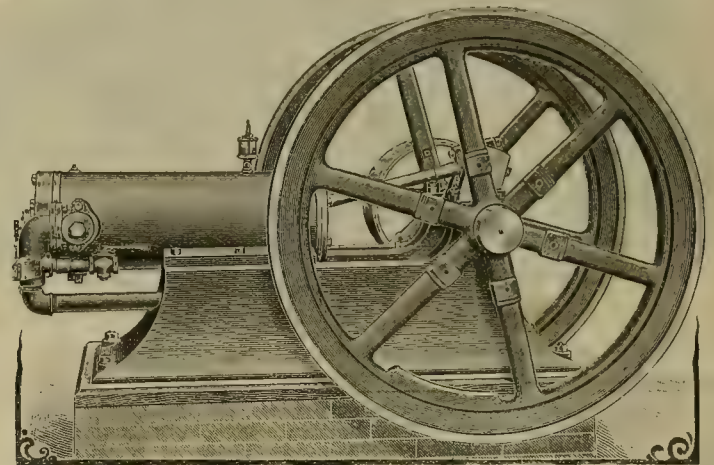
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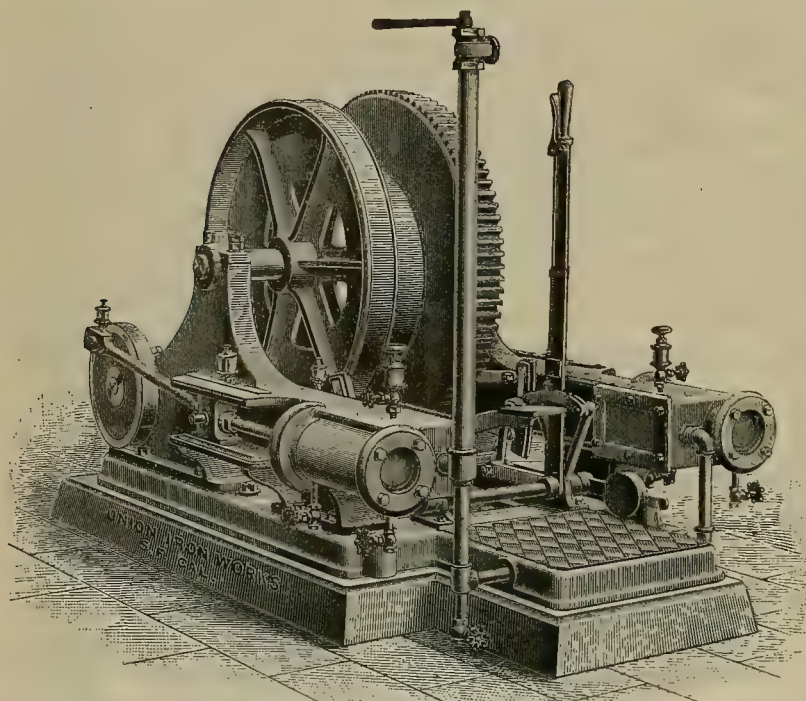


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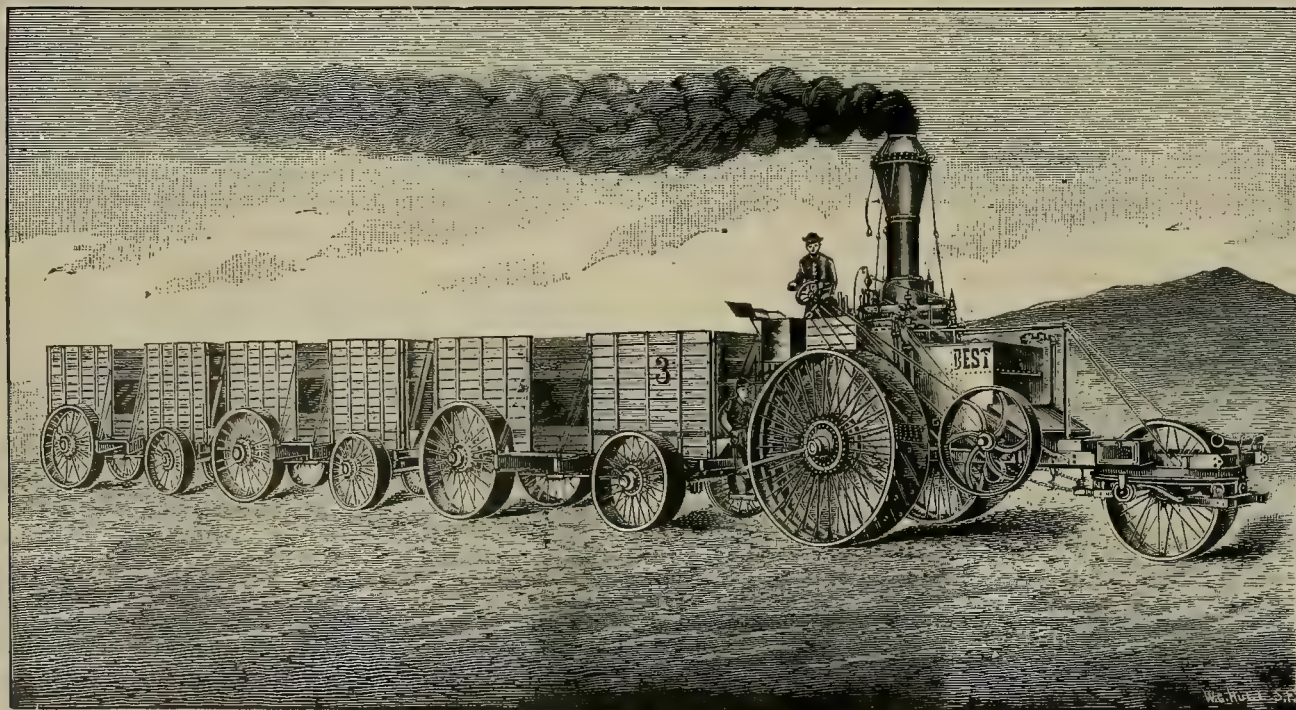
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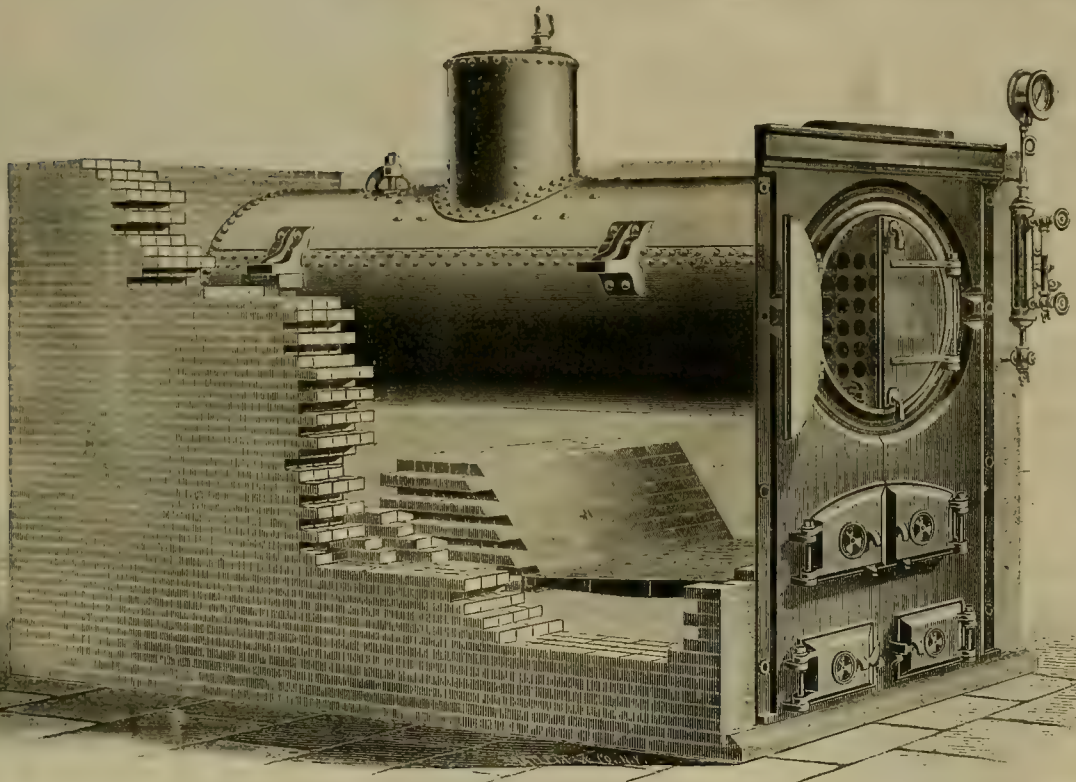
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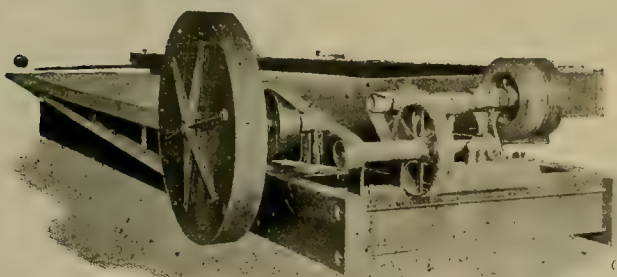
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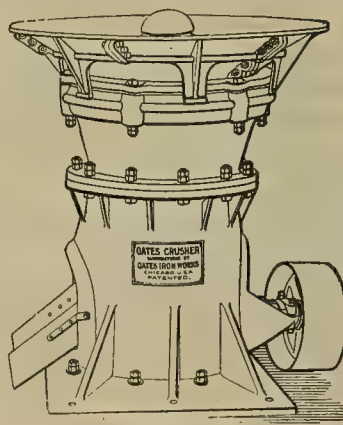
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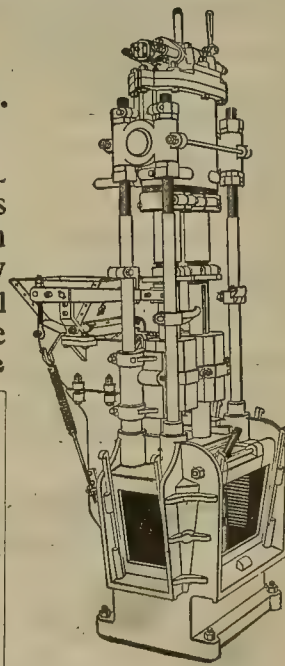
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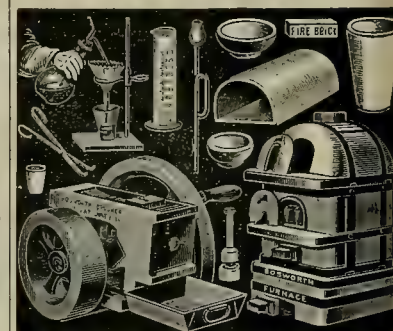
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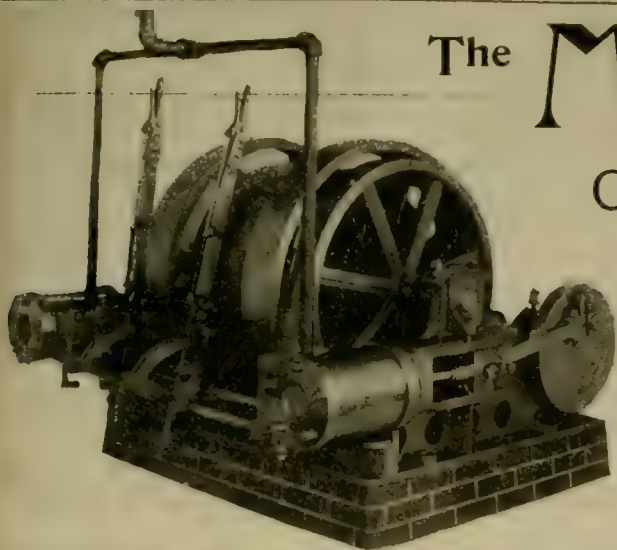
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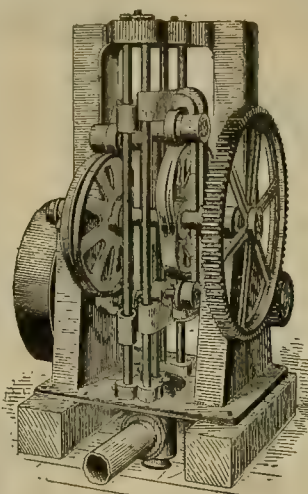
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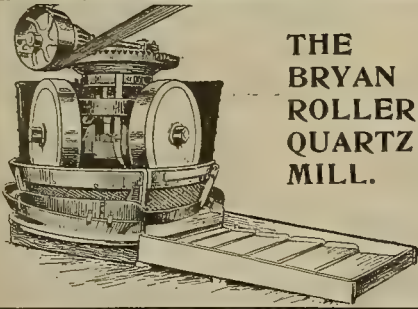
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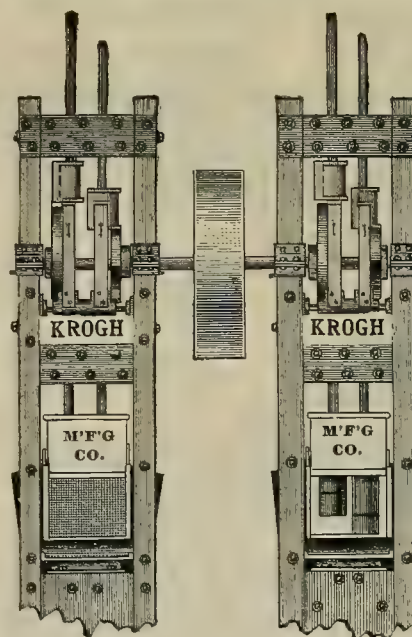


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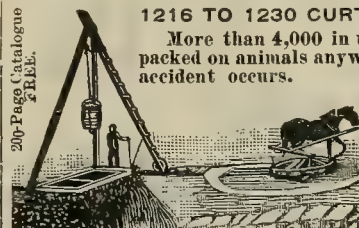
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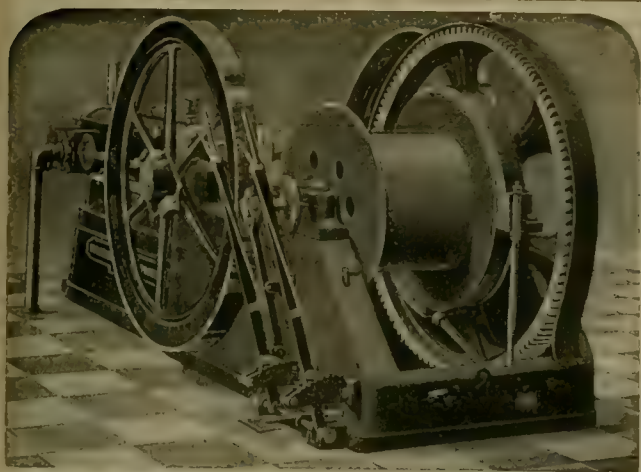
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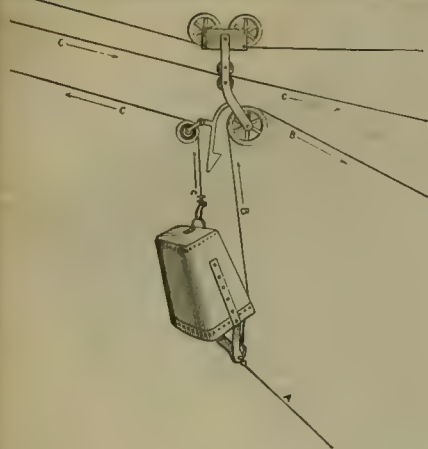
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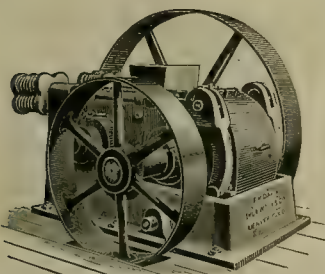
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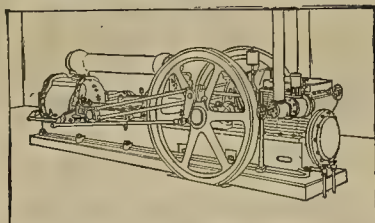
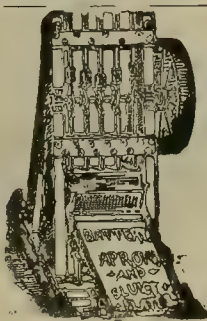
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We buy Gold, Silver, Lead, Copper, Bismuth, Uranium, Wolfram, Cobalt and Antimony Ores. With modern mills and machinery our facilities for sampling ores are the best.

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STEAM PUMPS, AIR LIFTS,
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Side-Dumping Ore Car,

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PURE RUBBER BOOTS

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Peroxide of Sodium

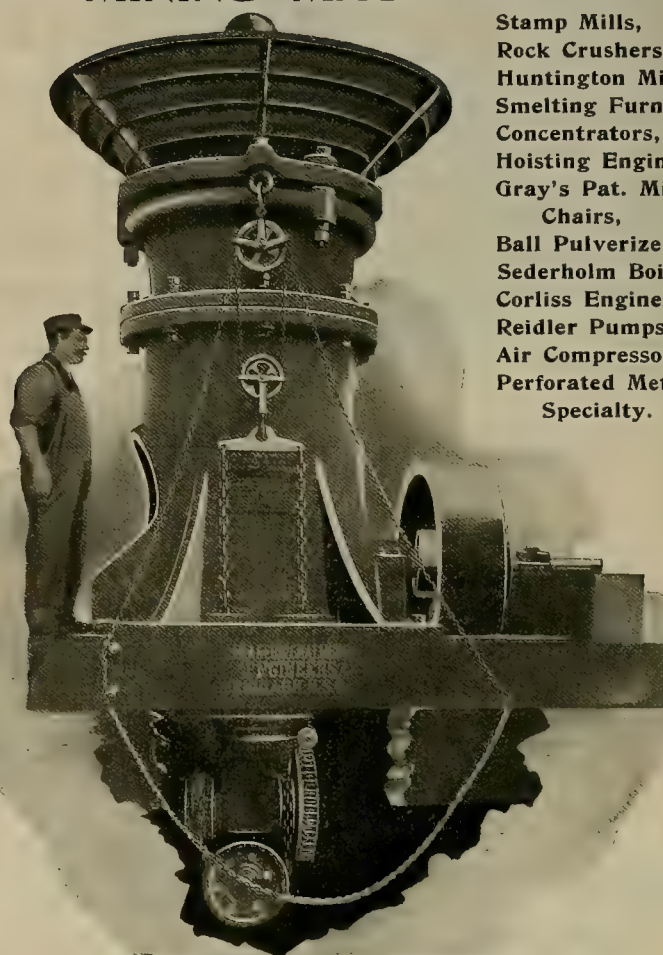
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REQUIRE LESS THAN

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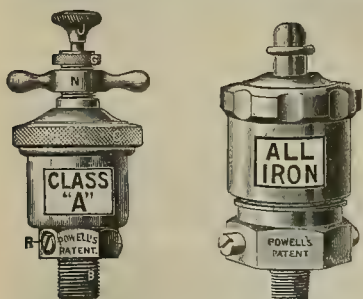
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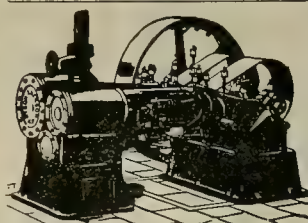
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FEED adjustable the entire length of Cup.
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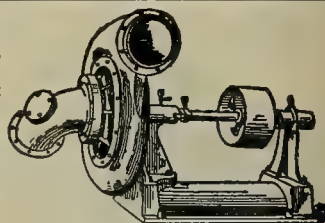
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The Wm. Powell Co., Cincinnati, O.
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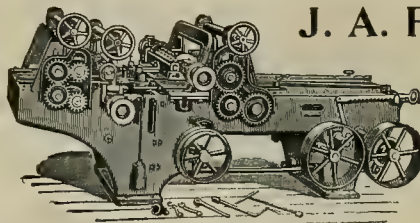
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For Irrigation, Drainage, Dredging, Mining, Etc. Capacities from 50 to 50,000
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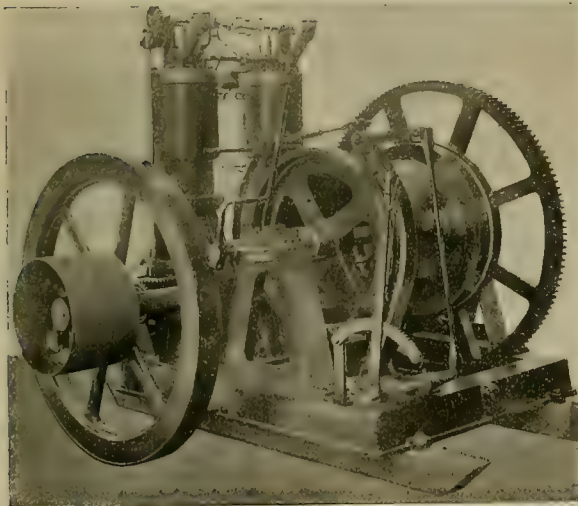
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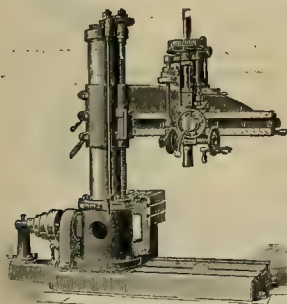
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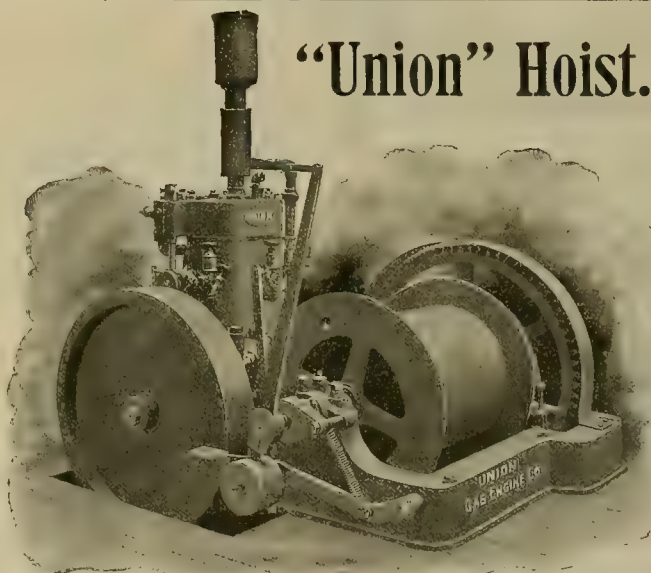
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The above cut represents our 10 h. p. Double Cylinder Engine of latest type, and Hoist combined on strong iron base. This hoist is designed to raise one ton 125 feet per minute from an inclined shaft, or 1500 pounds at the same speed vertical lift. The drum will hold over 600 feet of 3/4-inch cable. The outfit weighs 3500 pounds.

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STATIONARY ENGINES for All Kinds of Work, Built in Sizes from 3 to 200 h. p.

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EVERY BELT GUARANTEED.
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TURBINE AND GASCADE WATER WHEEL

Adapted to all Heads from

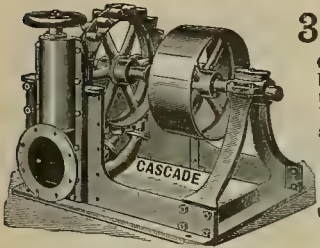
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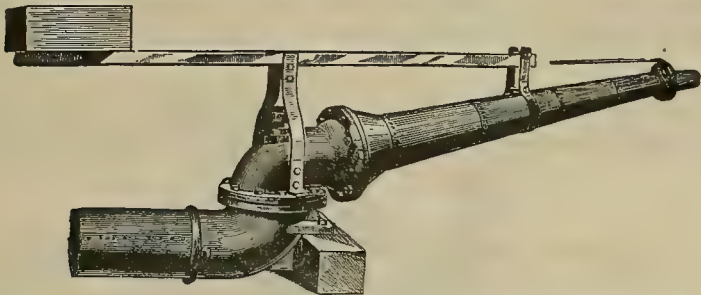
Send for a Pamphlet of either Wheel and write full particulars.

JAMES LEFFEL & CO.

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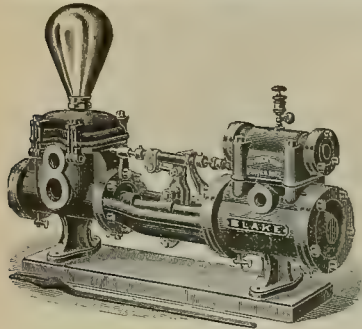


Double-Jointed Ball-Bearing Hydraulic Giants.



The above presents an improved Double-Jointed Ball-Bearing Hydraulic Giant which we build. The improvement consists of the introduction of a Ball Bearing by which the pressure of the water is reduced to a minimum and the direction of the nozzle changed at will with ease.

Catalogues and prices of our specialties of HYDRAULIC MINING MACHINERY furnished upon application. **JOSHUA HENDY MACHINE WORKS, 38 to 44 Fremont St., San Francisco, Cal.**

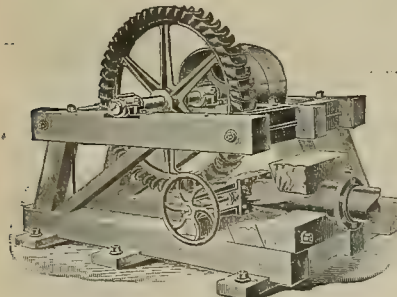


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The accompanying cut shows the general arrangement of Knight's Standard Water Wheel of which there are hundreds in use in different States of the Union.

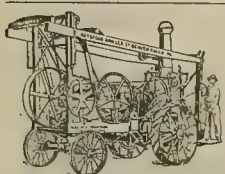
These Wheels are made from 2 feet to 6 feet in diameter, from 10 to 1000-horse power, and adapted to all heads and purposes.

Wheels inclosed in iron cases, from 6 to 24 inches.

Wheels for electrical power can be furnished with or without Governors. Highest regulation guaranteed.

Address all communications to
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For full particulars, send for descriptive catalogue.



For Testing Placer Ground.

Sinks and drives 6, 8 or 10-inch pipe through boulders; takes all the loose material out, including gold, as the hole is sunk. Does the work at a very small cost. Drills water and oil wells and mineral test wells through any kind of rock to 1500 feet. Several sizes.

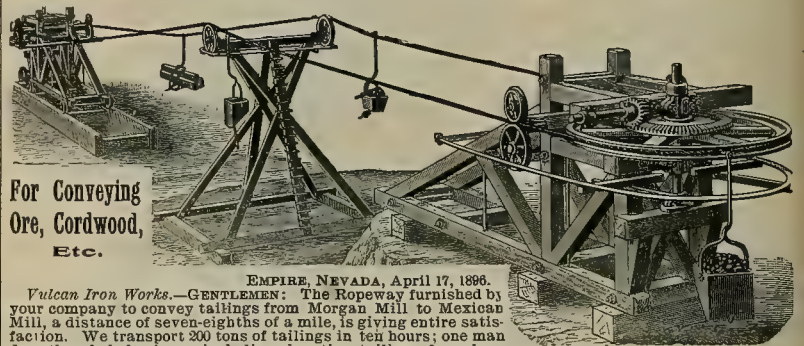
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VULCAN ROPEWAY

— WITH —
**AUTOMATIC ORE LOADER AND
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For Conveying
Ore, Cordwood,
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Vulcan Iron Works.—GENTLEMEN: The Ropeway furnished by your company to convey tailings from Morgan Mill to Mexican Mill, a distance of seven-eighths of a mile, is giving entire satisfaction. We transport 200 tons of tailings in ten hours; one man does the whole business, including elevating tailings from hopper in the ground, operating Vulcan self-loader, and attending to the Ropeway generally. The self-dumper requires no attention whatever. The Vulcan loader I consider the best feature in the whole Ropeway, making it possible for one man to load 200 tons in ten hours.

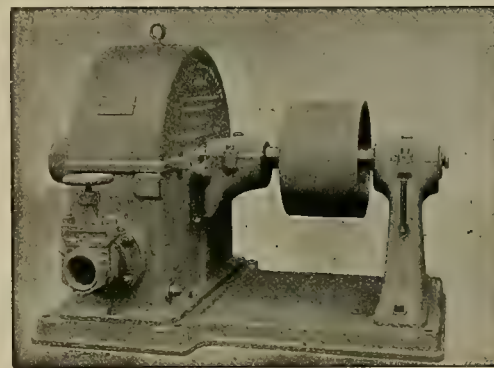
Yours very truly, **J. P. WOODBURY, Supt.**

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The Pelton Water Wheel Company



Gives exclusive attention to the development and utilization of water powers by the most modern, economic and improved methods.

An experience of more than fifteen years, involving both the theory and practice of hydraulic engineering as relates to power development in its widest range of application, is at the service of its customers.

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Wheels**

Now Running,

Aggregating some 700,000 H. P.

ELECTRIC POWER TRANSMISSION.

Pelton wheels afford the most reliable and efficient power for such service and are running the majority of stations of this character in the United States, as well as most foreign countries.

Highest efficiency and absolute regulation guaranteed under the most extreme variations of load.

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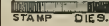
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Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.



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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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High Speed Special Rolls

as being the most efficient and the most economical machine for fine dry crushing ever placed upon the market. The rolls having

NARROW FACES and LARGE DIAMETERS

can be fed evenly over the whole width of faces with certainty, and hence the faces or crushing surfaces are easily kept true. Descriptive pamphlet on application.



HIGH SPEED SPECIAL ROLLS, WITHOUT HOUSING.

Double rope tramways are acknowledged to be superior to those of the single rope type, and any one contemplating the erection of a tramway should investigate the merits of the . . .

THE ONLY AUTOMATIC TRAMWAY BUILT.

FINLAYSON PATENT AUTOMATIC WIRE ROPE TRAMWAY.

In this system the cost of transportation is brought below any figure heretofore reached. Its tonnage capacity is unsurpassed. Further information on application.



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STEEL OR IRON.—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.

WRITE FOR CIRCULARS OF The Truax Pat. Automatic

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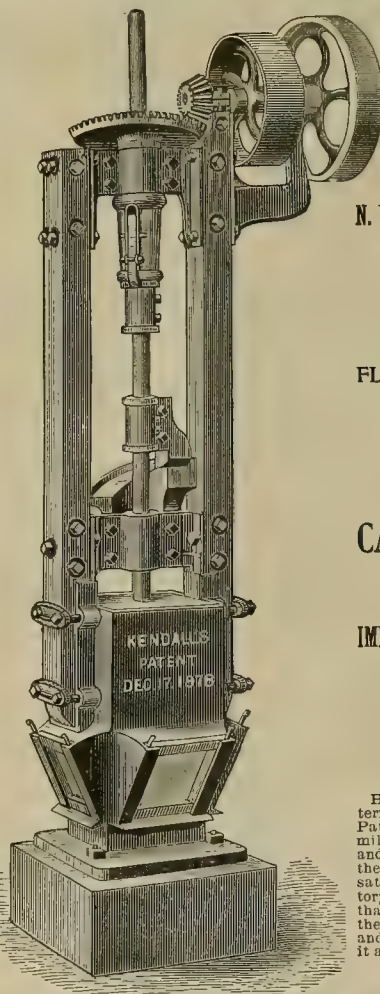
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OF EVERY DESCRIPTION.

All work tested and guaranteed.

IMPROVED PORTABLE HOISTING ENGINES

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Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are enabled to offer these mills at Greatly Reduced Prices. Having made and sold these mills for the past 16 years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap and durable mill that will do all that is claimed for it and give entire satisfaction.

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THE JACKSON HAND POWER ROCK DRILL.

Rapid stroke. Powerful blow. Easy running. No jar. Long bits changed and hole spooned without disjoining machine. Operated by one man. A guaranteed drill. Will work in any rock or position.

Dealers in General Mining Machinery and Supplies.

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New York Office, 130 Liberty Street. Cable Address: "Jack Drill" N. Y. ABC Code (4th Ed.) and Lieber.



Market Reports.

The Markets.

SAN FRANCISCO, Dec. 8, 1898.

SILVER.—London, 27 3/4; New York, 59 3/4; San Francisco, 59 3/4; Mexican Dollars, 47 1/2 @ 47 3/4. New York exchange, sight, 15; telegraphic, 17 1/2 cents premium.

LEAD.—New York dispatch, very dull, \$3 60 bid, \$3 62 1/2 asked. The firm naming the settling price for leading miners and smelters at the West quotes Lead \$3.50.

Local, pipe, 6 @ 6 1/4 c; sheet, 6 1/2 @ 7 c; pig, 5 3/4 c; bar, 6 c.

COPPER.—New York reports Lake quiet, 12.65 bid, 12.80 asked. Local, bar 20c per lb.

IRON.—American, soft, \$21.75 and \$23.75 per ton; Scotch, \$24.25. Local bar, 2 1/4 c per lb.

SPELTER.—8 1/2 @ 9.

TIN.—Pig, 22c per lb.; Bar, 25c.

ANTIMONY.—14.

BABBITT METAL.—No. 3, 7c.

QUICKSILVER.—Unchanged. Local, \$42; export, \$37.00 @ 37.50; carload lots, special rates.

Messrs. D. Houston & Co., metal brokers, New York: European copper consumption continues at a strikingly high rate, and deliveries are heavy in volume, exceeding supplies for the first 11 months of this year by 5037 tons for all Europe. Deliveries for 11 months this year amount to 213,270 tons, and supplies to 208,233 tons. The movement of copper in Germany is of a marked character, and that country is taking a more prominent place among the chief consumers of copper. Official returns show that Germany has used on an average 1552 tons more of foreign copper per month for the first nine months of this year than during the same period in 1896. German consumption of copper for this year, including foreign and domestic metal, is estimated at the rate of fully 17,500,000 pounds per month. The combined consumption of England and France for the first ten months of this year is estimated at 208,465,600 pounds, or at the rate of 20,846,560 pounds a month. As long as Europe needs and is able to so completely absorb such enormous quantities of copper there seems to be little or no danger of any radical reaction in the market. It is a noteworthy fact that European copper production for the first ten months of this year is 4165 tons less than during the corresponding months last year, and is also the smallest in five years.

POWDER.—F. o. b., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15 1/2 c; less than one ton, 17 1/2 c. No. 1* 60%, carload lots, 18 1/2 c; less than one ton, 15 1/2 c. No. 1** 50%, carload lots, 11 1/2 c; less than one ton, 13 1/2 c. No. 2, 40%, carload lots, 10c; less than one ton, 12c. No. 2* 35%, carload lots, 9 1/2 c; less than one ton, 11 1/2 c. No. 2** 30%, carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car 725 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—8x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$8.

COAL.—San Francisco coast, yard prices: Wellington, \$8 00; Coos Bay, \$5 00; Seattle, 6 00; Southfield, 7 50. Cargo lots, Eastern and foreign: Wallaseed, \$7 50; Cumberland, \$9 00; Rybmo, 7 50; Cannel, 9 50; Pennsylvania, hd., 14 50; Welsh Anthracite, 12 50; Scotch, 8 00; Rock Springs, 7 60.

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.08 per gal.; bbl., \$1.03; pure No. 2, cs., 85c; bbl., 80c; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.06; less than 200 gals., \$1.10; in bbls., 4c per gal. less than case; Baker's Crystal, \$1.26; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 44c; cs., 49c; raw, bbl., 42c; cs., 47c; lots of 5 bbls., 1c less.

MINES or prospects operated on contract to purchase, MONTHLY or under lease on fixed royalty or percentage. MONEY loaned, mines, MINING companies organized, their property acquired, financed and managed, MINES, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated. EXAMINE mines, prospects and mineral lands as to their value, method of working and condition of their title. Assay and chemical work done.

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J. D. BETHUNE,
(Late Associate Justice Supreme Court.)
Attorney at Law,
Mining Law,
PRESCOTT, ARIZONA.
A Valuable Gold Property for Sale.

ANNUAL MEETING NOTICE.

The Annual Meeting of the Stockholders of the EUREKA CONSOLIDATED DRIFT MINING COMPANY will be held at its offices, Nos. 1209-1211 Claus Spreckels Building, San Francisco, at 1 o'clock MONDAY, December 13th, 1898.

J. J. CRAWFORD, Secretary.

CAPITAL DESIRING TO INVEST IN RICH and Extensive Gold-Bearing Gravel Deposits. Address

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W. E. Holbrook, Pres't. L. F. Haskell, Sec'y.
20-30 Chronicle Building, S. F.

Lucol, boiled, bbl., 39c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17 1/2 c; Astral, 17 1/2 c; Star, 17 1/2 c; Eocene, 19 1/2 c; Extra Star, 21 1/2 c; Elaine, 22 1/2 c; Water White, bulk, in tanks, 11 1/2 c; Mineral Seal, iron bbls., 21c; wooden bbls., 23 1/2 c; cs., 26c; Mineral Sperm, 27c; Deodorized Stove Gasoline, bulk, 18c; do., cs., 18c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11 1/2 c; do., in cs., 16 1/2 c; Lard Oil, Extra Winter Strained, bbl., 56c; cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatsfoot Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs., 60c; Sperm, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25 @ 1.35 per gal.; wagon colors, \$2 @ 2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31c per lb.; carloads, 29c; in 10-lb. tins 37c; sulphuric acid, 2 1/2 c per lb. 66% B.; soda ash, \$1.60 per 100 lbs. 58%; hyposulphite of soda, 2 1/2 c per lb.; blue vitriol, 4 1/2 c per lb.; borax, refined, 5 @ 6c per lb.; chlorate of potash, 9 1/2 @ 10c; roll sulphur, 2 1/2 c; alum, \$1.90 @ 2.00; flour sulphur, French, 2 1/4 @ 2 1/2 c; California refined, 1 1/4 @ 1 1/2 c; nitric acid, in carboys 8c per lb.; caustic soda, in 10-lb. tins 15c per lb.; Cal. s. soda, bbls., 65c; sbs., 60c @ 100 lbs; chloride of lime, spot, 2.10 @ 2.25c; saltpeter, 15c; chlorate of potash, 25c; caustic potash, 12c.

CANDLES.—Electric Light Candles—6s, 16 oz., 7 1/2 c; 6s, 14 oz., 6 1/2 c; 6s, 12 oz., 5 1/2 c; 6s, 10 oz., 4 1/2 c; Granite (Mining) Candles—6s, 16 oz., 8 1/2 c; 6s, 14 oz., 7 1/2 c; 6s, 12 oz., 7 1/2 c; 6s, 10 oz., 6 1/2 c. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8c; colored, 9c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.40; cut, \$2.25; 10 to 20d, wire, \$2.45; cut, \$2.30; 8d, wire, \$2.50; cut, \$2.35; 6 and 7d, wire, \$2.60; cut, \$2.45; 4 and 5d, wire, \$2.70; cut, \$2.55; 3d, wire, \$2.85; cut, \$2.70; 2d, wire, \$3.10; cut, \$2.95. In carload lots, 10c per keg less.

CORDAGE.—

| | Sisal. | Manila. |
|---|--------|---------|
| 14-in. cir. (7-18 dia. and upward)..... | 9 1/4 | 9 3/4 |
| 12-thread (3/4 dia. and 5-18 dia.)..... | 9 1/4 | 9 3/4 |
| 6 and 9 thread (1/2 and 5-18 dia.)..... | 10 1/4 | 10 3/4 |
| Bale Rope (3 and 4 strand)..... | 9 1/4 | 9 3/4 |
| Bale Rope (2, 6 and 8 strand)..... | 9 1/4 | 10 1/4 |

In quantities not less than 10,000 lbs.

San Francisco Stock Board Sales.

SAN FRANCISCO, Dec. 8, 1898.
9:30 A. M. SESSION.

| | | | |
|-------------------------|-----|------------------------|-----|
| 100 Best & Belcher..... | 450 | 400 Occidental..... | 96c |
| 100 Chollar..... | 29c | 300 Ophir..... | 67c |
| 700 C. Cal. & Va..... | 40 | 500 Potosi..... | 28c |
| 500 Crown Point..... | 17c | 900 Savage..... | 20c |
| 700 Gould & Curry..... | 33c | 300 Union Con..... | 27c |
| 1100 Hale & Norc..... | 21c | 200 Utah..... | 16c |
| 200 Justice..... | 29c | 100 Yellow Jacket..... | 18c |
| 800 Mexican..... | 38c | | |

2:30 P. M. SESSION.

| | | | |
|-------------------------|--------|------------------------|--------|
| 500 Ophir..... | 64c | 300 H. & N..... | 10c |
| 700 Mexican..... | 34c | 650 Sierra Nevada..... | \$1.25 |
| 700 Gould & Curry..... | 30c | 100 Utah..... | 15c |
| 600 Best & Belcher..... | 40c | 700 Union Con..... | 20c |
| 350 Con. Cal. & Va..... | \$1.35 | 100 Challenge..... | 18c |
| 100 Savage..... | 20c | 100 Occidental..... | 94c |
| 600 Chollar..... | 26c | 200 Justice..... | 21c |
| 500 Potosi..... | 27c | | |

Acetylene Gas.

A handsome new illustrated catalogue will tell you where and by whom the new light is being used, and what the verdict is. Mailed upon application. **PACIFIC ACETYLENE GAS CO.,** 115 New Montgomery St., San Francisco.

Quicksilver

FOR SALE IN LOTS TO SUIT.
Agents for Redington Quicksilver Mine.
REDINGTON & COMPANY, Wholesale Drug-gists, 23-25-27 Second Street, San Francisco.

WANTED.—Position as Abstractor, Title Examiner, Stenographer, Correspondence Clerk, or General Office Man. Long experience. Best of references. Typewriter furnished. Bond if required. Address D., care M. & S. Press.

WANTED.

Competent and Experienced Mine and Mill Superintendent

To assume charge of newly developed property in Arizona. State experience, terms, references etc. Terms must be reasonable. Address **TRILBY MINE, Hot Springs Jct., Arizona.**

FOR SALE.

4 Woodbury Concentrators with new belts. Machines in good condition. For price and particulars, apply to **EDWARD GOODWIN, Supt. Montauk Con. G. M. Co., Newcastle, Cal.**

FOR SALE CHEAP.

2 Edison Bi-Polar Dynamos, 540 Lamps, with Switchboard and Apparatus Complete; 1 50-H. P. McIntosh & Seymour Engine; 1 60-H. P. Babcock and Wilson Boilers; All in first-class condition. Address **PACIFIC TELEPHONE & TELEGRAPH CO., 216 Bush Street, San Francisco, Cal.**

Mining Man of Experience,

Owner of four gold quartz mines, 3 to 20-foot ledges, about \$10 ore, 20,000 tons of quartz in sight near surface; considerable developments; quartz works by cyanide process; facilities for working quartz first class.

ONE-HALF INTEREST

Will be given to parties who will erect a milling plant of fifty tons daily capacity.

A. P. ANDERSON,

Oriental, Esmeralda County.....NEVADA.

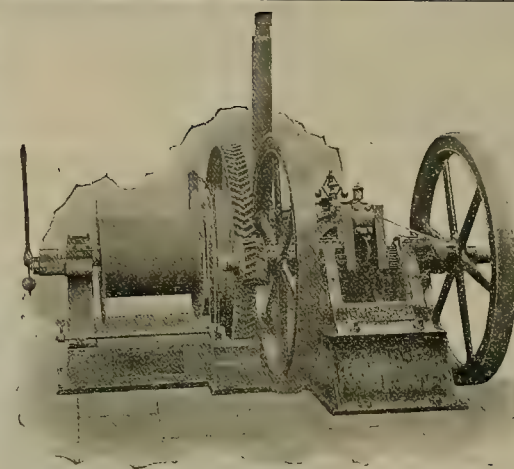
Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.



FRESNO, June 25, 1898.

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gasoline engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LODGE M. & D. CO.,

Per N. W. Moodey, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

405-407 SANSOME STREET, SAN FRANCISCO, CAL.

THE CALIFORNIA DEBRIS COMMISSION, having received applications to mine by the hydraulic process from the Wintz Mining & Improvement Co., in its mine near Pleasant Valley, El Dorado Co., to deposit tailings on a flat below the mine, from Joel Beans, in the Cleveland Mine No. 2, near Seales, Sierra Co., to deposit tailings in Rock Creek; from J. B. Jones, in the Haskell Valley Mine, near Buck's Ranch, Plumas Co., to deposit tailings on a flat below the mine; from Thos. Gomez, in the Snowy Side mine, near Buck's Ranch, Plumas Co., to deposit tailings in Willow Creek; from N. H. Fris, in the New York Mine, near Buck's Ranch, Plumas Co., to deposit tailings in Willow Creek; from J. C. Horner, in the Chaplain Mine, near Buck's Ranch, Plumas Co., to deposit tailings in Willow Creek; from Llewellyn A. Hoeflich, in the Rocky Bar Mine, near Nelson Point, Plumas Co., to deposit tailings in worked out pits; and from C. W. Ayers, in the Oriole Gravel Mine, near Jamestown, Tuolumne Co., to deposit tailings on a flat below the mine, gives notice that a meeting will be held at room 59, Flood Building, San Francisco, Cal., on December 12, 1898, at 1:30 P. M.

ANTIMONY.

We buy Antimony Ore in any quantity and pay prompt CASH for same. Write us and let us know what you have.

Chapman Smelting Works Co.,
(INCORPORATED.)
422 Battery Street.....San Francisco, Cal.

Silver City Reduction Co.,
SILVER CITY, GRANT COUNTY, NEW MEXICO.

Purchasers and Smelters of Gold, Silver and Copper Ores.

This Plant is Owned and Operated by the Estate of the Late Senator George Hearst of California.

Diamond Drill for Hire.
DRILL CAN BE HIRED, TOGETHER WITH EXPERT TO OPERATE.
DIAMONDS FOR SALE.
Apply to **J. A. MURRAY, care of Risdon Iron Works, San Francisco.**

UTAH
Mines—Dividend Paying
and Investment Stock.
W. E. HUBBARD & CO., 15 W. 2d So. Street, SALT LAKE CITY.

TUBBS CORDAGE CO.
(A CORPORATION.)

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Duplex Rope, Tarrad Manila Rope, Hay Rope, Whale Line, etc., etc. Extra sizes and lengths made to order on short notice
611 and 613 Front St., San Francisco, Cal.

Skeleton Mining Report.
NEEDED BY EVERY MINING MAN.
FIFTY CENTS POSTPAID.

Mining and Scientific Press, 330 Market St., S. F.

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Bought and sold for non-residents. SOLID DIVIDEND PAYERS as an investment. Prospective producers as a speculation. Write for information.

H. P. PALMER & CO.,
Exchange Nat. Bank Bldg., SPOKANE, WASH.

HERRIN & REINER,
Mine and Stock Brokers.

Reliable Quotations given on all the Standard British Columbia, Washington and Idaho Mining Stocks.

Rooms 9 and 10, Zeigler Block, Spokane, Wash.

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A. BARNES, Mgr., 16-18 Zoe St., San Francisco.

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BUSINESS COLLEGE.
24 Post Street, - - - San Francisco.
Has opened a Department of Civil and Mining Engineering, Chemistry, Metallurgy, Mill Construction, Assaying, Blow-Pipe Analysis, Geology, Trigonometry, Geometry, etc., under the direction of Prof. O. H. Packer, an engineer of national reputation. Full information furnished on application.
The College has also Departments for Bookkeeping and Business Practice, Shorthand and Typing, Penmanship, Modern Languages, English Branches, Telegraphy, and Electrical Engineering.
Students can enter at any time. Pupils receive individual instruction. Twenty teachers. Moderate charges. Write for Catalogue and Journal.

I. L. Burton Machine Works.
PATENT CENTRIFUGAL Pumps.
Highest Efficiency, Simplicity and Durability.
Peterson Current Motor for streams not less than 3-mile current. Horse Powers, Portable Wood Saws. Some second-hand Pumps and Gas Engines, Steam Engines and Boilers for sale cheap. 115 and 117 First Street, San Francisco, Cal.

INVENTORS, Take Notice!
L. PETERSON, MODEL MAKER,
226 MARKET ST., N. E. Corner Front (Up Stairs), SAN FRANCISCO. Experimental machinery and all kinds of models. Tin and brasswork. All communications strictly confidential.

Assessment Notices.

MARINA MARSICANO GOLD MINING COMPANY.—Location of principal place of business, Sunny Hill, Shasta County, California; location of works, Sunny Hill, Shasta County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of November, 1898, an assessment (No. 16) of 2 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 24th day of December, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 16th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
CHARLES BOVONE, Secretary.
Office—217 Sacramento street, San Francisco, California.

CONSOLIDATED ST. GOTHARD GOLD MINING COMPANY.—Location of principal place of business, 113 Crocker building, San Francisco, California; location of works, Nevada County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 10th day of November, 1898, an assessment (No. 16) of Ten Cents (10c.) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 113 Crocker building, sixth floor, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 14th day of December, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 30th day of December, 1898, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
J. P. HOLLING, Secretary.
Office—113 Crocker building, sixth floor, San Francisco, California.

ARRASTRAVILLE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of November, 1898, an assessment (No. 2) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 218 Jackson St., San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 17th day of December, 1898, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 17th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
J. MIDDLETON, Secretary.
Office—213 Jackson street, San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of December, 1898, an assessment (No. 23) of three (3c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 9th day of January, 1899, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
CALVERT MEADE, Secretary.
Office—106 Leidesdorff street, San Francisco, California.

DELINQUENT SALE NOTICE.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Auburn, Placer County, California.
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 11) levied on the 3d day of October, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|-------------------|-----------|-------------|---------|
| Per Henrichs..... | 71 | 500 | \$50 00 |
| J. Young..... | 276 | 200 | 20 00 |
| Jos. Rohrer..... | 279 | 50 | 5 00 |
| Kathe. Young..... | 280 | 50 | 5 00 |

And in accordance with law, and an order from the Board of Directors, made on the 3d day of October, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, No. 237 Twelfth street, San Francisco, California, on MONDAY, the 6th day of December, 1898, at the hour of 5:30 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
F. METTMANN, Secretary.
Office—237 Twelfth street, San Francisco, California.

THE MOST DIRECT AND CHEAPEST ROUTE

—TO—
The Eastern Oregon,
The Coeur d'Alene,
The Kootenai,
—IS VIA—

---THE---
**Oregon & Railroad
and Navigation
Company's Lines.**

For Information, Address
W. H. HURLBURT, or E. C. WARD,
General Pass. Agent, General Agent,
Portland, Or., 630 Market St.,
San Francisco.

DELINQUENT SALE NOTICE.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the 22nd day of August, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|-----------------------|-----------|-------------|----------|
| C. Rehn..... | 79 | 2,000 | \$200 00 |
| C. Rehn..... | 81 | 459 | 45 90 |
| C. Rehn..... | 82 | 1 | 10 |
| G. F. Ochs..... | 8 | 100 | 10 00 |
| G. F. Ochs..... | 9 | 250 | 25 00 |
| G. F. Ochs..... | 105 | 200 | 20 00 |
| G. F. Ochs..... | 170 | 100 | 10 00 |
| E. S. Heller..... | 10 | 100 | 10 00 |
| A. Schifmann..... | 12 | 50 | 5 00 |
| C. Warnke..... | 153 | 250 | 25 00 |
| L. Hehemann..... | 15 | 200 | 20 00 |
| T. J. Sullivan..... | 18 | 500 | 50 00 |
| E. Schulz..... | 41 | 200 | 20 00 |
| E. Schulz..... | 49 | 50 | 5 00 |
| J. Forbes..... | 43 | 50 | 5 00 |
| C. Ebbecke..... | 45 | 100 | 10 00 |
| N. Stand..... | 90 | 50 | 5 00 |
| J. Green..... | 104 | 200 | 20 00 |
| W. J. Rustemeyer..... | 109 | 500 | 50 00 |
| W. J. Rustemeyer..... | 116 | 500 | 50 00 |
| W. J. Rustemeyer..... | 117 | 500 | 50 00 |
| G. Schmitt..... | 47 | 5,000 | 500 00 |
| G. Schmitt..... | 48 | 2,000 | 200 00 |
| G. Schmitt..... | 49 | 2,000 | 200 00 |
| G. Schmitt..... | 51 | 1,900 | 190 00 |
| G. Schmitt..... | 221 | 500 | 50 00 |
| G. Schmitt..... | 61 | 500 | 50 00 |
| J. G. Hs..... | 142 | 4,150 | 415 00 |
| E. M. Fernandez..... | 100 | 100 | 10 00 |
| F. Woenne..... | 134 | 1,000 | 100 00 |
| J. H. Slevers..... | 156 | 500 | 50 00 |
| H. Page..... | 203 | 1,000 | 100 00 |
| H. Page..... | 205 | 1,000 | 100 00 |
| H. Page..... | 206 | 1,000 | 100 00 |
| W. J. Potosien..... | 207 | 100 | 20 00 |
| W. J. Smith..... | 218 | 700 | 70 00 |

And in accordance with law, and an order from the Board of Directors, made on the 22nd day of August, 1898, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the company, room 57, 916 Market street, San Francisco, California, on FRIDAY, the 25th day of November, 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
GEO. W. FLEISSNER, Secretary.
Office—916 Market street, room 57, San Francisco, California.

POSTPONEMENT.
The day of sale of the above delinquent stock has been postponed to MONDAY, December 5th, 1898, at the same place, at 10 o'clock A. M. By order of the Board of Directors.
GEO. W. FLEISSNER, Secretary.
Office—916 Market street, room 57, San Francisco, California.

DELINQUENT SALE NOTICE.

LEON GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Riverside County, California.
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the 14th day of May, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|----------------------------|-----------|-------------|----------|
| W. H. Bailey, Trustee..... | 261 | 2,400 | \$240 00 |
| W. H. Bailey, Trustee..... | 261 | 2,000 | 200 00 |
| W. H. Bailey, Trustee..... | 262 | 10,000 | 150 00 |
| C. A. Bailey..... | 133 | 1,000 | 15 00 |
| C. A. Bailey..... | 135 | 1,000 | 15 00 |
| C. A. Bailey..... | 136 | 1,000 | 15 00 |
| C. A. Bailey..... | 138 | 500 | 7 50 |
| C. A. Bailey..... | 169 | 2,000 | 30 00 |
| C. A. Bailey..... | 210 | 4,532 | 67 98 |
| R. L. Cheney, Trustee..... | 245 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 246 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 247 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 248 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 249 | 5,000 | 75 00 |
| R. L. Cheney, Trustee..... | 250 | 250 | 3 75 |
| R. L. Cheney, Trustee..... | 251 | 2,500 | 37 50 |
| R. L. Cheney, Trustee..... | 262 | 1,000 | 15 00 |
| W. H. Bailey, Trustee..... | 256 | 3,300 | 49 50 |
| W. H. Bailey, Trustee..... | 259 | 7,300 | 109 50 |
| W. H. Bailey, Jr..... | 147 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 148 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 149 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 150 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 151 | 1,000 | 15 00 |
| W. H. Bailey, Jr..... | 188 | 2,500 | 37 50 |
| W. H. Bailey, Jr..... | 208 | 4,000 | 60 00 |
| W. H. Bailey, Jr..... | 209 | 632 | 7 98 |

And in accordance with law, and an order from the Board of Directors, made on the 16th day of May, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 508 Safe Deposit building, San Francisco, California, on TUESDAY, the 1st day of November 1898, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
R. L. CHENEY, Secretary.
Office—Room 508 Safe Deposit building, San Francisco, California.

POSTPONEMENT.
The day of sale of the above delinquent stock has been postponed to THURSDAY, December 1st, 1898, at the same hour and place. By order of the Board of Directors.
J. W. PEW, Secretary.
Office—310 Pine St., Room 15, San Francisco, Cal.

POSTPONEMENT.
The day of sale of the above delinquent stock has been postponed to THURSDAY, December 1st, 1898, at the hour of 1 o'clock P. M., at the office of the company. By order of the Board of Directors.
J. W. PEW, Secretary.
Office—No. 310 Pine street, room 15, San Francisco, California.

Northern Pacific Ry.
TICKETS AT LOWEST RATES TO
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AND ALL EASTERN CITIES.
Through Cars and Magnificent Service.
Send six cents in stamps for illustrated book "Wonderland," to T. K. STATELER,
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You may pay
for Experience

but the man who's wide-awake, gets it at some one else's expense.

If you're going to pump—tell us. What we tell you may save many regrets as well as many dollars.

We also send our catalogue—all free.

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PUMP, BELL, BRASS AND MACHINE WORKS,
FREMONT AND NATOMA STREETS,
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Cost to Run, 1c per hour per H. P.

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430 S. W. Boulevard, Kansas City, Mo.



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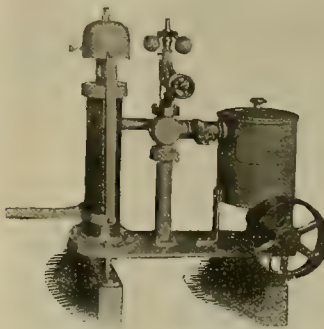
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Do they govern? Yes, they do. As a perfect Water Wheel regulator they have no equal. Write for latest report of regulation obtained at recent tests.

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MANUFACTURING COMPANY,**
NEW HAVEN, CONN.
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Send for Dredging Catalogues Nos. 15 and 16.

WE ALSO BUILD

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and Hoisting Machinery.

EVANS HYDRAULIC GRAVEL ELEVATORS.

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For transporting Ore, Fuel, Merchandise, etc., in bulk or in packages. SIMPLE, ECONOMICAL, INEXPENSIVE, PRACTICAL.

LOADS MECHANICALLY. DUMPS AUTOMATICALLY. Send for Ropeway Pamphlet No. 20.

THE CALHOUN EXCAVATOR. A COMBINED POWER-SHOVEL AND CABLEWAY.

Cableways,
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Incline Planes,
Logging Machinery,
Suspension Bridges,

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If you want your iron or wood work
in perfect condition, keep
it painted with

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FOR ROASTING, CHLORINATING AND DESULPHURIZING ORES.

Extracts from Letters Received from Mr. Philip Argall, Manager the Metallic Extraction Co., Cyanide, Colorado:

January 2, 1897.

"The roasting is invariably good. We can do 80 tons per day to 0.13% sulphur, when everything runs smooth. Our month record which, of course, includes all delays, is 1700 tons, from 1.94% sulphur to 0.16%."

February 19, 1897.

"Our furnace is now running very nicely indeed, averaging 90 tons per day to 0.10% sulphur, and doing excellent work; in fact, it has improved right along and we are highly pleased with it."

For 24 hours ending 7 A. M. to-day 102 tons were roasted."

The ROPP FURNACE is now in successful operation at the following reduction works: The Hanauer Smelting Works, Salt Lake City, Utah (one furnace); The Metallic Extraction Co., Cyanide Colo. (one furnace); The Colorado-Philadelphia Reduction Co., Colorado City, Colo. (three furnaces); The Selby Smelting & Lead Co., Selby, Cal. (two furnaces); The Mount Morgan Gold Mining Co., Rockhampton, Queensland (one furnace); Broken Hill Proprietary Co., Broken Hill, New South Wales (four furnaces); Puget Sound Reduction Co., Everett, Washington; Colorado Ore Sampling & Reduction Co., Cripple Creek, Colo.; Consolidated Kansas City Smelting & Refining Co., for the Arkansas Valley Smelting Works, Leadville, Colo.; Robert Lanyon's Son's Spelter Co., Iola, Kansas (two furnaces); Mountain Copper Co., Ltd., Keswick, Cal.

Catalogue on Application.

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SAN FRANCISCO, SATURDAY, DECEMBER 17, 1898.

THREE DOLLARS PER ANNUM.
Single Copies, Ten Cents.

Northern and Southern California Gold Mines.

That part of the Pacific coast known as "California" comprises such a vast extent of territory that even to many residents it is difficult to realize that from its northern to its southern boundary is a dis-



DRIFT AND STOPE, 321-FOOT LEVEL, LITTLE BUTTE MINE, RANDSBURG, CAL.

tance of nine hundred miles over ordinary lines of travel. Illustrative of the extent of the gold area of



DRIFT 480-FOOT LEVEL, LITTLE BUTTE MINE, RANDSBURG, CAL.

the State are here presented views and brief descriptions of three gold quartz properties over five hundred



NEW BRUNSWICK MINE, SHASTA CO., CAL.



LITTLE BUTTE MINE, RANDSBURG, CAL.

miles apart, the one in the edge of what is known as "southern California," the others amid the snows of Shasta. It is not to be understood that the counties of Kern and Shasta mark the termini of California's gold-producing area. Two hundred miles farther south than Randsburg, Kern Co., is the largest aggregation of stamps under one roof in the State—200 in number—monthly pounding out \$50,000 in gold, and far to the north of Shasta stretches the great area of Siskiyou, gold-ribbed and still largely productive after forty years steady output.

In April, 1897, Clark, Allen and Oakley bonded a claim known as the Little Butte, at Randsburg, and organized the Little Butte Mining & Milling Co. At that time there was one shaft 107 feet deep following the hanging wall of the ledge, but with no pay ore down to that depth. The new company put in a horse whim and continued the old shaft down to a depth of 260 feet, at which point a small body of rich ore was found which continued 50 feet farther down in the shaft. The owners then bought a 25 H. P. gas engine and hoist with a capacity of sinking to a depth of 1000 feet. After

straightening up the old shaft to an even grade, they put in a T-rail track and a 1000-pound skip, erected necessary buildings for accommodating the machinery and began work of sinking and drifting every 50 feet east and west below the 260-foot level. This showed that the main shaft was sunk between two pay chutes, as drifting a short distance either way good ore was found. In April, 1898,

a two-stamp mill was bought to handle the ore taken out during development work, this little mill being run from the same engine that is used for hoisting, milling on an average about six tons daily. During the past four months there has been some stoping done from the 260, 321 and 378-foot levels, showing free-milling ore that yields well. At the 378 foot level was found a body of blue sulphuret ore that plates upwards of \$10, with \$3 to \$6 in concentrates. The main shaft is now down nearly 600 feet, with a width between the walls of from 12 to 15 feet, the ore holding good value. The company has on its payroll about thirty men, and during the month of November milled and shipped to the mill at Barstow about 300 tons of ore, all this going far to confirm the belief that, as elsewhere in the State, it pays to go down on southern California quartz developments.

On Rich Gulch, Shasta Co., is the National Consolidated, the northern outcropping of the Old Dig-



NATIONAL CONSOLIDATED MILL, SHASTA CO., CAL.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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San Francisco, December 17, 1898.

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gings quartz belt. At the Little Butte, in Randsburg, lack of water makes necessary the use of a gas engine for motive power. At the National Consolidated, water is utilized in producing electric current for light and power. As in the southern California mine, the Shasta property produces free gold, the arsenides and pyrites being concentrated, thirty miners finding constant employment. The ore body lies near the contact of the slates and plutonic rocks and is reached by a 700-foot tunnel.

In the same vicinity in Shasta Co. is the New Brunswick mine, here referred to as illustrative of how an "abandoned mine" under better management can be made pay. After the expenditure of considerable money the mine was abandoned, and laid idle many years. The present owners spent a little money judiciously, have put up a small stamp mill from the profits and are steadily going ahead.

The only reason for citing these small properties in each end of the State is to note that it is just in the way they are worked lies largely the development of the State's mineral wealth. What it is desired to point out in illustrating and referring to these small concerns is in such slow but sure ways—cautious, economical, intelligent and progressive work—may the mineral area of the State be made of greatest value.

We have many great mining enterprises made possible only by aggregation of individual capital, prominent because of their magnitude of output and admirably administered. It is only by such aggregation of capital and liberal investment that great mining properties are made. But nearly all things truly great have humble beginnings, and some of the greatest mining enterprises began as quietly as have those noted herein. The point, however, is here: A hundred small mines are better than two or three large concerns—better for the miner, the local market, the machinery manufacturer, the mining engineer, the furnishers of mining supplies and everybody indirectly connected with the industry. For, after all, it is on small mines so worked that the public prosperity rests, as their multiplicity means the creation of a mining class, individual owners and wage earners as independent in their way as the farmer or the merchant. Such development means the establishment of permanent mining communities, the creation of the most profitable kind of home markets, an increase of population and wealth and an aid to the general prosperity of the State.

In a similar way in other parts of the world the mining industry has been thus developed to the general good. In no other way can better wages be secured; in no other way can the money produced be kept to aid in further development of the State's industries, and in no other way can the working

miner be given opportunity for permanent and independent occupation. Sole employment of foreign capital, foreign drainage of profits and steady decrease in the wage scale will never build up a commonwealth. Foreign capital is not to be decried, but the greatest measure of value to this State or any other State is proportional to the earnings either for themselves or for others of abiding American citizens.

MEMORABLE in mining annals is the recent rise in the value of shares of stock in leading copper companies, the evidently profitable character of the business occasioning unusual demand, more especially in Boston and other Eastern cities, for the stock at a price far in advance of former figures. Investors figure about as follows:

| | Annual Production (approximate) pounds. | Cost laid down N. Y., cents per pound. | Present Mkt price cents per pound. | Profit per annum based on such calculation. |
|-------------------|---|--|------------------------------------|---|
| Calumet..... | 100,000,000 | 6½ | 13 | \$6,500,000 |
| Montana..... | 60,000,000 | 6½ | 13 | 3,900,000 |
| Tamarack..... | 20,000,000 | 9 | 13 | 800,000 |
| Quincy..... | 17,000,000 | 6½ | 13 | 1,105,000 |
| Old Dominion..... | 10,000,000 | 7 | 13 | 600,000 |
| Osceola..... | 10,000,000 | 8 | 13 | 480,000 |
| Atlantic..... | 5,200,000 | 9½ | 13 | 125,000 |
| Wolverine..... | 4,500,000 | 7½ | 13 | 236,250 |

The Boston *Financial News* points out that the above profits would be equivalent to a profit per share per annum of \$65 on each share of Calumet; \$26 on each share of Montana; \$13 on Tamarack; \$11 on Quincy; \$4 on Old Dominion; \$5.25 on Osceola; \$4.88 on Atlantic, and \$3.93 on Wolverine. On the assumption that the price does not go below 13 cents, and that the cost of production will not be exceeded the Boston estimate, it will readily be seen how the possession of such stock appeals to those who have money which they want to earn interest for them, and who view with indifference the state or municipal security that offers but 3% per annum.

THE technical report of G. W. Melville, chief of the Bureau of Steam Engineering of the U. S. Navy, is an interesting one, coming as it does at the close of a brief but brilliant record. It tells what the navy did in the late war with Spain and what it needs. In pleasant contrast to the stumbling inefficiency of the army is tersely stated the celerity of successful naval operations. Quick work was required in fitting out an auxiliary fleet of over 100 vessels, in replacing old, worn out shell boilers by water-tube boilers in various monitors, in furnishing floating machine shops, designing new machinery, refitting old, and providing proper supplies promptly and in working shape. The results are also noted. Nearly all former specifications and methods have been revised, nickel steel will hereafter be used in engine construction, weldless steel tubes will in future have the call, and water-tube boilers meet with unqualified approval. The San Francisco built vessels, the Oregon and Marietta, deservedly come in for special favorable mention. The steam turbine, of which much was expected, is not endorsed. Just tribute is paid the personal efficiency of the U. S. Engineering Corps, and practical recommendation made as to further improvement and permanent value thereof to the nation.

A UTAH MILL BUILDER thinks that next season will see more new mills put up than at any corresponding period in that State's history. He says that many small mine owners are beginning to see that the progress in ore reduction, and the decreased cost in mill construction for the past few years no longer admits of the stacking or rejection of low grade ores; that there is no use in "waiting for silver or lead to go higher," but that business suggests putting in stamps and concentrators, especially the latter. "Some persons," says he, in the Salt Lake *Tribune*, "plead that they are financially incapable of building a mill, and yet month in and month out they will continue to spend money in vain search for shipping ore, when it is as plain as the nose on a man's face that nature has left them with a milling proposition flecked here and there with very rich ore, if you please, and nothing more. The sooner the philosophy of the thing is recognized the better, and, that done, you will see more milling propositions among the successful ones in the camps."

A SPOKANE, WASH., mine operator says that he will "never again have anything to do with the organization of a treasury stock corporation: almost every failure in mining operations hereabout may be traced to that pernicious system." He goes too far

in such wholesale denunciation of a system that at times does not deserve such general verdict, yet, as a steady business proposition the Spokane operator is finding out, as a good many before him have discovered, that the assessment system is the only satisfactory one. True, to the inexperienced or credulous there is a charm in the words "paid up and non-assessable" on a stock certificate or in a prospectus, but that is only a nicely sounding phrase. Those who mean business and contemplate continuous working of the property find fewer obstacles in the assessment plan than in any other co-operative system that was ever devised.

COLORADO'S Commissioner of Mines wants the next session of that State Legislature to pass laws giving him authority to remove explosives from supply stores in mining camps; prohibiting the employment of any but licensed men to run steam engines; prohibiting the employment of such men more than eight consecutive hours in one day; requiring that all abandoned shafts be securely covered and fenced; providing a penalty for failure in reporting accidents; regulating the speed at which men can be raised and lowered in shafts; prohibiting an engineer from operating more than one cage at a time when lowering or hoisting men, and requiring the appointment in all State mining camps of men who shall be under the orders and direction of the commissioner. In Colorado, as in other mining States, there is a general tendency favoring the enactment of such laws, and it is probable that at least a part of them will be on the Colorado statutes at the close of its next legislative session.

At the meeting of the Trans-Missouri Freight Bureau in Kansas City, Mo., on the 6th inst., freight rates on ore and bullion were advanced, the new tariff going into effect Jan. 1st, '99, affecting the smelting and mining industries of the entire region between Utah and Chicago. East of Denver, Colo., the advance over the present rates is \$2 per ton on bullion and \$1 per ton on ore. Utah points are similarly affected. The present bullion rates from the latter State, eastward, are \$11 to the Missouri river, \$12.50 to the Mississippi, \$13.50 to Chicago: on ore, \$9, \$10.50 and \$11.50, respectively. This will occasion a general upset and readjustment of next year's contracts, the loss, as usual, falling mainly on the producer. The effect will probably be a curtailment of production, the extraction and treatment of less "lean" ore, and the abandonment of a class of properties that just about paid expenses under the existing freight tariff.

PURVEYORS of mining stocks in Colorado are offering extraneous inducements. A circular to hand from a mining company offering 100,000 shares of its treasury stock at 15 cents per share urges upon its prospective clients to come and look at the property themselves, and offers to pay all traveling and hotel expenses "from his home to the property and return" of any one buying 10,000 shares. The idea is susceptible of even wider application and is not to be hastily decried. The Colorado railroads and hotels will doubtless look with favor on the proposition. Such inducements have been granted elsewhere, though it is believed this is the first instance where it was publicly announced in a prospectus.

It is a mistake to assert, as it has recently been done somewhat extensively, that the production of gold in the United States in '97 was the largest in the history of the country. The largest gold production for any one year in this country was in 1853, when the yield was 3,144,374 ounces fine—\$65,000,000—\$8,000,000 in excess of the '97 yield. This came almost entirely from California. It is believed that the gold output of South Africa for the current calendar year will even exceed the '53 yield, which has thus far been unexcelled in any year by any country.

In December, '95, Cripple Creek, Colorado, mining stocks sold in the aggregate for 33% more than in December, '98. This in the face of the fact that many of what were then prospects now represent dividend-paying mines, is illustrative of the effects of a "boom" as compared with actual profit-producing property.

THE 76th (29th annual) meeting of the American Institute of Mining Engineers will be held at No. 12 W. 31st St., New York City, beginning Feb. 21st, '99.

Concentrates.

COPPER matte is imported into the U. S. free of duty.

"DORE" bullion is silver containing a small percentage of gold.

SO FAR as known, no California county maintains a mining bureau.

A 20-TON SMELTER is to be built and operated at National City, Cal.

ABOUT 1000 men are getting out as best they can from Dawson to the coast.

THE Portland mine of Victor, Colo., paid \$570,000 in dividends this year.

THE dividends paid for the current year by the Mercur mine of Utah total \$355,000.

MONTANA miners are vigorously protesting against the law requiring safety doors on hoisting cages.

IN ordering boiler tubes, the outside diameter should be given; in ordering wrought iron pipe, the inside.

THE Copper Queen M. Co. at Bisbee, Arizona, has 1200 men on its payroll and its annual product is estimated at \$2,000,000.

THE Columbia, Cal., Exploration & Tunnel Co. now has boring machinery at work at Columbia, Cal., in quest of pay gravel.

THE Kennedy mine, Amador Co., Cal., now with a shaft 2300 feet deep, is about to have an additional shaft 8x17 feet, 3100 feet in depth.

BUTTE, Montana, smelters have been asked to temporarily suspend operations because of the fatal effect of the fumes upon residents.

THE area of an orifice to discharge six pounds steam per second under a gauge pressure of 125 pounds per sq. in., should be three-tenths of 1 sq. in.

IN New South Wales in '97 the average yield of gold per miner employed was £45 6s 8d; in Queensland during that year \$225 18s 3d per miner.

OLD California miners write that the recent "stirring of the elements"—hurricanes, etc.—betoken an extremely wet winter, which would be acceptable.

THE first carload of Fuller's earth prepared in California arrived in San Francisco this week from the mine, three and one-half miles from Famosa, Kern Co.

AT White Cloud, Churchill Co., Nevada, has been discovered a ledge of black hematite iron with a slight percentage of silver. A smelter, etc., is "projected."

THE Holy Terror, South Dakota, 10-stamp mill is credited with a \$70,000 cleanup from one week's run last month—a result equivalent to the name of the mine.

DURING the first nine months of '98, mining machinery was exported to Australia to the value of £349,791; during the corresponding period of '97 the value was £297,250.

THE Supreme Court of Montana has decided that a prosperous working mining corporation cannot dispose of its entire interests without the consent of all of its stockholders.

NEW YORK purchasers have eagerly absorbed the large crystals taken from the McSorley mine, Chili gulch, Calaveras Co., Cal., and present effort is made to find more there.

THE Green Mountain, one of the Anaconda properties, is, probably, the deepest mine in Montana. It is 2200 feet in depth, and an ultimate depth of 4000 feet is contemplated.

ACCORDING to a press dispatch, the transfer papers in the sale last Wednesday of the property of the Dahlonga, Conn., Georgia, gold mine, "required \$9180 revenue stamps thereon."

STATE COAL MINE INSPECTOR YOUNG of Wyoming says there is much activity in the coal mining business of the State, and operators find it difficult to get men enough to work the mines.

A BROKER who retains and claims as his commission the difference between the amount paid by the buyer and the smaller amount asked by the seller cannot be held for embezzlement.

WHERE a man hires to work at a stipulated rate per month, knowing that certain work will be required of him on Sunday, the law will not imply a promise to pay additional wages for such Sunday work.

THE proportion of safety-valve to grate surface in the case of a lever safety-valve is 1 sq. in. of valve area to 2 sq. ft. grate area; with a "pop" safety-valve, 1 sq. in. valve area to 3 sq. ft. of grate area.

THE Museum of the California State Mining Bureau will close Saturday, Dec. 24th, until further notice, pending removal to new quarters in the ferry building, foot of Market street, San Francisco.

SINCE '49 every year with a "9" has seen a big "mining rush." '49, California; '59, Pike's Peak; '69, White Pine and the Comstock; '79, Leadville, Colo., and Tombstone, Arizona; '89, Harqua Hala; '99, —?

"DRIFT MINING" has long been duplicated in the Australian provinces of Victoria, where "dead rivers" have been discovered, and gold-bearing "cement" and gravel profitably followed under the volcanic cap.

A MIXTURE for preventing fumes in mining powder, patented by R. Crowe of Georgetown, Colo., consists of 50 per cent unbolts wheat flour, 25 per cent common salt finely ground, and 25 per cent pulverized bicarbonate of soda.

A "CURRENT UNIT" is such a strength of current that when passed through a circuit one centimeter in length, arranged in an arc one centimeter in radius, will exert a force of one dyne on a unit magnet pole placed at the center, equal to ten amperes.

WORK on the Sutro tunnel began Oct. 19, 1869. On Sept. 1, '78, it had advanced 20,489 feet. At that date the temperature of the air was 95°, and of the water 105° at the header; there was then an average daily flow of 1,285,000 gallons of water.

RECEIPT is acknowledged of the Truckee, Cal., folio, No. 39, and the Boise, Idaho, folio, No. 45, of the Geologic Atlas of the United States. They can be secured from the Director U. S. Geological Survey, Wash., D. C., on transmission to him of 25 cents each.

THE receipt this week of a letter from Manila, Philippine Islands, U. S. A., from a prominent Colorado mining engineer, now a U. S. soldier, ordering this paper sent there during '99, illustrates the fact that a small amount of money can now be

made to go a long way by using a 2-cents American postage stamp. The 2 cents that brought the letter to San Francisco would have carried it to San Juan, Porto Rico, a distance of over 10,000 miles.

THE new mill that takes the place of the one partially destroyed by fire at the property of the Standard Con., Bodie, Cal., is to be fire-proof so far as practicable. Such construction costs considerably more at first, but is more economical in the long run.

IT is suggested that San Bernardino Co., Cal., from which part of Riverside Co. was recently sliced, be still further subdivided by the creation of a new county taking in part of Kern and Inyo counties, covering Randsburg, Ballarat and other mining districts.

THE term "gossan" may be defined as a ferruginous crust filling the upper parts of pyritous veins or forming a superficial cover on masses of pyritic ores. It consists principally of hydrate oxide of iron, resulting from the oxidation and removal of the sulphur, copper, etc.

ON the 5th inst., a decree was entered in the United States Circuit Court, in Los Angeles, Cal., deciding what is known as the School Section cases, the court deciding that Section 36 did not pass to the State of California, which will have the effect of making all mining claims on that section valid.

COLLECTIVELY thanks are returned for the numerous kindly and complimentary references to the recent brief announcement regarding the two-thousandth issue of this paper. More especially are the many private letters appreciated in which the writers say so many nice things as to its present and future.

STATE MINING COMMISSIONER HEWITT of Michigan, in his annual report, mentions the ownership of 800 shares of Calumet & Hecla stock "by a modest drayman of Calumet, who works early and late at his chosen avocation, seemingly undisturbed by the fact that his dividends amount to \$32,000 annually."

DURING 1897 there were 1015 separate fatal accidents in and about all the mines and quarries, more than 20 feet deep, in the United Kingdom, involving the loss of 1102 lives, showing, on comparison with the previous year, an increase of eleven in number of accidents and a decrease of eighty-six in the number of lives lost.

"STATICS" relate only to the action and effect of forces; "kinematics" treat solely of relations of motion; "dynamics" or "kinetics" treat of simple motion as an effect of the action of forces; "energetics" treat of modifications of energy under the action of forces, and of its transformation from one mode of manifestation to another, and from one body to another.

OLD files can be partially resharpened by immersion for a short time in dilute acid. They must be first cleaned. A solution of sulphate of copper will remove iron filings from a file without affecting the file itself. Zinc filings can be dissolved out with dilute nitric acid. Any grease must be removed from the file first. This is best done with dilute caustic alkali.

IN the latest published annual expense account of the Anaconda, Montana, Mining Co., appear some large items; during the year was paid out for timber, \$429,888; labor, \$3,376,502; machinery and repairs, \$461,612; candles, \$1,671; coal, \$207,861; fuse and caps, \$27,004; oil, \$16,979; powder, \$147,298; freight on ore, \$425,081. The total expenses for the year aggregated, \$15,266,611. The receipts for the year were \$18,817,957.

UNDER the laws of the United States, silver is an actual legal tender to the amount of \$5 anywhere in the United States and under all conditions. Above that amount the legal tender feature of the silver dollar is confined to the contracting parties. If the creditor waives the right to specify in what kind of money the debt shall be paid—then the debtor may pay in any lawful money of the United States: silver, gold or currency.

THE largest of California's "dead rivers" known is the "Big Blue Lead," which extends about sixty-five miles, paralleling the main divide of the Sierra Nevada thirty miles west. Its elevation varies from 3000 feet at Forest Hill to 5000 feet at Little Grizzly. The present rivers in that vicinity run at right angles to its course. As a rule, the deep gold is 900 feet; that nearer the surface 929. The gold and gravel are found as deposited in live rivers amid banks, bars, eddies, ripples and falls; little gold in the rapids; much in the eddies. It has yielded about \$100,000,000.

BY the use of a specially constructed device a wire rope 3000 feet long can be cleaned and lubricated in fifteen minutes. The apparatus is made in halves hinged at one side, is closed over the rope either at the surface or brace; above the lubricating vessel is a collar, also in halves, and having six wire brushes which bear upon the rope. The lubricator being charged with oil, the signal is given to the engineer to lower, and immediately the cleaner starts to revolve and to clean the rope. The cleaned portion passes through the oil vessel and thus becomes thoroughly lubricated.

THE electrolytic copper refining industry owes its success very largely to the value of the so-called impurities of the raw copper. Nearly all pyritic copper ores contain silver and gold, and when raw copper from these ores is electrolytically refined, the silver and gold are found as an insoluble "anode sludge" on the bottom of the vats. From this sludge these metals can be obtained as bullion by a comparatively simple and inexpensive chemical treatment. The value of the bullion recovered in one year by the Anaconda Co., at their electrolytic refinery in Montana, was \$3,650,000.

TO ASSAY a quicksilver ore containing arsenic the ore may be mixed with four and one-half times its weight of litharge; heating this in a retort produces a flowing, slag-like mass, formed by the litharge, sulphuret of arsenic, etc., the cinnabar being decomposed into sulphurous acid and metallic mercury. The quicksilver is completely volatilized by a moderate heat, and collects in the condensing apparatus, and the farther portion of the neck of the retort. The one precaution necessary during the operation is to gradually and moderately heat the clay or glass retort, to prevent its being perforated by the effects of the litharge before the process is finished.

SO FAR this year the Jackson Co., Oregon, chicken with 84 cents in gold in its gizzard; the Toledo, Wash., fir tree which, when burned, yielded \$4.73 from its ashes; the Picoacho white gold sold at Yuma for \$21.75 per oz.; with other usual tales are not to hand, though due Dec. 1st, due doubtless to the dry

year. From Montana, however, comes the statement that a Bannack City dredging company finds in its gravel leaden bullets "carrying considerable gold." Besides are also discovered "buckshot and bird shot assaying high in gold." Should Prof. Emmens of argentaurum fame get hold of these in connection with his Mexican silver dollars he might further contribute to the general hilarity.

WEIGHT of hydraulic pipe varies. Capt. Longridge gives a rule for ascertaining the weight per foot of welded pipes of 8 inches diameter and upwards, with 1-16 inch thickness, to allow .67 pound for every inch of diameter; and for riveted pipes, .81 pound for every inch of diameter. For pipes of 2-16 inch, 3-16 inch, 4-16 inch, etc., thickness, the above constants to be multiplied by 2, 3, 4, and so on, according to the thickness. For instance: What are the weights, per foot, of the following welded pipes, and of the same dimensioned pipes, riveted—(a) 9 inches in diameter, 3-16 inch thick; (b) 12 inches diameter, 5-16 inch thick; (c) 20 inches diameter, 1-2 inch thick? (a) Welded, .67 x 3 x 9 = 18.09 pounds—riveted, .81 x 3 x 9 = 21.08 pounds; (b) welded, .67 x 5 x 12 = 40.02 pounds—riveted, .81 x 5 x 12 = 48.60 pounds; (c) welded, .67 x 8 x 20 = 107.02 pounds—riveted, .81 x 8 x 20 = 129.06 pounds.

CALIFORNIA has had the largest hydraulic mining plants in the world, and California miners are putting in equally extensive apparatus elsewhere. At the Consolidated Cariboo Hydraulic Mining Company's property near Quesselle Forks, B. C., J. B. Hobson, an old Placer Co. miner, has put in considerable development work. Two lines of sluices, 7 feet wide, were placed in the bed of the gulch, paved with steel riffles, weighing in the aggregate seventy-nine tons. A canal 7 by 13 feet, ten miles long, was commenced in June and completed Nov. 15. A dam 435 feet long on top and 50 feet high was constructed across the outlet of a lake at the head of the canal for storage of about 550,000,000 cubic feet of water. The construction of this dam and the canal furnished employment for 350 men and 120 horses and cost \$125,000. During the progress of the opening up of the lower or bedrock bench of gravel rich gravel was found. About 75,000 pounds of dynamite, 75,000 pounds of black blasting powder and 100,000 pounds of other miscellaneous mining supplies are used annually at the mine, which has now completed thirty-three miles of canals and three storage reservoirs having a total area of 2184 acres and a storage capacity of 1,016,000,000 cubic feet water. About \$1,000,000 has been expended in equipment of the property since 1894 and about \$500,000 in gold has been recovered during the progress of development work. It is estimated that the company's leases contain about 400,000,000 cubic yards of high-grade gold-bearing gravel. It is proposed to extend and increase and to open up the property in other places.

WHEREVER it is impossible to get water for placer mining, and the conditions are such that a "dry washer" can be used, such apparatus is employed. This device is based upon the same principle as the "farmer's mill," which separates the grain from the chaff, with such changes as are required by the difference in the material to be handled. Many different styles of dry washers are in use in desert mining regions. One general description fits them all, since their difference consists merely in peculiarities of adjusting their several constituent parts, as the angle of the apron, mesh of screen, height and number of riffles, etc. A dry washer consists of a strong wooden frame, to the bottom of which is attached a bellows, the top of which forms the riffle board, consisting of wire netting covered by canvas, across which the riffles are nailed. Above the riffle board is the apron, and above it the screen. A simple crank and gear sets the bellows in motion, and by percussion, gives a shaking movement to the apron. While one man is turning the crank, another shovels the pay dirt onto the screen, through which it falls on the apron and from it on the riffle board. The intermittent blast blows the light particles of dust and sand away, while the heavier ones, and with them the gold, are caught by the riffles. After a number of shovelfuls of dirt (from 50 to 100) have been run through the machine, the riffle board is taken out, the larger particles of gold are picked out by hand, and the rest is dumped on a sheet of canvas, to be once more run through the machine at the close of day, or when a sufficient quantity of the concentrated pay dirt has been collected. Such a method entails loss; still it has been demonstrated that experienced men can save, under certain circumstances, up to 85 per cent of the gold contained in the material worked.

IRON chemically pure is too soft for mechanical purposes, and is rarely found in native masses but mineralized in ores with different elements, metals and substances in the form of oxides, chlorides and fluorides, and when reduced to a metallic state these alloy and combine. Upon these alloys or combinations depends the commercial value of the ore. The mineralized ores of iron are brought through the agency of the blast furnace to a metal of commerce, designated "pig iron," the constituent elements of which are of the utmost importance to the foundryman, for the value and usefulness of the cast metal depend upon them. The allied metals with which iron will combine equally, chemically and mechanically, when reduced in a blast furnace are thirteen. Six of these are electro negative to it and seven electro positive. The electro positive are calcium, magnesium, beryllium, zirconium, aluminum, manganese and zinc. Copper and zinc are pyro-electro and change polarities with iron at different temperatures. The electro negative metals are chromium, vanadium, copper, cadmium, cobalt and nickel. The electro negative metals render iron electro positive, making it cold short, having a crystalline fracture and a polished surface is easily oxidized. The chill is well and clearly defined, white, hard and brittle. The electro positive render iron electro negative, making the iron tough, having an uneven or fibrous fracture and to a limited extent resisting oxidation. The chill has radiant streaks from gray back into chill of combined carbon, giving it a mottled appearance, making the chill tough but not so hard as in the electro positive. The electro and pyro-electro conditions of metals are of interest and may often assist to account for some one of the many peculiar conditions of metal, so often occurring, which the ordinary chemical analysis takes no account of, as it simply deals with iron, carbon, silicon, phosphorus, sulphur and manganese. These alloyed or combined together in certain proportions make what is commonly called "pig iron." The value of this metal depends on these constituent elements and a practical knowledge of them is what is desired by both the furnaceman and the foundryman—the former in making and grading his furnace product, and the latter in buying his metal and making castings to meet certain requirements.

The Refining of Base Lead Bullion Containing Silver, and High in Gold.*

NUMBER VII.—CONCLUDED.

By G. H. BLAKEMORE.

Re-Melting Rough Bars of Silver into Market Bars.—Four half 1000-oz. bars are placed in a crucible standing on two five-bricks, the latter being placed on the fire bars of the remelting furnace. If the crucible was placed on coke only the latter would burn out long before the charge in the crucible was melted and naturally the crucible would sink down until it rested on the firebars, with the result that it would be a difficult matter to get the silver quite molten, through the crucible chilling on close contact with the air drawn through the grate.

When the charge of silver is thoroughly melted down, it is well stirred up and then withdrawn from the furnace by the aid of two men. A basket-shaped pair of tongs is used to grip round the crucible. Over the handles of the tongs, an iron ring is slipped and pressed down tight, so bringing a big strain on the jaws of the tongs, preventing them from slipping off the crucible when the strain of the weight comes on them. The second man has a piece of chain about 3 ft. 6 in. long, one end having a cross bar on it, the other a hook. The hook is slipped under the hinge of the tongs enabling both men to lift. When the crucible is lifted out of the furnace, two or three pieces of soft pine wood, or some soft charcoal, is dropped into it. The carbon of the wood or charcoal extracts the oxygen out of the silver and in two or three minutes the silver may be poured out into some warm, oiled moulds, without any fear of vegetation taking place. Before pouring, however, a dip sample is taken, and this being assayed, the result in fineness is stamped on the two 1000 ozs. bars which each charge produces. Before this is done, the bars are cleaned up with a file and a rough edges are trimmed up with a hammer and cold chisel. Care must be taken in pouring out the silver that any slag floating on the surface is kept back so as not to spoil the bars. Both bars are branded with the same number, and after weighing it is easy to know what the value of the two bars is.

Litharge Assays.—When concentrating retort gold-silver bullion, the following figures, representing the assay value of the cupel and the litharge produced at the time, will serve to give an idea of the variation in litharge assays:—

| Cupel Dip Assay. | | Litharge Assay. | |
|------------------|----------|-----------------|----------|
| Ag. Ozs. | Au. Ozs. | Ag. Ozs. | Au. Ozs. |
| 10,089.2 | 942.5 | 22.96 | 1.12 |
| 14,278.9 | 1,137.8 | 78.90 | 5.14 |
| 17,217.8 | 1,517.6 | 28.32 | 0.36 |
| 15,743.0 | 1,235.6 | 61.18 | 3.38 |
| 13,804.8 | 1,198.4 | 225.75 | 1.04 |
| 4,242.9 | 451.2 | 10.64 | 2.11 |
| 6,602.3 | 523.9 | 18.39 | 1.26 |
| 13,814.1 | 1,794.5 | 11.48 | 2.45 |
| 16,775.2 | 2,128.8 | 17.07 | 4.29 |
| 12,341.8 | 1,634.4 | 23.16 | 1.60 |

There is nothing regular about them, *i. e.*, high cupel assays do not necessarily mean high assay litharges. As much of the litharge as is possible is returned to the softening furnace to assist in the oxidation of the antimony, in preference to returning it to the blast furnaces.

Parting Dore Bullion.—The process of parting which seems to me the quickest, cheapest and most efficient with small plant expense, is the Gutzow process. For an expenditure of £550, a plant can be erected which is capable of handling with the greatest ease 200 lbs. of dore bullion every twenty-four hours, and with an extra expense of about £100, its capacity could be trebled most comfortably. All that is required in the plant are the following items:

1.—One 500 gallon tank on a stand 8 feet high to supply water to the plant. A steam pipe fitted to it to enable hot water to be produced, or the water from steam traps in the refinery can be used. 2.—One parting kettle, cast iron, with moveable hood also cast iron. Kettle told 1000 lbs. concentrated H_2SO_4 , set over fireplace. 3.—One small lead condenser to catch sulphuric acid fumes from the kettle, 10 ft. 0 in. x 7 ft. 0 in. x 5 ft. 0 in. made of 4 lbs. to sq. foot lead. 4.—Two cast iron pans about 6 ft. x 3 ft. x 1 ft. deep. 5.—Two lead lined wooden boxes with antimonial metal plug cocks. Size of boxes 2 ft. 0 in. x 18 in. x 18 in. 6.—One lined wooden box 6 ft. x 1 ft. x 6 in. x 1 ft. x 6 in. to hold precipitated copper. 7.—One recovery box, eight compartments, made of 2 in. soft pine each, compartment 2 ft. wide, 4 ft. deep, and 4 ft. long. This is to be filled with scrap iron. 8.—One drying pan of cast iron, 5 ft. x 2 ft. 6 in. x 6 in. deep, set over fireplace. 9.—Three leaden buckets to hold acid. 10.—One iron paddle 4 ft. long of $\frac{1}{2}$ in. round iron. 11.—One iron ladle to hold about one pint, $\frac{3}{4}$ in. iron handle. 12.—Two trowel-shaped tools. 13.—Six wooden paddles 1 in. round; handle blade of paddle 6 in. x 4 in. 14.—Set hydrometers; twaddles. 15.—Two or three beakers. 16.—Some glass rod. 17.—Scale to weight $\frac{1}{2}$ ton. 18.—Remelting furnace for gold. 19.—Three

pairs india rubber gloves. 20.—Three pairs india rubber boots to reach to thighs. 21.—Three woollen sweaters. 22.—Steam connection with hoses fitted with leaden pipe, $\frac{1}{2}$ in., $\frac{1}{4}$ in. hole in end. 23.—Water supply laid conveniently to various parts of buildings and fitted with "roses" if wanted. 24.—Building over the lot.

I simply propose to give a description of the above process and give actual working facts. Descriptions of all other processes for the parting of dore bullion can be found in almost any work dealing with the metallurgy of silver and lead.

A charge of 200 lbs. of dore, or whatever amount the kettle is for, is placed in the kettle with $\frac{1}{4}$ to $\frac{1}{2}$ lbs. of concentrated acid per lb. of dore silver. The dore is not granulated, but is used up in bar shape as it is cast from the cupel. In about two hours' time a jar or two of the mother acid is used (which is got when the process is working regularly) until all the silver dissolved—usually after three to four hours boiling. Then fill up the kettle to within an inch of the top with the mother acid before spoken of, so as to give about $\frac{1}{4}$ lbs. of acid to each lb. of dore silver charged. Generally a lot of sulphate of silver, of both kinds of sulphate, precipitates when the cold acid is added. Sometimes so much of this comes down that it is necessary to heat the contents of the kettle to boiling point again. When the silver has mostly gone into solution, use the ladle described and bale the gold powder out. The pan having a circular depression in the center of the bottom, this can be readily done. When the gold is all out, the kettle is allowed to stand for about half an hour and then the contents are syphoned out (to within 2 inches of the bottom) into a cast iron pan with or without a water jacket, the former for cooling purposes. The syphon is simply a piece of $\frac{1}{2}$ -inch pipe bent to the shape desired. When using it, the pan end has a plug of wood driven in so that it can be easily removed, or else a small cast iron plug cock could be fitted on. The pipe is then filled with some of the mother acid, and the kettle end is quickly put under the acid and the plug opened rapidly; this syphon seldom "misses."

As soon as the kettle is emptied, the steam is turned on to the pan, carefully of course, so that the lead pipe does not blow out of the liquor. A test taken by dropping some of the liquor on a cold plate will show when the steaming is finished. When there is plenty of bisulphate of silver in the liquor, a spot of it sets in a solid lump like a drop of candle grease might do. It is also white in appearance. When the silver is all as sulphate, the drop on cooling shows a few sulphur yellow crystals and a quantity of liquor around it. It is advisable, however, to make the workman use a hydrometer test as well, but in combination with the crystallizing test. It is not necessary to run the liquor down lower than 135 degrees T. At first the right point takes some explaining to the men and personal superintendence, or they may give the pan too little steam and get the silver crystallized out principally as bisulphate, or give it too much and so produce very dilute mother acid. In the start of operations it may take ten hours steaming to bring the liquor to the point required, but when there is mother acid to return to the dissolving kettle, three hours is usually sufficient. Immediately the liquor has been sufficiently diluted by the steam, the latter is shut off and the pan allowed to stand for 24 hours, *i. e.*, presuming it has no water jacket. A few minutes the next morning will draw off the mother liquor and in an hour all the crystals may be shovelled out into a leaden box, leaving room for the next charge of silver solution, which should be ready to syphon out of the dissolving kettle.

The crystals are washed with hot water, which takes the copper and iron sulphates, etc., out, first in a box by stirring and decanting off the liquor, and then in a box on wheels, lead lined, with a false bottom, and lined with a piece of ordinary unbleached calico, tacked on. Hot water is run on and about four washings given. The crystals are then removed to the drying pan. A couple of hours will dry the crystals and the dried sulphate of silver is ready for heating in a retort. A retort holding 560 lbs. of alloy will hold 260 lbs. of sulphate of silver. It is mixed with 4 to 5% of ground coke or charcoal, and four hours heating is sufficient to reduce it to metallic silver. It is advisable to put about 5 lbs. weight of fireclay or any siliceous material in with the charge to prevent the retort being eaten out at the line of the molten charge. The following assays show its fineness:

| | |
|-----------|------------|
| 1. 996.40 | 7. 985.00 |
| 2. 995.30 | 8. 997.30 |
| 3. 998.30 | 9. 990.10 |
| 4. 996.30 | 10. 996.10 |
| 5. 994.30 | 11. 996.80 |
| 6. 994.60 | 12. 997.50 |

There are no very troublesome fumes given off, beyond a smell of sulphur that inconveniences no one. The bars are afterwards melted up on a new cupel and a couple of hours' heat with a little blast will bring the silver up to 998 fine.

All the washings from the sulphate of silver are run through a box holding precipitated copper and any silver in solution is precipitated there. The copper which it replaces, and silver not precipitated, is caught outside in the recovery box filled with thin

scrap iron. Daily tests of the waste liquor from this box have failed to show the faintest trace of copper or silver escaping. Once in a month the first two compartments of this box are cleaned out. About 50 lbs. weight of precipitates are obtained. This is simply put back into the copper box. One assay of this material is as follows: 53 15 per cent Ag.; 10.40 per cent Cu. The rest was iron, dirt, etc.

The gold, at the end of the week, is put back into the kettle, with about 1 lb. of acid for 2 oz. of gold and boiled with frequent stirring for about three hours. The gold is then ladled out while the liquor is simmering into a lead-lined box, and well washed with hot water. This removes all the copper and most of the silver.

It takes two or three hours to well wash it. It is then simply put into a crucible and melted up. No refining need be done beyond this because the gold is usually from 980 to 995 fine. It is no advantage in New South Wales to make it particularly fine, because the Mint makes no more allowance in its treatment charges for gold 1000 fine than it does for gold 500 fine. In quantities under 5000 ozs. the charge is 4d. an ounce on standard gold (not fine gold) whether the gold is absolutely pure or the dirty stuff which stamp batteries turn out. This surely is clinging to the memories of antiquity with a vengeance, and it is to be hoped that some more modern business ideas will be inaugurated very shortly in an institution which is one of the most useful in regard to the mining industry which the colony possesses.

If it is desired to make nice-looking bars, all that is necessary to do is to pour about $\frac{1}{4}$ th of an inch of oil into the moulds. When the gold is poured in, the oil rises on the top and burns off, leaving the face of the bar bright and yellow. A little powdered borax sprinkled on will complete the cleaning. Then tip the red-hot bars into cold water and from there place in a weak pickle of sulphuric acid. Scrubbing with a brush cleans everything off leaving the bars as bright as a sovereign.

I forgot to mention that the silver sponge, which collects in the copper box, is collected weekly and put into the gold-washing box with about 20 per cent by weight of sulphate of silver crystals, and the box filled up with hot water. Any particles of copper are thus decomposed at the expense of the sulphate of silver, which is reduced to the metallic form. All washings, whatever from, are always passed through the copper box, and if this practice is adhered to there can be no possible chance of loss. The washings from the gold are first run into a canvas filter and any gold which collects there is simply cupelled off and recovered.

SAMPLE ASSAYS OF DORE BULLION TREATED.

| Fineness in Silver. | Fineness in Gold. |
|---------------------|-------------------|
| 1. 892.00 | 103.90 |
| 2. 938.00 | 56.78 |
| 3. 941.40 | 53.42 |
| 4. 931.50 | 67.79 |
| 5. 924.00 | 74.18 |

The gold as it comes out of the dissolving kettle, when the dore bullion is as rich in gold as the examples given, looks like coarse red sand. It is only when the gold is much more diluted with silver that it is obtained as a black, finely divided powder.

Assays of silver produced by this method showed that it contained 0.96 ozs. of gold per ton downward to a trace. The cost of parting per oz. is under one farthing, *i. e.*, from 0.19d. to 0.21d.

The average cost of refining base bullion under the circumstances described in this article is not more than 28s. a ton. With cleaner bullion the cost could be very considerably reduced, for like everything else in this business the impurities determine the expense.

Dangerous Practice to be Avoided.

TO THE EDITOR:—On my travels, looking at copper mines and reduction works, I have examined the works of the — furnaces. Here they carried away the slag, left over in the converters, in single-truck, conical slag pots. When the slag was thought to be cooled off sufficiently it was dumped on a pile and the possible "kings" broken off. In order to expedite matters the laborers would squirt water on the slag, still hot in the pot, with the occasional explosion of some slag cones. Neither the general manager, superintendent, foreman nor gang boss would pay much attention to these explosions, accompanied with deafening, thunder-like noise. Sometimes it would happen that the ignorant laborer got burnt or even very seriously mutilated, as happened one morning while I was at the works. No one seemed to know the cause or apparently cared, these laborers being of low humanity and education, and lots more to be had in that country. The company had in its employ a very good metallurgist and assayer, too, but he either did not take time to look into the cause of this trouble or did not care to show his superiors his greater knowledge (not always safe for a long tenure position).

As a rule, it is a pretty fair sort of man that can mind his own business, so I, being a visitor, did not

*Australasian Institute Mining Engineers.

wish to parade understanding of things that ought to have been attended to by the general manager.

The obvious lesson taught is this: Copper in the liquid state absorbs large quantities of oxygen; when cooling gives it off again. The slag under these conditions is porous and the water sprinkled on converted into superheated steam. Let this get united with the escaping oxygen and the contact of sufficiently hot slag, and you will have a first-class explosion, with possible loss of life and limbs. Moral: Don't get water in contact with your hot slag, or slag pots while full of hot slag. K. E. RYPPHA.

Improvements in Wire Rope Tramways and Cable Hoists.

Among recent improvements in wire rope tramways are those in the Bleichert system, manufactured by the Trenton Iron Company of Trenton, N. J., notable being the patent locked coil track cables and the Webber patent compression grips. These are now used exclusively on all lines of this kind manufactured by them. The locked coil cables present a smooth surface for the carriage wheels to run on under all conditions. This style of cable is stated by the manufacturers to have overcome the difficulty experienced with broken wires, which result in unstranding of the wires, leaving a rugged surface, causing rapid wear of both the cable and the carriage wheels. The Webber grip dispenses with the necessity for lugs on the traction rope, the life of which is thus extended, as the wear is distributed over the entire rope, instead of being confined to certain spots.

Among the Bleichert tramways now in course of erection is noticed one 7000 feet long, of five tons hourly capacity, at Topia, Durango, Mexico, for the Miller & Sibley Mining & Milling Co. of Franklin, Pa.; one 6100 feet long, of ten tons hourly capacity, in British Columbia, for the Fairfield Exploration Syndicate of Vancouver; one 12,700 feet long, of twenty-five tons hourly capacity, for the Highland Boy Gold Mining Co. of Salt Lake City, Utah, and one 8550 feet long, of twelve tons hourly capacity, at the Camp Bird mine, Colorado, for T. F. Walsh of Ouray. The latter contains an angle station which practically divides the tramway into two independent sections. In all of these lines there is a fall in favor of the loads sufficient for gravity to operate,

and in most cases the power developed will be utilized in carrying up back freight to the mines.

A line for the Plymouth Cordage Co. at Plymouth, Mass., which is just completed, contains some novel features of interest. This line is about 1150 feet long and will be used for carrying baled hemp from the warehouse to their mill. At one point the lines make nearly a right angle bend, around which the cars pass without being detached from the traction rope or manipulated in any way, demonstrating the feasibility of passing angles without detaching. The structural work of the line at Plymouth is of steel. Near the angle station the line passes over railroad tracks spanned by a bridge. Cars of special design are used, and along the warehouse for a distance of 500 feet shunt rails extend, so that the cars can be loaded at numerous points, special apparatus being provided for releasing the traction rope while the cars are being loaded.

In the way of hoist conveyor plants, for handling heavy loads, is also noted one recently built for the United States Government at St. Paul, Minn. This makes a clear span of 1150 feet across the Mississippi river, and is used in the construction of one of a system of four locks now being built for the improvement of the river navigation under the supervision of Major F. V. Abbot. The supporting towers are mounted on trucks and may be moved as desired, and in this respect the line is similar to those used in the construction of the Chicago Drainage Canal. The distinguishing feature of the line is the absence of fall rope carriers, known as the



HEAD SUPPORTING TOWER HOIST CONVEYOR PLANT.



SUPPORTING TOWER ST. PAUL, MINN., HOIST CONVEYOR PLANT.



CABLEWAY HOIST CONVEYOR FOR U. S. GOVERNMENT ACROSS THE MISSISSIPPI AT ST. PAUL, MINN.

Laurent-Cherry system, and is fully covered by patents owned by the Trenton Iron Co. This line has been in satisfactory operation for some time. The local representative of the Trenton Iron Co. is Newton M. Bell, 109 California St., San Francisco.

The Paris Exposition of 1900.

TO THE EDITOR:—The recent Miners' Convention held in San Francisco made the first practical move toward taking action in regard to the Exposition of 1900, in the appointment of a committee on California's mineral display for the Paris Exposition. When is taken into consideration the vast amount of labor required for making such a display as California can, and should make, a year's time is none too much for preparing and getting all in place for the opening, 1st of January, 1900, and it is to be hoped that no time will be lost by the committee after the 1st of January, 1899. The question of expense and to what extent the work is to be carried should be carefully considered, for unless the State can make a creditable exhibit, it had better make none. This question will have to be settled by the Legislature, for if no appropriation, then no exhibit. The importance of a large and attractive display of all of California's products can be forcibly understood when it is known that there was at the Exposition of 1878 16,156,628 admissions. At the Exposition of 1889 at Paris California made no exhibit. The California Paris Exposition Committee of 1878, of which Almarin B. Paul was chairman, had a hard time financially, until Jno. W. Mackay came to the rescue with his check for \$5500. This enabled the committee to complete a fine collection, which was carefully classified by Prof. H. G. Hanks, also one of the committee and who was made one of the special commissioners for California to represent the State in Paris. The collection as there displayed created great interest, and it was asserted that within two years after the Exposition closed at least \$5,000,000 in French capital came to California for investment in our mines. This is just what we want to bring about now by showing the vastness of our mineral wealth, not only in gold, silver and copper, but our other mineral products. I read with pleasure your suggestions regarding this matter in the issue of the 3rd. The press of the State and every miner should give hearty co-operation to the end of having a first-class collection.

PROGRESS.

A Zinc Process for Precipitating Gold From Weak Solutions.

Recent reference herein to the practical economical cyanide methods of W. K. Betty, cyanide manager at the Crown Deep mine, Johannesburg, S. A., makes the following of additional value. It is condensed from a paper on that subject written by T. L. Carter and read at a recent meeting of the Chemical and Metallurgical Society of S. A., as reported in the society's journal:

This process is an important extension of the zinc precipitation process, and will prove of benefit to the industry. The Crown Deep slimes plant had originally six Siemens & Halske boxes; now only half of one box is used, that being sufficient for the zinc method of precipitation. The boxes are 40 feet long, 6 feet broad, 5 feet deep, divided into nine compartments. As in the Siemens-Halske process, it is necessary to have the solutions as clear as possible before passing them through the box. For this are two receiving tanks, 36 feet in diameter, 12 feet deep, with sand filter beds. From these tanks the solutions are pumped into a small wooden tank at the head of the box. A 4-inch pipe carries the solution from this small tank to the precipitating box. The rate at which the solution flows through the box is from fourteen to fifteen tons per hour. This seems large when compared with the rate of four tons per hour, used by the Siemens-Halske box.

An important point is the preparation of the zinc. After it has been cut on the lathe it is taken to a trough containing a solution of acetate of lead of about 10 per cent strength. The zinc is thoroughly washed and stirred in the solution until it becomes of a dark hue. If it is not thoroughly stirred, only the outside of the mass of zinc will become coated, the inside remaining quite bright. An empirical way to note if the solution is strong enough is to look at the zinc, and see if it is sufficiently and thoroughly coated. After thus preparing the zinc, it should be placed in the box, and covered with the auriferous solution as quickly as possible, since leaving it in the air seems to adversely affect it.

The next important point is the addition of free cyanide at the head of the box. Twenty pounds of KCN are dissolved in an iron tank, holding about 75 gallons water. This 2½% solution is allowed to run freely into the auriferous solution entering the box for four hours, raising the strength of the solution passing through from .007 per cent to .025 per cent. When the 20 lbs. of KCN are finished another 10 lbs. are dissolved as before, and freely run into the box, taking six hours, and raising the solution about .007 per cent higher. The addition of the cyanide as described must not be neglected. It is absolutely necessary at the commencement to let this free cyanide run into the box. Twelve or fourteen hours after starting a slow drip is allowed to fall into the solution as it enters the box, bringing up the strength of the solution going through the box from .007 per cent to .008 per cent, and this is dropped in through the run of the box.

The first four or five days the precipitation seems quick and almost perfect. An assay of the solutions in different compartments on different days showed that at first all the precipitation was done in the first two compartments, the lower compartments receiving little gold. After a while, however, the first compartments ceased to act so well, and the percentage of precipitation in them was greatly reduced. Gradually the top compartments did less and less, the lower compartments now doing their share in the precipitation. After ten or eleven days the zinc in the upper part of the box becomes "dead," and rises to the surface. A good plan would be to prevent the zinc from rising to the surface by means of thin screening, for when the mass floats on the surface it is continually knocked against the sides of the box and very minute particles are carried away. It might be said that the zinc in the other compartments will catch these particles, but the zinc there is not in a condition to do so. This mechanical loss is the reason why the solution at the foot of the box gives such a high assay value after the box has been running for a prolonged period. The longest time the box has been run with continued good precipitation without cleaning up was twenty-two days, for which period the assay value of the solution entering the box was 36 grs. and at the foot 3½ grs., giving a precipitation of 90.2 per cent. Note, however, the assays for the last few days—9 grs., 4½ grs., 7.7 grs., 7.2 grs. and 18 grs.—showing that after a time the box ceases to act satisfactorily.

Cleaning up the box is considerable bother when the zinc has to be dissolved. So far the gold slimes from the slimes plant have been kept separately and smelted alone, but it is intended to make the slimes plant simply a preparatory place for the zinc used in the sand boxes. When this is done the trouble from "dead" zinc will be obliterated and a precipitation of 96 or 97 per cent expected to be obtained. After a few days run the zinc from the slimes plant will be taken out and put into the weak solution boxes of the sand plant, just as these boxes

require fresh zinc. Heretofore has only been dissolved the zinc in the first two or three compartments, that in the lower part of the box being used to charge the top section of the new box. It is not advantageous to use the old zinc for the top of compartments of a newly started box for it is somewhat dead; best results have been obtained when freshly cut zinc was used throughout. The improvement will be noted when this zinc can be used in the sand plant, starting each time with new zinc throughout. In order to facilitate taking out the zinc is a block and tackle running the whole length of the box. By fastening it into two hooks at the ends of the tray carrying the zinc, the material can be easily lifted from the box; the zinc was dissolved in the usual way.

"Smelting the material gave us great trouble at first, but I trust the other assayers on the mines will not have the bother we had at first, and that these remarks on the smelting of the slimes will be of some service. On account of adding so much lead acetate, there is a large percentage of lead in the auriferous zinc slimes, naturally. An analysis for lead showed that a sample I took contained 23 per cent of this objectionable metal, besides 5 per cent of other base metals."

The first method used was to reduce the base metals with crude tartrate of potash, bringing them down in the metallic state with the gold. Borax 65 per cent and Na₂CO₃ 9 per cent made up the rest of the flux. This worked quite well, giving a splendid fusion and a clean, bright slag, practically free from gold and silver. The base metal formed a thick layer on top of the button of gold, which came off quite readily by chilling with water. Assays showed that the matte ran 3.9 per cent gold and 5.1 per cent silver. The mattes were put in the safe, and, when a large quantity had accumulated, were smelted down and purified. The gold buttons were put into a clay-lined crucible, and when in a molten condition a shovel of niter and a little sand were thrown in, then after a few minutes a handful or two of bone ash was added. The oxides were skimmed off and the same process repeated until a fineness of 834 was obtained.

A successful way to oxidize the excessive base metals is to employ a light blast of air. In the assay office is an air tap, from the compressor upon which a hose is fitted. From this source the air is obtained. Care should be taken to use a clay-lined crucible, to prevent the litharge from being reduced by the carbon of the crucible. After thorough oxidation, if a flux of borax 5, sand 1, Na₂CO₃ 2 parts is added, the bar can be poured after the flux has thoroughly fused.

In experiments in the laboratory to find out if the slimes could be somewhat purified by a wet method, the slimes were treated with HNO₃ after the treatment by sulphuric acid, and although a large percentage of the lead was thus dissolved, there still remained about 6 per cent of it. Hydrochloric acid was tried with little success, also acetic acid, which dissolved most of the lead. It might be a saving if a cheap, workable wet method could be found for refining the slimes, thereby dispensing with the rather expensive clay liners, which have to be used now if fine bullion is desired.

There seems to be a growing desire on the Rand to get the bullion as fine as possible, to eliminate everything save the gold and silver. Now the great agent for this work is oxygen, and it is a matter of importance to use the substance which gives oxygen most cheaply and efficiently. The two substances mostly used there are MnO₂ and KNO₃. The question arises, which of the two is the best oxidizing agent? It appears to Mr. Carter that nitre should be used entirely as an oxidizing agent.

The best results were obtained by the following flux, which he worked out for the product from the slimes works, using clay liners: Borax, 60 per cent; niter, 19 per cent; sand, 11.5 per cent; soda, 7 per cent. With this flux, bullion of 876 fineness was obtained.

Care should be taken in recharging the pots. There should be some of the former charge unmelted on the surface, for if more of the fluxed auriferous zinc slime is placed in the pot when the contents are molten, violent boiling will ensue, with danger of considerable loss.

Regarding the possibilities of the process, what it might do in the future, it seems it may make the zinc process more applicable to gold-bearing ores of all description than before. One drawback to the use of the cyanide process for ores rich in copper pyrites was that if it is used .2 per cent to .3 per cent of cyanide solution on such ores, the copper will decompose all the potassic cyanide, and if the gold and copper go into the boxes to be precipitated, the copper will coat the zinc and greatly interfere with the precipitation of the gold. The drawback was somewhat overcome by the Siemens-Halske process, which made use of very weak solutions and succeeded in precipitating the gold from them. In the future ability is anticipated to manage solutions as low as .005 per cent by the zinc precipitation method.

The president, in his inaugural address, said that he thought by the use of warm water the extraction from sands would be accelerated and increased. If this is made practical on a large scale, the amount

of potassic cyanide used on the fields can be greatly reduced, for the weak solutions can be effectually precipitated by the zinc method.

Care must be taken in the assaying of the solution at the top and bottom of the box. Two methods are used—evaporation in lead dishes and the silver nitrate method.

During the three months' trial: Tonnage slimes treated, 11,280; assay value, 3,157 dwts.; actual extraction, 87.49 per cent; tonnage solution used measured by water meter, 21,842 tons; assay value entering box, 36 grains; gold contents, 1645.679 ounces fine gold; gold recovered, 1557.847 ounces fine gold, equal to an extraction of 94.6 per cent of the solution treated. Working costs, 2s 9d per ton; profit, £4984 8s 11d, equal to 9s per ton treated. Cost of cyanide equal to 3½d per ton treated.

Working costs include all the zinc put into the box, and sulphuric acid used for dissolving same. "We do not anticipate that working costs will be higher than 2s for October and 1s 9d for November. I might state that so far the actual extraction has been over the theoretical.

"Thus, gentlemen, you have the results of our three months' test. The use of lead in conjunction with zinc was patented by Mr. MacArthur early in the historical year 1894. Mr. Betty makes no claim for originality for that part of his process. What he does claim, though, is that by a happy conjunction of free cyanide, lead and zinc he gets an almost perfect precipitation from solutions so weak in cyanide that it was formerly considered hopeless to attempt to make them amenable to precipitation on zinc in an ordinary zinc box."

Mill Work Results.

TO THE EDITOR:—The following results of some of the runs made at the Garnet G. M. Co.'s mill at Pony, Montana, the past season may be of interest:

July 27th to Aug. 13th—16 days 1½ hours' net running time for twenty stamps—918 tons of ore were crushed, of an assay value of \$5.76 per ton, or a total gross value of \$5287.68 for the lot.

This yielded gold bullion worth \$2473.03, per mint returns, and concentrates worth \$2115.75, as per Butte smelter returns; a total of \$4588.78, or 86.7% of the assay value of the lot. The net returns for bullion was \$2463.26, and for 77,442 lbs. dry concentrates, \$1645.93.

In 19½ days' calendar time, or 17 days' net running time, from Aug. 17th, 3 P. M., to Sept. 2nd, 11 A. M., 1027 tons of surface lead ore was crushed. The assays showed a saving of 70% of the gold and silver and 75% per cent of the lead. The lead was largely sulphate, with some carbonate, the balance galena. The gold is carried almost entirely by the iron and copper sulphides associated with the lead. These were mostly oxidized in this lot of ore, the gold also appearing to be in the particles of oxides carried over in the tailings. Finer crushing was tried, but proved unsatisfactory.

From Sept. 2nd, 3 P. M., to Sept. 22nd, 3 P. M.—17½ days' net running time—1017 tons milling ore was put through. Assay value, \$5.30 per ton, \$5390.10 for the lot. The working results were \$2659.58 worth of bullion and \$1589.64 in concentrates, a saving of 79% of assay value.

Twelve hundred and thirty-three tons were crushed from Sept. 22nd, 3 P. M., to Oct. 17th, 5 P. M., in 23 days actual running time. This lot had a total assay value of \$5462.19, or \$4.43 per ton, and gave \$2636.10 in bullion, with \$2353 in concentrates.

Thirty-mesh steel wire screen was used, the screen frame being 4'4" x 12", with a 2" vertical center strip. The screens lasted about 7 days each. With new dies a chock block was used, being replaced from time to time by shallower ones, to keep the discharge nearly uniform. This was kept as near 5" as practicable. The drop was from 6" to 9" and 80 to 85 per minute.

The gold in the ore is in exceedingly minute particles and worth \$13 per ounce, the alloy being silver. Numerous tests of ore and pulp failed to show the color, and even when quicksilver was fed with the ore no gold or amalgam was found in the mortars.

The pulp was sized before passing to the vanners. Canvas plant tests showed a vanner saving of 95% to 98% of the concentrates. The smelter returns showed from 13% to 18% silica in the concentrates.

The details of expense are not at hand. In the summer's estimate the cost at the mill was under 40 cents per ton of ore worked, the total for mining, milling, etc., being within \$2 per ton.

Igo, Cal., Dec. 12th, '98. E. L. BALLOU.

A NEWLY PATENTED contrivance is one which automatically shuffles playing cards. It has a flaring mouth at the top, in which the cards are placed to drop down on a slotted grate, the latter being shaken by a handle to drop the cards into a channel leading to the base below, where the cards fall. This contrivance should avert the loss of life incident to the difficulties which will occur in games of chance where the dealer is always an object of suspicion.

The Handling of Dynamite.

Mine Inspector Byrne of Montana, in his annual report to the Governor, presents some points as to the handling of dynamite. Among other things he says that dynamite should be stored in a cool, dry place. Nitro-glycerine is a liquid with a high boiling point, but it evaporates sensibly at temperatures a little above the normal. At a temperature of say 100° Fahr. the loss is serious in proportion to the time of exposure. In this way the powder may be much weakened. In a damp place it will absorb moisture, and if it is stored for any length of time it will be spoiled.

Probably two-thirds of the fatal accidents that have happened with dynamite have come from careless methods of thawing. Dynamite freezes at about 45° Fahr. In this condition it is stiff and hard and should not be used for blasting, as it is insensitive to the ordinary detonator. The powder is a poor conductor of heat, and for this reason it freezes and thaws slowly. The time required to thaw it thoroughly when it is once solidly frozen is much greater than most people think. Shut up in the boxes in a magazine, it will remain frozen even in summer for many weeks.

The thawing of dynamite is always attended with danger if it is done rapidly at a high temperature. The danger is in direct proportion to the temperature. No matter how urgent the haste may be, the temperature used should never exceed 100° Fahr. A dry heat should be used—that is, the powder should not be brought in direct contact with hot water or steam. Water tends to make the nitro-glycerine exude and also attacks the chemical salts in the composition. Where the object justifies the expense it is a good plan to keep the interior of the magazine at a moderate temperature, say 60°, which will prevent the powder from freezing.

Steam pipes should never be used inside of a building where powder is stored. The best method of heating is the well-known hot water system used for dwellings. In this the circulation is active and the arrangement such that the water cannot be brought to the steaming point or even be overheated. It has been found that a maximum temperature of 104° in the water gives an active circulation. The heater is located at a safe distance and the water circulates through pipes in the building and returns to the heater. The pipes outside the building are well protected and covered to prevent loss of heat, and the building should be made as impervious to heat as possible.

Double walls, floors and ceiling with a sawdust filling answer every purpose, but the building must be made absolutely tight. A crack under a door or a window will counteract the best heating system that can be made.

If steam is available, a very cheap and efficient system of heating a small building is as follows: On the outside of the building a sheet iron drum is set up and connected with another inside. Two pipes pass through the wall connecting the drums near the top and bottom. The outside drum is set a little lower than the other to provide for the overflow of the water. The holes through the walls are packed around the pipes with waste or tow. Water in the outside drum is heated by a small steam pipe and circulates through the drums. The room is kept warm by the radiation from the inside drum. If the building is tight and properly insulated the amount of steam necessary is very small. To prevent the vapor from making the room damp, the drums are closed on the top with wooden lids covered on the under side with cloth soaked in paraffine. The sheet iron drum used for the transportation of glycerine or coal oil is well suited to this work.

When dynamite is being used in winter on a large scale, as at a mine, it would pay to build a small thawing room of this kind, say 12x16. The powder needed for the day's consumption could be carried in and left for 12 hours or more—the boxes being simply opened or the powder taken out and put on shelves, depending upon the time available. A temperature of 75° or 80° maintained during the night would suffice to thaw the powder. A thermometer should always be consulted to regulate the temperature of the room, which should not exceed, say, 85°.

This particular arrangement for a thawing room is convenient, but it may be varied to suit the case. The essential feature is a tight, heat insulated room kept at a moderate and regulated temperature.

The plan of a thawing room is much better than using thawing stoves. The best of these are liable to get out of order, if not originally dangerous. The thawing room has great capacity, so that the work need not be done in a hurry, and has always this advantage over small apparatus. Any excess of temperature brings discomfort to the operator and so gives warning. A room in which a man can work without distress is reasonably safe for thawing dynamite.

In no case should any apparatus for thawing powder be used in a magazine or building where a large quantity of powder is stored. The same warning

applies to the handling of caps in the preparation of primers.

In charging a drill hole use a wooden tamping rod. If the hole is dry, cut the cartridge into short lengths and slit them along the sides, so that when driven down with the rod the powder will spread and fill the inequalities of the hole. The primer, with the cap carefully attached, should be put in last—that is, on the top of the charge. The hole is then to be filled and tamped with care. Earth or clay mixed with gravel makes one of the best tamplings. In a wet hole leave the cartridge intact for the better protection of the powder. The water which surrounds the cartridges will transmit the blow to the rock, but use tamping in every case. Some miners do not think it necessary, but it is the only way to get the best results. The powder gases tend to act in the line of least resistance. If this work is not properly done a part of the energy will be expended through the open drill hole or in blowing out a weak tamping before the gases have done their work on the rock.

There are two reasons for putting the cap at the top of the charge. If it is buried in the mass of the charge, the fuse in burning down to it may set fire to the powder by side spitting and burn up a part of it before the cap explodes. The other reason is this: The detonation is not instantaneous. It begins at

deflected the bob from its vertical position to such an extent that the bottom of two lines were 7.5 millimetres farther apart than the tops of the same lines, forming an angle of six minutes.

New Pipe Line of the San Gabriel Electric Company.

All the pipe for this great project was made in sections 15 feet in length at the Lacy Manufacturing shops in Los Angeles, Cal. The accompanying illustration gives an idea of the difficulties connected with this undertaking. The pipe is laid on a mountain slope at the mouth of the San Gabriel canyon, extending from the end of the company's tunnel to the foot of the mountain, 940 feet, with a perpendicular fall of 400 feet to the company's power house.

The pipe is 36 inches diameter, made of $\frac{1}{2}$ and 1-inch steel plate. One of the main difficulties encountered in this work was the laying of the pipe down the backbone of a ridge; as no ditch could be dug to hold pipe in position, great care had to be exercised to prevent the sections of pipe, as they were being hoisted to their position, from rolling off into the canyons on either side of the ridge.

The 15-foot sections were hoisted into position by a wire rope tramway, the remaining joints being made on the ground. The largest part of this entire



LAYING PIPE FOR THE SAN GABRIEL ELECTRIC COMPANY.

the cap and moves by a wave or impulse through the powder. The detonation proceeds in lines radiating from the cap and the greatest effect is in the direction of the greatest dimension of the powder; as a bottoming effect is usually required, the best place for the cap is at the top of the charge.

The gases given by an explosion should be colorless and invisible. The visible smoke consists of solid products formed in the reaction and of dust made by disintegration of the rock. The best gases are those of a complete detonation. To insure this strong detonators should be used, and the powder should be in good condition and the charging should be done with care. It is very essential that the cap should be in actual contact with the powder.

It should be kept in mind that the gases given by the best powder are irrespirable. Carbonic acid is the characteristic gas, the physiological properties of which are well known. Carbon monoxide is produced by some powders, and this, even in small quantities, is an active poison. The danger incurred in going into a drift where a charge has been recently fired depends chiefly upon the ventilation. If the ventilation is poor the air in the drift is already impoverished. The oxygen is deficient, and the addition of even a small amount of irrespirable gas may turn the scale and make the air dangerous to life. This effect is more marked in mines at great elevation above the sea level because, owing to the lightness of the air, the amount of oxygen in the cubic foot is smaller than normal. Inspector Byrne says that he has strongly condemned the use of wooden boxes for thawing and has succeeded in many instances in securing the adoption of a hot water thawer instead.

The desirability of using brass plumb-bobs in surveying work was recently emphasized by the magnetic deflection of an iron bob, and the consequent introduction of considerable errors in some underground surveying recently undertaken. In plumb-ing a shaft about 400 feet deep with an iron plumb-bob it was found that the magnetism of a large number of old rails stored in one of the chambers

line was laid up the slope of a rocky mountain, at an angle of forty-five degrees.

The Lacy Manufacturing Company are the largest manufacturers of riveted steel pipe in southern California. They have made a specialty of heavy pipe for electric power companies, and have made and laid many miles of steel pipe for large irrigation enterprises in California.

Recent Additions to the Museum of the California State Mining Bureau.

Steatite—Five varieties of steatite; from A. W. Pray, Escondido, Cal.

Copper Ore (Chalcopryite)—Rich ore from the Blue Ledge, Joe creek, Siskiyou Co., Cal.; from L. F. Cooper, Crescent City, Cal.

Auriferous Vein Matter—Gneiss, hornblende, schist, with free gold, porphyrite, etc., and country rock, from the Golden Cross mine, Hedges, San Diego Co., Cal.; from C. A. Hamilton.

Dolomite—Curious dolomite formation from Morro creek, San Luis Obispo Co., Cal.; from Mrs. E. B. Richardson.

Sylvanite (Telluride of Gold) on Phonolite; Tetrahedrite in Barite, carrying 200 ounces silver per ton, and Uraninite (Oxide of Uranium)—All from Ph. Rearden, M. E., Denver, Colo.

Staurolite Shale—Believed to be the first staurolite crystals found in California; from Dr. J. F. Fargo, San Antonio, San Bernardino Co., Cal.

Bromyrite (Bromide of Silver)—Very rare; from Zacatecas, Mexico.

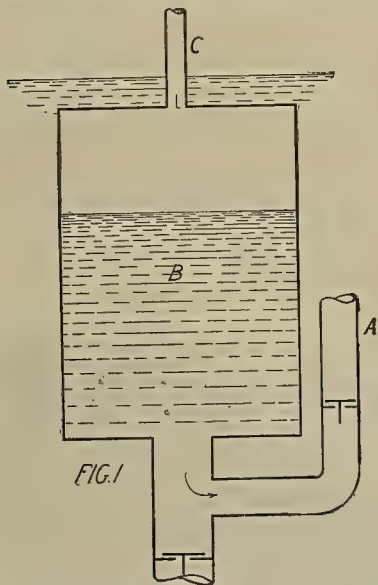
Guadalcazarite (Sulpho Selenide of Mercury and Zinc)—Very rare; from Guadalcazar, Mexico.

Gold Quartz (rich in free gold) and Nagyagite (Sulpho Telluride of Lead and Gold)—The first time this mineral has been noted in California; from Dorsleska mine, Union creek, Trinity Co., Cal.; from E. D. Lawrence. This is an interesting discovery. As other localities are reported from Coffee Creek district which are said to show telluride of gold, there may be an important telluride belt in that region.

HENRY S. DURDEN.

Pumping by Compressed Air.

The term "direct air pressure pump" is usually applied to that class of pumps in which the liquid is taken into an air-tight vessel and then driven out by the application of compressed air directly to the surface of the liquid. For instance, if the vessel *B*, Fig. 1, contains water, and air be forced in through the pipe *C*, the water will be driven out through the pipe *A*. The apparent simplicity of this operation and the absence of costly cylinders, pistons, rods,



valves, etc., has made it a popular subject with inventors. Several pumps involving this principle have been patented, a number of which have been tried practically, a few being now on the market.

To make the system self-operative, inventors have either introduced floats inside the tank *B*, or have made the tank *B* itself a float, the motion of these floats being made use of to automatically open and close a valve on the pipe *C* in such a way as to cause the tank *B* to charge and discharge itself regularly.

Difficulty also lies in the loss of power when the compressed air in *B*, after driving the water out of the vessel, is allowed to escape into the atmosphere, thus losing all the power that was required to compress the air. The percentage of this loss increases with the head against which the water is pumped,

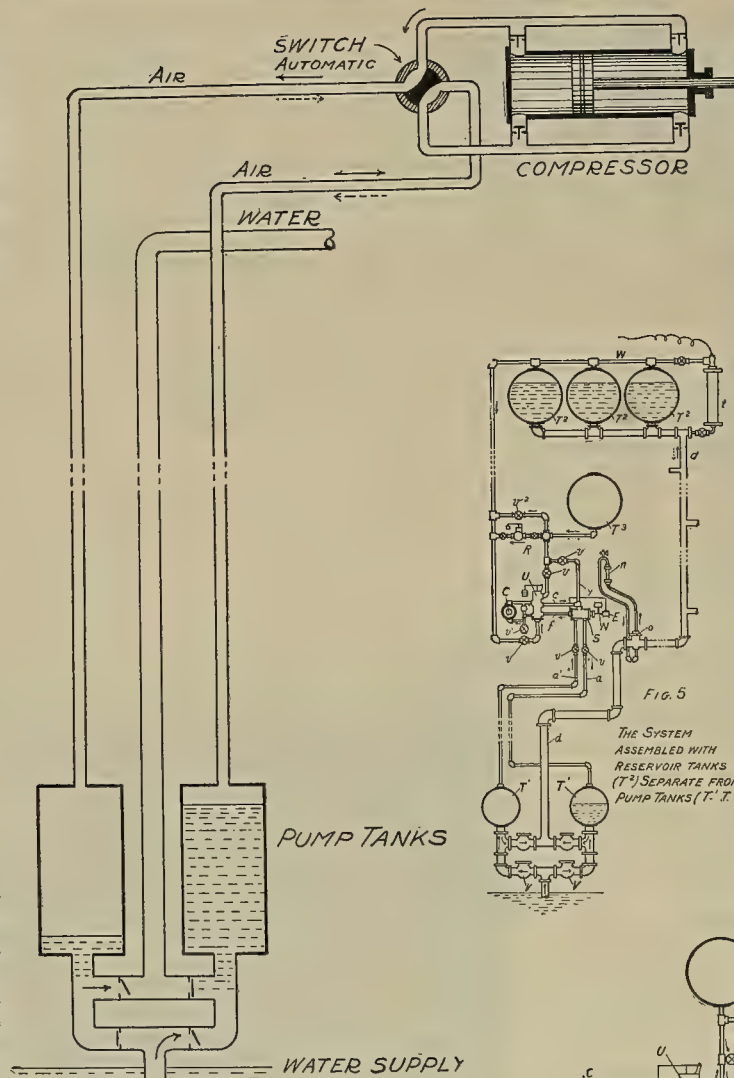


FIG. 2.—PUMP APPLIED TO A SINGLE SOURCE WITH SINGLE LIFT.

and approximates 50 per cent when pumping to a height of 100 feet.

In a new system adopted by the Pneumatic Engi-

neering Co., 100 Broadway, New York City, these difficulties are overcome, for in it there are no floats and no air valves outside the engine room, and the air is not allowed to escape, being re-used again and again.

Fig. 2 shows how these conditions are attained. Assuming the compressor to be in operation with switch set as in the figure, the air will be drawn out of the right hand tank and forced into the left hand tank; and in so doing will draw water into the former and force it out of the latter, the charge of air in the system being so adjusted that when one is emptied the other is just filled, when at that moment the switch reverses the pipe conditions so that action in the tanks will be reversed.

The switch is placed on the air pipes near the compressor, where the engineer can see its operation and adjust it as needed. It can be automatically operated any one of three ways: First, by means of the suction, which occurs in the intake pipe to the compressor when water is drawn above its outside level in one of the tanks; second, by a mechanism that will throw the switch at some assigned number of strokes of the compressor; third, by an electrically controlled mechanism, the circuit being made and broken by a

PUMP APPLIED TO WELLS IN GROUPS.

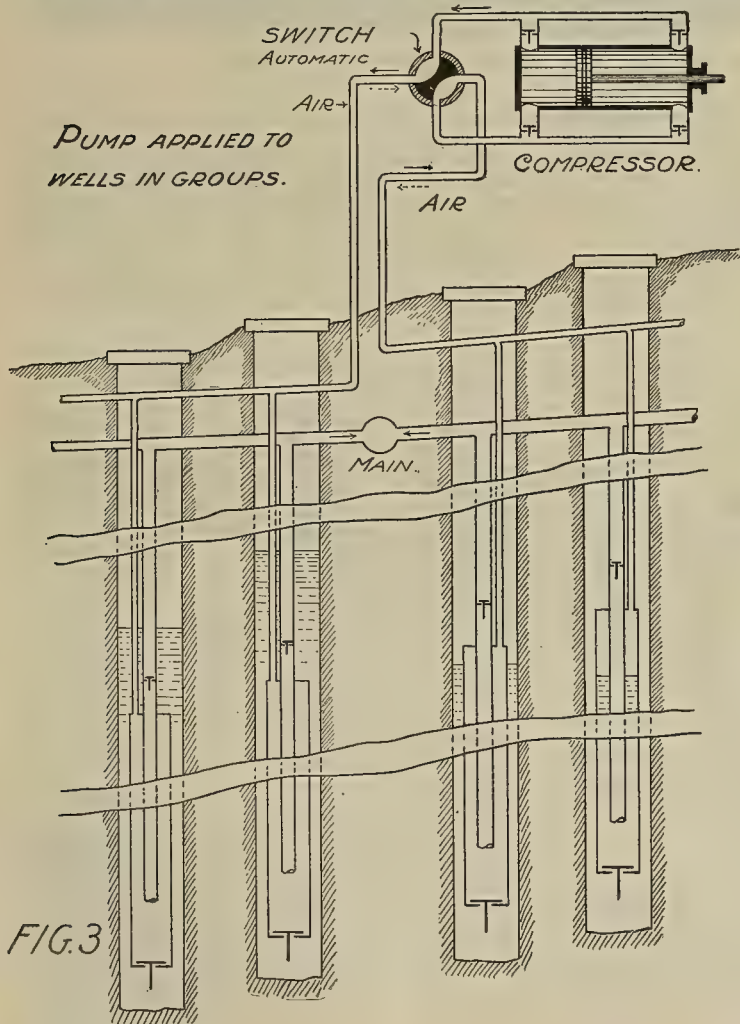


FIG. 3

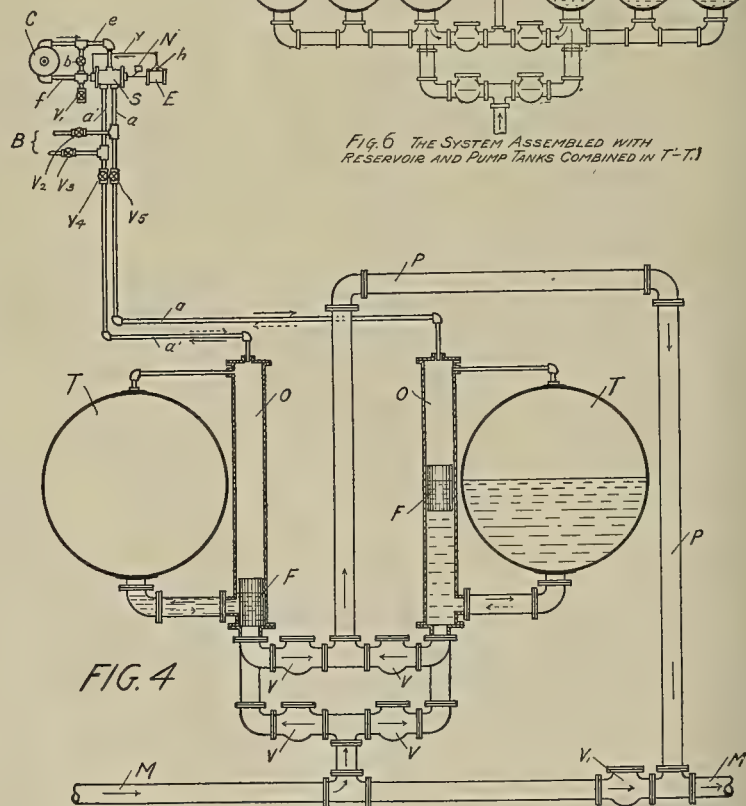


FIG. 4

THE COMPOUND DIRECT-AIR-PRESSURE PUMP

(ADAPTED TO FIRE PROTECTION)

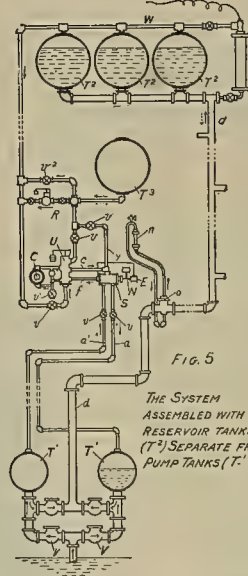


FIG. 5

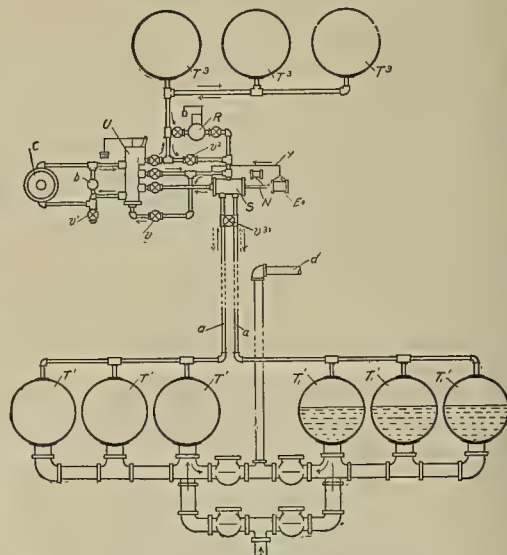


FIG. 6 THE SYSTEM ASSEMBLED WITH RESERVOIR AND PUMP TANKS COMBINED IN T-T

pressure gauge on the intake to the compressor, or, if desired, by a float in one of the tanks.

The system's best advantages appear when the water is distant from the source of power, as in mines and wells, or where a power plant already installed desires to get water from some distant point or points. One compressor can pump from any number of places at the same time, and each point made to deliver according to its capacity, as is illustrated in Fig. 3. In the manner there shown all the wells in a village could be operated by a single compressor.

There can also be provided instantaneous high pressure service for fire protection by placing wherever desired two tanks, one containing air at high pressure, the other water. By opening a valve on a pipe connecting the tanks, the pressure of the confined air will be available throughout the water system. The proportion of tanks, arrangement of valves, etc., are details to be worked out for each plant. One such arrangement is shown in Fig. 4. In such cases the fire service tanks can be used as pump tanks, taking their water from low pressure mains and delivering it forward at a higher pressure. However, if these tanks are made large, the compressor need not be started except in case of prolonged fire.

Where elevated reservoirs, tanks or standpipes are not possible, or are not desired, the whole reservoir system can be placed underground, or in a basement, the pressure being supplied by tanks of compressed air in connection with tanks of water. An application for a patent is on file for such a system provided with automatic pressure-controlling devices and giving high pressure fire service when desired.

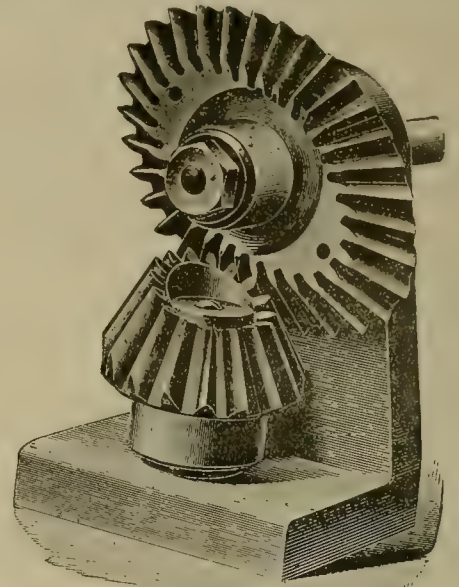
000,000 pounds. While the trade has steadily expanded, the prices have as steadily declined, despite the tariff.

British Mineral Production in 1897.

Official British statistics for 1897 just published show that the total value at the mines and works of the forty-three different minerals which the country has produced, was £72,043,801, as against £69,088,366 in 1896. The output of coal was 202,129,931 tons, the highest hitherto recorded. The *American Manufacturer* points out that the year 1897 is memorable from the fact that for the first time the output of coal in the Kingdom has gone beyond 200,000,000 tons; it exceeded that of the previous year by 6,768,671 tons. The quantity exported was no less than 37,000,000 tons, and is likewise the highest amount on record; the exports approach our entire output fifty years ago, and considerably exceed the output of any other country in the world except Germany and the United States. Bauxite shows a marked increase, while alum clay has dwindled to very insignificant proportions. Gold ore has increased in 1897, but shows a great falling off compared with 1894 and 1895. Lead ore and iron pyrites, after a heavy drop in the years just mentioned, seemed to have reached a settled production for the time being. Mica appears as a new comer with a total of 4983 tons in 1897. Manganese ore continues on the downward grade, the decrease in 1897 being nearly 50 per cent compared with 1896. Soapstone, after a blank for two years, was responsible for twenty-eight tons in 1897. Oil shale is lower. Petroleum stands unchanged. Phosphate of lime shows up a little bet-

"A New Mechanical Motion."

Natural incredulity results when "a new mechanical motion" is introduced to notice. As *Machinery* expresses it, there has been so much ingenuity expended on the transmission of power, that every possible method seems to have been discovered years ago. Sometimes one has to go back many years to find the original, but it is very seldom that the search is not successful. It is, therefore, with considerable misgiving that we call the device illustrated by the annexed engraving "a new mechanical motion."



VARIABLE SPEED BEVEL GEAR.

However, it certainly is new to many. As will be seen, it is a variable speed bevel gear, an elliptical bevel wheel driving a conical wheel, or vice versa. The salient feature, which renders the arrangement possible, is the shape of the pinion. It will be seen that on one side the teeth are carried further towards the intersecting point of the two cones, and that these extended teeth gear with the teeth on the short radius of the elliptical wheel. On the other hand, the short teeth on the pinion gear with the teeth on the long radius of the elliptical wheel. Intermediate between the long and the short teeth are others of graduated length to gear with corresponding teeth on the large wheel. The result of the arrangement is that while the small wheel makes two complete revolutions for each revolution of the large shaft, one of the wheels must run at a variable speed, the two extreme speeds being proportional to the longest and shortest radius of the elliptical wheel. The intention of the inventor is to apply the device to equalize the effort on the pedal over a considerable arc. The crank is applied to the axis of the large wheel; when the crank is descending, and the rider is able to exercise his full power, the large radius of the elliptical wheel is in action. When the crank gets on to the center the small radius revolves more quickly when near the center, and more slowly when in the best position for the rider to drive it. Hence, it is argued, the driver can use his muscles for a greater proportion of the period occupied by one rotation of the crank than if he had uniform gear.

Temperature of Battery Water.

With a free-milling gold ore (quartz), what degree of temperature of battery water effects the best amalgamation?

Spokane, Wash.

Between 60° and 70° F. has by some been considered the most satisfactory temperature, though other millmen claim that a temperature of even 80° F. insures the best results. The best thing on that subject that has recently appeared is a practical article on the "Temperature of Battery Water," on page 505, of the issue of Nov. 19, '98.

THE air brake was invented by Westinghouse, 1874; the torpedo by Bushnell, 1777; watch, by Peter Hele, 1477; thermometer, by Drebel, 1609; telescope, by Lippersheim, 1608; printing, by Gansfleisch, 1438; cotton gin, by Eli Whitney, 1793; microscope, by Jansen, 1590; lithography, by Senefelder, 1798; lightning rods, by Franklin, 1752; gunpowder, by Schwarz, 1320; balloon, by Montgolfier, 1783; barometer, by Torricelli, 1643.

A LARGE Pennsylvania tube company has spent \$100,000 in installing machinery for the operation of its entire plant by electricity. This is said to be the first large iron mill in this country to adopt electricity for power. A thousand H. P. will be distributed to about twenty-five motors of 40 H. P. each. The estimated saving in fuel will be 25 per cent.

PROPORTIONS FOR A COMPOUND DIRECT-AIR-PRESSURE PUMP.

REQUIREMENTS
LIFT 1000 GALS. PER MINUTE (~2.23 CU. FT. PER SEC.) THROUGH 500 FEET VERTICAL
LENGTH OF BOTH AIR PIPES AND OF WATER PIPE EACH BEING 600 FEET

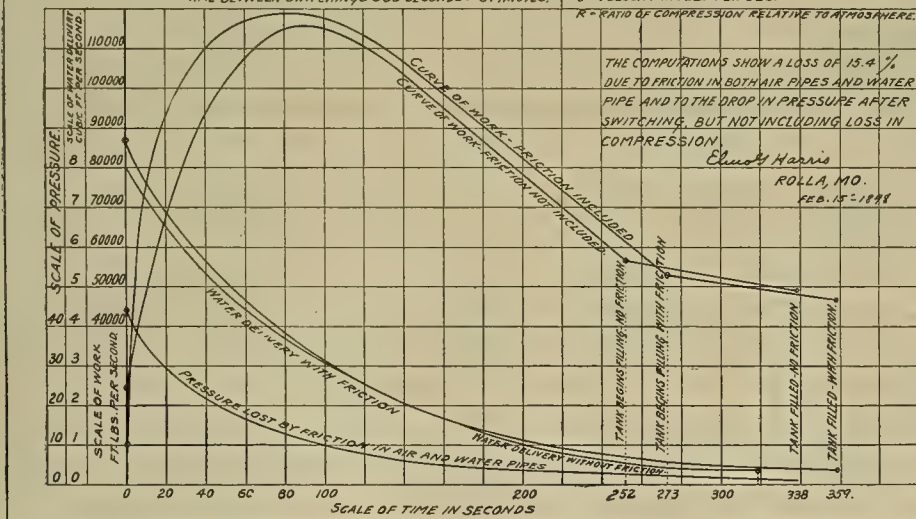
PROPORTIONS

COMPRESSOR DISPLACEMENT, 9.5 CU. FT. PER SEC.
AIR PIPES 5 INCHES DIAMETER.
PUMP TANKS 816 CU. FT.
WATER PIPE 12" (MAY BE REDUCED TO 10" WITH BUT LITTLE LOSS).
TIME BETWEEN SWITCHINGS 360 SECONDS = 6 MINUTES.

FORMULA USED TO GET PRESSURE LOST IN FRICTION IN AIR PIPES.

$\beta = .000002 \frac{1}{2} V^2 R$
 β = PRESSURE LOST IN POUNDS PER 39 INCH
 l = LENGTH OF AIR PIPE IN FEET.
 d = DIAMETER OF AIR PIPE IN INCHES
 V = VELOCITY IN FEET PER SEC.

R = RATIO OF COMPRESSION RELATIVE TO ATMOSPHERE.



The store of compressed air will keep up pressure in the system while the compressor is idle at night or otherwise.

The general arrangement of such a system is shown in Fig. 5 and in Fig. 6.

Where it is necessary to pump sewage or corrosive liquids the absence of delicate and nicely fitting parts in contact with the liquid, and also the absence of need of frequent inspection, is believed by the manufacturers to render this system peculiarly suitable. The pumping engine is in this system replaced by two plain strong tanks with no movable parts except the inlet and outlet water valves. These tanks need no attention and may be set above water or submerged as desired.

The system as designed uses to the greatest possible degree the energy stored in compressed air, when the work of expulsion of water from one tank is done the compressed air remaining in that tank being transferred by the compressor to the other tank without loss of expansive energy.

In mine pumps no delicate or costly machinery goes under ground, effecting saving in first cost and in attendance and repairs.

Plate No. 7 presents a graphical study of an assumed proposition in which the loss is 15.4 per cent from all sources.

This is a matter of general interest to engineers, mine owners, superintendents and others handling large quantities of water where the power is distant from the supply.

WIRE NAILS have only been in common use for sixteen years, but in that time they have conquered the foreign as well as the domestic market. The output for 1897, as appears by the Treasury statistics just printed, reached the enormous total of nearly 900,

ter than in 1894 and 1895, but the total is only estimated, and even then pales before the figures in the special table of imports. The Falls of Foyers is still the only place where aluminum is produced. No plumbago, antimony ore, potassium, or quicksilver was produced last year. The imports of the latter article were 4,105,053 pounds, against 3,536,928 pounds in 1896. Sodium is now only produced at Oldbury, the amount for 1897 being about eighty-five tons, valued at £12,750. Strontium sulphate has declined somewhat, but still the total far exceeds that of the six preceding years. The output of iron ore increased from 13,700,764 tons in 1896 to 13,787,878 tons in 1897, the product of the latter year being valued at £3,217,795. The value of the coal output was £59,740,009, or about 80 per cent of the total, iron ore being second, and representing but 5 per cent of the value of the total mineral production. Bauxite was produced in Ireland to the amount of 7249 tons, valued at the pits at £1918, and yielding a total of 310 tons of aluminum metal. As the home production of manganese ore was small in 1897, only 599 tons, nearly all the ore used in Great Britain has to be imported. The imports last year amounted 159,982 tons, or about 3000 tons more than in 1896. Fully one-third was imported from Russia, the other third from Turkey and Chili, and the balance from other countries, leading among which were British India, Brazil, Spain and Greece.

THE electrical building of the Paris Exposition of 1900 will contain machinery for lighting the entire grounds, which requires engines of over 12,000 H. P. This will require an immense amount of water for the generation of steam, and it has been decided to utilize this water in a great electrical fountain 100 feet high before delivering it to the boilers.

Records of Mine Work.

Inquiry as to convenient forms for record blanks for mine work shows the growing realization of the value of such records. Herewith are presented a few that have been found to satisfactorily fill daily requirements. It is manifest that no form that could be published would fill all individual requirements. It is believed, however, that any one desirous of keeping a record of such things will find in any or all of these a few general points that permit of adoption in his individual case. The utility and value of such

records are not here made the subject of any argument. Many will consider the whole idea "too much bother and expense," or "not worth the trouble." A still greater number think differently, and they rank among the most successful miners—"success" in this case meaning resultant profit from the mining work.

The blanks printed are copies of those in use, and while they are manifestly from a comparatively large concern, they contain little practical details that might with advantage be observed by many smaller mining enterprises.

Blank No. 1 is designed as a record of progress and costs in mine or mill work in either shaft or tunnel. Each line filled out under the several headings would be the summary of one week's work. In this case the actual figures on the blank obtained for reproduction are given for the first week of the record.

Blank No. 2 is self-explanatory, being the weekly report and expense account of the foreman.

No. 3 is the shift report of a crew in charge of machine drills in drifting.

Nos. 4 and 5 are also of convenient form.

NO. 1.

| 189... | For Week Ending | Particulars and Dimensions. | Distance for Week, Feet. | Total Distance, Feet. | No. of Cubic Feet. | No. Cars of Ore. | No. Cars of Waste. | Total No. Cars of Ore and Waste. | No. Skips or Buckets of Water. | Approximate No. Tons of Ore. | Approximate No. Tons of Waste. | Total No. Tons of Ore and Waste. | Mining Cost per Cubic Foot, Cts. | Mining Cost per Tonal Foot, Cts. | Mining Cost per Ton of Ore, Cts. | Mining Cost per Ton of Waste, Cts. | Miners' Wages. | Carman's Wages. | Timberman's Wages. | Proportion of Shift Boss Wages. | Total Cost Mining Wages. | Total Cost Supplies. | No. of Tons Milled. | Milling Cost per Ton. | Value per Ton Milled. | REMARKS. | |
|---------|-----------------|-----------------------------|--------------------------|-----------------------|--------------------|------------------|--------------------|----------------------------------|--------------------------------|------------------------------|--------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------|----------------|-----------------|--------------------|---------------------------------|--------------------------|----------------------|---------------------|-----------------------|-----------------------|----------|--|
| Nov. 6. | Shaft | 15x6 | 16 | 354 | 1440 | | 176 | 176 | | | 158 | 158 | 12.77 | 1150.00 | | 104.50 | | 116.40 | 169.25 | | 15.00 | 184.25 | 17.40 | | | | |

NO. 2.

WEEKLY REPORT.

|Mine, 4th and 5th Level. | | | | | | |
|---|------------|--------------------|-----------------|-------------------------------|--|--|
| Week ending.....189... | | | | | | |
| | Dimension. | Distance per Week. | Total Distance. | No. of Men Employed and Time. | | REMARKS. |
| | | | | | | |
| Drifting..... | | | | | | Shift boss expense, \$15. Lagging, 30 Wedges, 30. Rails, 28 feet. Caps, 1 box. Fuse, 600 feet. 8x8 68 lineal feet. 6x8 48 lineal feet. 4x8 32 lineal feet. Cars run down tramway, 130: 1800 lbs. per car. |
| Crosscutting..... | | | | | | |
| Sinking..... | | | | | | |
| Shaft 6x15 feet. | 11 feet. | 439 feet. | 0 | 68-9 days | | |
| Stopping..... | | | | | | |
| Raising..... | | | | | | |
| Breasting..... | | | | | | |
| 180 cars hoisted from mine. | | | | | | |
| 73 lbs powder..\$ 8.76 | | | | | | |
| 30 lagging..... 1.95 | | | | | | |
| 30 wedges..... .30 | | | | | | |
| 38 feet rails..... 2.80 | | | | | | |
| 1 box caps..... .55 | | | | | | |
| Carmen..... 600 feet fuse.. 3.30 | | | | | | |
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Mining Summary.

ARIZONA.

Shirley & Treadwell are developing the Oliff properties in the Black Hills. J. McGregor made a shipment of ore from the Yellow Ned mine last week which returned nine ounces gold and 146 ounces silver to the ton.

The Septazuma M. Co., near Geronimo, is installing a big smelting plant. Fourteen carloads of machinery arrived recently. At Prescott, Thompson & Rowe had sixteen tons of ore run through the Silver Flake mill with satisfactory results. J. Chambers had a lot run through the same mill yielding \$40 per ton gold. High grade gold ore is reported to have been discovered on the black point at Cerbat. Qualey Bros. continue shipping ore from their claims in the Lone Star district near Graham. Another discovery of high-grade ore is reported in the Commonwealth mine at Pearce. The Hardy mine, in the Whetstone mountains, made a shipment of 1000 sacks of high-grade copper ore. The ledge cut by the tunnel at 150 feet is 17 feet thick, yielding copper ore which averages 17 per cent in metal the entire width.

The Stockton Hill mines, near Kingman, are again being opened up. The old Crook mine in Yavapai county is to have a stamp mill. Lyons' new stamp mill on the Hasayampa is about completed. Near White Hills, C. Latin and partners have struck placer ground, which they are working with dry washers. The Azurite, Pima county, is working twenty-five men. It will be ready to blow in the furnace as soon as coke arrives. The shaft in the Mammoth mine is being sunk an additional 100 feet; this will make it 700 feet deep. At 600 feet the vein is 40 feet wide. The United Globe smelter is temporarily shut down for want of coke. The Tennessee fifty-ton concentrator is expected soon to turn out a carload of concentrates daily. The Old Dominion Copper Co. is accumulating a large quantity of copper at the smelter. There will probably be 2,000,000 pounds for shipment when the railroad switch is completed.

The Ajo copper mines in Yuma county have passed to Eastern capitalists, who are doing extensive development work. C. F. Hine is operating the Live Dog mine in Yuma county and is said to be taking out good ore.

It is locally reported that the Saginaw mines and works, near Tucson, will start up again soon. Development in the Santa Maria mine at Arivaca is showing high-grade mineral. The Nelson copper smelter of Silver Belt is outputting three tons of matte a day. The Mammoth G. Co. has 100 men employed in the mines and at the mill. The Azurite is working twenty-five men and will blow in shortly.

Yuma Sun: Stein & Broderick, who own the wolframite properties at Russellville, are employing sixty-five men. M. Canna, who also owns some properties in the district, has twenty men at work. A quantity of ore has already been shipped. Work has resumed, with thirty men, on the Ray copper mines, Mineral Creek district, Gila county, a bond on which was secured some time ago by an English company, the provisions of the bond being the payment of \$100,000 at the end of the first year and a like amount in two years. The Klondyke mine in Casa Grande district, Pinal county, owned by J. Bauerlan, carries gold, copper and silver. There is a large body of ore which yields \$30 per ton, and with a reduction plant, could be profitably worked. After eighteen months of working in the Wizard mine, in Big Bug district, Yavapai county, was found a pay streak 2 feet wide, carrying \$40 in gold per ton. The Chicago M. & M. Co. is working the gravel deposits of Walnut Grove district, Yavapai county, by the steam shovel process, and is meeting with success. The World's Fair mine, in the Harshaw mountains, recently shipped a car of ore which went 1800 ounces in silver to the ton.

Globe Times: At the Ray copper mines near Globe the new operators have cleaned out and timbered the 100-foot shaft of the Poorman claim and sunk it 50 feet deeper. In the Ray claim the shafts have been cleaned out and retimbered. Work will be continued on both claims, by contract. The Mammoth gold mine near Tucson is being sunk 100 feet deeper. From the 200 level the ore body has been large but low grade. At the 400-foot level the ore measured 60 feet. The average width has been 40 feet. When the projected 100 feet deeper is finished the shaft will be 700 feet. The water for the engines at the mine is brought up in the returning ore buckets. The mill is handling 150 tons per day over their two and three-fourths miles of bucket line. The cyanide plant at the mill has been in operation for six months on the estimated dump of 150,000 tons. The Mohawk Co. is operating on an extension of the Mammoth mine with a 30-stamp mill located on the mine and furnished water through a pipe line. The Washington Camp country has shipped ores from Crittenden for twenty years. The ores are a sulphide copper of a high grade, carrying silver, a little gold and a large percentage of zinc. Bartlett & Crowe have run concentrators on the Holland and other ores for two years, shipping the product to the smelting works. The Oro G. M. Co. of Oro Blanco district, close to the Sonora line, is sinking and continues to look well. A mill is contemplated.

Tombstone Epitaph: The Loudon and Galen mines in the Whetstone mountains are shipping 1000 sacks of high-grade copper ore. The ledge cut by the tunnel at 150 feet has been passed, being 17 feet thick, yielding copper ore which averages 17 per cent.

Phoenix Republican: The Zonia M. Co. is operating near Kirkland. They have bought and bonded twenty claims and are grading for a smelter and hoist. The Plomosa No. 1 and No. 2, near Yarnell, have a shaft down 100 feet and 150 feet of drift on a ledge 5 feet

wide that is said to average \$10 per ton in gold.

CALIFORNIA.

Amador.

Jackson Dispatch: At the Lincoln mine, Sutter Creek, the shaft is down 500 feet and work is progressing; ore is being taken out at the 100-foot station. At the Mahoney shaft Supt. Ross is sinking 100 feet from the 1000-foot level and at the same time taking out ore enough to keep the 40-stamp mill running night and day. The Wildman shaft is being repaired, in consequence of which only twenty stamps are dropping. The Emerson shaft is down 350 feet and is still in greenstone. This shaft will strike the Wildman vein at a depth of 3000 feet perpendicularly, and through it most of the work will be done when it reaches the intended depth. At the Potazuba they are hauling ore to the Bailoi mill and will crush about 175 tons. The Potazuba is owned mostly by local people. At the Bailoi twenty stamps are dropping on rock from the 200-foot level which is paying well.

Jackson Republican: The Bay State mill near Plymouth is running about ten stamps. The miners are stopping and will continue so for some time. The Keystone mine at Amador City is being worked with a full force. The mill is running all the stamps. The Monarch mine near Nashville is doing extensive development work. At the South Spring Hill, Amador City, five stamps are used to crush rock from the Median mine. The cleaning up of the Empire dump is in progress day and night.

Jackson Ledger: D. Fisher, who prospected the Spagnoli mine near Clinton, which he and his associates recently bought, has concluded that the property is of sufficient value to justify extensive operations. They will sink a shaft and construct a mill. The Picochontas mill at Drytown will be ready to run as soon as water comes. At the Centennial mine at Drytown the water is being kept out of the shaft. The vertical shaft at the Kennedy mine is well under way. The collar is in the neighborhood of 50 feet lower than those of the other shafts. The shaft is to include three compartments, each of which is 4.2x5 in the clear, making an excavation 16.8x 7.3. The plant to be installed will handle all the work for a year or more, during which time the management of the property will reach a decision as to which manner of power to provide for in their permanent works. The ledge which the Kennedy people are intending to open up by this shaft is one they are now mining in their old shafts and which, if it retains its present course, will be in the new shaft at about 3100 feet depth.

Calaveras.

San Andreas Citizen: Work on the Howard mine, near Milton, is progressing. A contract has been let to sink 250 feet. At the Lost Log mine there are ten men employed. The shaft has been sunk 150 feet, where the vein shows well. Since June last the Somersville Bros., operating the Somersville river bed gravel mine, near Vallecito, have realized \$6000 and have had from eight to ten men employed. Work has been suspended for the winter. At Angels the Utica and the Stickles mills are in operation and the sixty stamps of each mill are dropping day and night. The Lighter mill is running twenty stamps. Fully 1000 men are employed at the several mines at Angels, the Utica alone working 400. At the Big Bonanza mine Supt. Blackhart is pushing development work. At the Fox mine an electric motor and steam hoist will be installed.

El Dorado.

The Boulder M. Co. have forty men enlarging their ditch. J. H. Skinner, on Quartz Hill, struck high-grade quartz recently at a depth of 110 feet.

Placerville Nugget: The 10 stamp mill at the gravel mine at Grizzly Flat shut down on account of the freeze. The Eagle King mine is running night and day.

Placerville Democrat: Titcomb Bros. & Selby of San Francisco began operations on the Harville hydraulic mine near Diamond this week. F. Thomas & Co. will build a 5-stamp mill on their quartz mine near Gold Hill. At Kelsey, after having been closed down for several years, the 20-stamp mill at the Gopher-Boulder, including the electric plant, was started up last week. The new mill of the Griffith Con. mine, near Diamond, together with the electric appliances, concentrators, ore crushers, etc., were started up last week and are working successfully. The head of water is 1012 feet, delivered to a Pelton wheel, which runs at a speed of 450 revolutions a minute and is directly connected with a 250 K. W. Westinghouse generator, giving 333 H. P. The line of transmission is four and one-half miles, the electric pressure being raised to 10,000 volts. It operates an alternating current hoist motor capable of raising 5000 pounds 600 feet a minute. Croft & O'Brien have tapped the ledge in their Independence mine, near Slate mountain, at a depth of 130 feet; it is of good grade. Supt. Moore has men to work on the Lucky Marion mine near Greenwood.

Kern.

Near Tehachapi the Big Horn Co. is putting in a 2-stamp mill to be run by water power; it will do its own work in addition to custom milling. There are about twenty-five men in the camp. The Matthews quartz mill is being built in Mojave. It will have a capacity of twenty-five tons per day. G. Otterman has one claim at Bearville from which he has taken considerable ore, which is reduced with an arrastra. H. Vincent Wallace of Bakersfield, will erect a 2-stamp mill at Bearville.

Los Angeles Mining Review: At Randsburg the Yellow Aster Co.'s engine and pump at the wells were started last week and in a few hours the pipe was discharging a heavy flow of water at the mill site on Rand mountain, six miles distant. It is expected that before Jan. 15th the mill will begin operation

and thirty stamps be dropping on Rand ore. The company now employs 140 men. The output of the mines for December will be fifty tons per day and the product will probably equal that of November, which was about \$70,000. The Little Butte the past week added \$2000 to its treasury. Meade Bros., Stamm & Bacon have bought the Cuddeback tailings dump, approximating 5000 tons, and will soon begin the erection of a 30-ton cyanide plant. The tailings are said to be fairly rich.

The Eureka mill people have been successful with their cyanide plant and in a short time will do custom work with it. Cyanide treatment seems to work successfully with most of the ores of this camp. Reports of good strikes last week come from the Standard mines, near the Little Butte, and the Chase-Crenshaw claim, south of the Rand. Benson Bros., on one of their claims near Val Verde, opened a body of good shipping ore.

From the Ruby and Alpha claims near Johannesburg good ore is being extracted. The dry concentrator at the Hard Cash mine was started last week and is working satisfactorily.

Randsburg Miner: The Red Dog mill made a crushing of ten tons of ore from the Kustron mine. The same mill ran sixty tons of ore from the Butte and cleaned up over \$100 a ton. In the Windy mine near Johannesburg a new strike was made that will go \$400 a ton.

Mariposa.

The Mt. Gaines mine will be the first in Mariposa county to use electricity as a power to crush quartz. The Gazette notes that the Merced river is in a natural position to furnish power for the mines on each side of it.

Mono.

A strike of gold ore has been made in Antelope valley by J. E. Carter, and he has done sufficient work to show that it is a promising property. A. B. Lemmon of Santa Rosa is interested. They have eleven men at work.

The frame for the new mill building is up at the Standard Con. mine at Bodie. The battery frame will be completed by Jan. 1, '99. An addition of one wire to the pole line has been finished for four miles. At tailings plant No. 1, 361 tons of tailings were treated during the week. The November product of the tailings was \$5400.

Nevada.

Near Nevada City the water from the Spanish mine will be used for power at the Champion mine, and a pipe line is being laid to convey it from the former to the latter mine, a distance of several miles.

Progress is being made at the Gaston Ridge mine near Graniteville, and the new air compressor started this week. The mill is running steadily on good ore.

Grass Valley Union: Williamson & Co. are doing considerable development work at the Giant King mine, near Washington.

Telegraph: The completion of the new plant at the Empire mine at Grass Valley is to be celebrated Dec. 28. The Empire is the oldest working mine in the State.

Nevada City Transcript: Arrangements will probably be completed soon for resuming development on the Columbus drift mine near Nevada City. Work was discontinued on the property upon the death recently of C. Waterhouse.

Placer.

A force at Shady Run is building a large reservoir for the quartz mill company.

Riverside.

At the Gavilan mine this week a gold nugget worth several hundred dollars is reported to have been found on the 500-foot level.

The Gavilan mine near Perris is down 300 feet and lately a good vein on the lowest level has been uncovered. This ore is having a separate milling. The vein is 18 inches wide. There are thirty men employed. After Jan. 1st the mine will be sunk deeper. The Santa Rosa mine, which has been idle for nearly two years, will, it is said, resume operations. The cyanide plant on the Santa Rosa tailings is giving returns of \$2000 a month. The Good Hope mine is being run by leasers. Some of them are doing well. George & Johnson, two leasers, made a run of sixteen tons of ore which netted \$24 a ton. Cheatham & Tipton, controllers of the Good Hope cyanide plant, are producing good results. I. N. Boicourt has a claim near the Good Hope which he will soon cyanide on a large scale. J. B. Dennis has started his mill on ore from one of his properties near the Santa Rosa mine. The Pilot mine near Cotton is crushing rock worth \$50 a ton. The Chuckawalla Co. will put in a milling plant.

Sacramento.

The Mississippi Bar mine near Folsom will be operated by W. P. Bonbright & Co. of Colorado, who have secured title to the property, and the contract for the construction of the dredger has been let to the Risdon Iron Works. The machinery will be ready to be placed as soon as the carpenters finish their work. Fifteen men will be employed on the dredger.

San Bernardino.

Near Vanderbilt the St. George mine, which had been long abandoned, has developed under its new management into a producing mine. The Bronze is also producing, and some late discoveries have been made on the Hong Kong group which prove it to be a meritorious property.

Shasta.

Redding Free Press: Twenty-five thousand pounds of sulphurets from the National mine were shipped from Redding last week to the smelter. McKinnon & Henderson sold to A. R. Parsons of San Francisco and associates the Bacchus quartz mine in Dog Creek mining district for \$2000.

Shasta Courier: The Penrose claims near Shasta have been sold to J. H. Roberts and others. It is understood that Capt. Roberts will do extensive development on the White Oak. J. Herron of Redding, will soon begin

working his mine near Shasta, and will crush the ore with an arrastra.

Sierra.

The Los Angeles company that have a bond on the Kenton mine near Alleghany struck the ledge recently. It is reported that the ledge is 8 feet wide and of good grade. This company has been running for the ledge all summer and have expended nearly \$25,000.

Grass Valley Union: Another good strike is reported made in the York mine at Downville recently. The property has been yielding well the past year. A mill was recently erected, which is running steadily. Last week a new strike was made in the Mountain mine at Sierra City which is said to be a good grade of ore.

The Dewey Gravel M. Co., composed mostly of Grass Valley people will prospect an extensive property near Forrest. Work will begin immediately.

F. B. Hill, Supt. Oriental mine near Alleghany, expects to have the mine clear of water by Jan. 1st. The shaft is 280 feet deep; when the mine is unwatered, sinking will begin.

Siskiyou.

Yreka Journal: McCaw & Co. are building a quartz mill at Patterson creek. They bought the mine from Fry & Macaulay for \$35,000. The ledge is about 30 feet in width and mills from \$80 to \$100 per ton. The new quartz mill at the Schroeder mine on Deadwood will be ready to start up soon on ore taken out the past two years. W. N. Dale has bonded his mine near Yreka to people who will begin extensive operations next spring. Milliken & Barry of Fort Jones bought the old Jesse Franklin quartz mine, on Rattlesnake creek, in which they find good prospects. Ironsides & Wadsworth are prospecting the Gaffney mine, near Fort Jones. The Greenhorn blue gravel mine is yielding good returns, notwithstanding the scarcity of water. The company consumes 110 cords of wood a month for raising the bedrock water used in sluicing.

Trinity.

The Weaverville Journal says that a San Francisco company has bought the Paulsen gravel properties on Trinity river. The papers are being passed upon by the attorneys of the San Francisco company, and as soon as approved the sale will be closed and the company take possession. A representative of the company will arrive shortly to ascertain the amount of pipe, lumber, labor, etc., required to thoroughly equip the same. The properties are between Lowden Ranch and Douglas City and contain about 1400 acres.

Tuolumne.

At the Santa Ysabel mine, at Quartz, the ore body lately struck at the 400-foot level was from 6 to 8 feet thick when first entered and it is growing thicker as drifting proceeds. The shaft is down 550 feet and an entrance made at the 500 level.

Sonora Democrat: In the Mt. Jefferson mine near Groveland twenty men are employed. The shaft is down 200 feet. The vein returns from \$8 to \$10 per ton. The 10-stamp mill is soon to be supplanted by a new plant. The new hoist and pump are working satisfactorily. The Mt. Jefferson has been idle for many years. The vein averages 8 feet in width. It is owned by a Boston company.

In the Big Oak Flat mine one shaft is down 150 feet and another 50 feet. The vein is from 4 to 6 feet wide and mills \$15 per ton, besides concentrates. There is a 5-stamp mill with a crushing capacity of twelve tons each twenty-four hours, but ten new stamps are soon to be added. The mine is under bond to the Tuolumne M. L. M. & D. Co. At the Longfellow mine near Groveland a force was this week put in the new shaft and three shifts will be kept at work until it is 300 feet deeper. The present depth of the shaft is 295 feet. The shaft is being driven in the vein and at 120 feet crosscutting showed 30 feet of quartz. Milling tests yield \$3.30 per ton. The mill is run by steam, from six to eight cords of wood being consumed daily, while battery water is pumped from the mine. The property was opened forty-five years ago, but never went deeper than 90 feet. The Mack mine is bonded to an Oakland company who are pushing development work. The mine has a 6-foot vein of low-grade quartz, but with frequent pockets keeps the cleanups up to a good average. The shaft is down 212 feet. The Mack is equipped with a steam hoist and pumping plant and a mill is among the early possibilities. The Carlotta is being unwatered. Work on the Uncle Sam at Araratville is confined to sinking the shaft. A 90-foot tunnel has been run on the Red Jacket and shows a good prospect. The Kanaka is putting in a new air compressor. The Mississippi and Abbie L. are bringing out good ore. Drifting on the vein continues in the Donella. Richards & Wetmore have secured a bond on a gravel claim at Mountain Brown. The Blue Lizard has been bonded by Alameda people and sinking has begun. On the Tough Nut the tunnel is in 100 feet and milling ore has been found. Work on the Big Oak Flat ditch is progressing. From this the mining district to be benefited will have practically unlimited water for mill and power purposes. Williams & Nichols on the Lily and Gertrude claims are getting out good ore. Their arrastra will be started as soon as the rains increase the water supply. N. Screech, who operates a quartz mine on the Middle Fork of the Tuolumne, has made a cleanup from his arrastra which gave an average of \$30 per ton. The Mexican M. Co. are erecting a hoist and pumping plant. The Stockton Gravel M. Co. has 150 men at work on the new ditch to convey water to the Philadelphia placer diggings.

Sonora Independent: High-grade rock has been struck in the Purdy vein of the Hazel Dell group of mines near Soulsbyville. There are six mines in this group and the properties are operated by the Jubilee M. Co. Work is progressing with power drills and air compressor. The Mt. Lily mine is taking out good ore. At the Black Oak mine ten more

stamps will be put in as quickly as possible, making a total of thirty.

Jamestown Magnet: The McCormick mine near Stent is working six miners. The machinery for the Columbia Expl. and Tunnel Co. is being placed in position and boring for gravel will begin on the Bannister claim near Jamestown. The machinery will be driven by steam. Developments are being made by a San Francisco company on a gravel claim near Springfield Flat. They have a large body of good gravel which prospects well. At Columbia work on the Hope continues. The Philadelphia Gravel Co. are pushing their ditch to completion. A company has begun work on a large scale on a gravel deposit on the Stanislaus river near Pine Log. Holmes Bros. have opened a small vein near Columbia which prospects well. Ball & Stone have leased the Hudson & Calhoun mine at Saw Mill Flat and will begin operations on an extensive scale immediately. Abell & Co. are opening their gravel mine near Crystal Cave. An ore chute has been found on the Jim Budd mine at American Camp. The vein is 220 inches wide. The Jubilee M. Co., operating the Hazel Dell group of mines, have opened a body of good ore.

COLORADO.

BOULDER COUNTY.

In the Victoria mine at Summerville an 18-inch vein of four-ounce ore has been discovered; an 8-inch streak shows ten ounces to the ton.

CLEAR CREEK COUNTY.

Near Empire the tunnel of the Bellevue-Rochester Tunnel Co., composed principally of people interested in the Bellevue-Hudson mine, is to be driven by an air compressor. The objective point of the operation is the Bellevue vein, which will be tapped 200 feet below the present workings or 300 feet below the surface. The portal of the tunnel is directly at the base of the mountain, and with in easy reach of the Colorado Central tracks. A change in the values of the mine from silver-lead to gold, running in some instances as high as three ounces to the ton, is said to have determined the owners to begin a work that will cut several other veins. With many of the deeper shafts water is becoming a serious problem, whose solution this bore will render easy. The Bellevue was a large shipper before the decline in silver. Three shifts are retimbering the drift in the Conqueror mine, closed against the lessees by order of Mine Inspector Nye. A body of high-grade concentrating material remains in the stope. The arrival of the heavy machinery for the Forrest City Co. will enable it to sink the deep shaft on the Empire City lode. Cleveland capital is backing the enterprise. The Gold Dirt Co. on Silver mountain is running on the tribute system. There is awaiting shipment over 500 tons of high-grade milling stuff. The output will be increased as soon as additional mill service can be supplied by water conveyance. McDonald & Trevillion realized \$75 per ton from two carloads, and Wolcott & Co. and Mitchell & Cutting are breaking ore of like quality in adjoining ground.

Idaho Springs Gazette: The Mammoth tunnel, near Idaho Springs, is working twelve men. It is in 1000 feet. The Perkins Con. G. M. Co. has twenty-eight claims and is running a crosscut which will cut some of the veins at a depth of 2000 feet. The tunnel is in 700 feet. A vein 18 feet wide was cut recently which went \$30 per ton. The Champion made a shipment of copper ore. The Joe Reynolds is shipping first-class ore by the carload. It is found at a depth of 800 feet.

DOUGLAS COUNTY.

Near Rico the Black Hawk mine, a lead property, carrying some silver and gold, is a regular shipper. The Alleghany and the Swansea are shipping several carloads a month.

EAGLE COUNTY.

From Red Cliff the Ground Hog mine is shipping small lots of high-grade ore to the home smelters.

EL PASO COUNTY.

At Victor the Victor-Colorado tunnel has reached 2127 feet. Twelve tons of \$60 ore was sent out from the Hankey & Cole lease last week. Miller & Gray sent out fifteen tons of \$15 and \$25 ore from their lease on the Pharmacist. The Raven Co. and lessees shipped 140 tons of ore last week, of which one-half was smelting grade. Vein No. 25, which was recently cut in the Mogul mine, Cripple Creek, runs two ounces in gold to the ton. The tunnel is in 750 feet. Through this tunnel five companies will be working their properties Jan. 1st. Fifty tons of ore taken from the Trachyte will run \$50 and \$70 to the ton.

Victor Record: The Orpha May of the Union Co. at Victor produced 800 tons of ore in November with a gross bullion value of about \$15,000. The production of the Deadwood last week amounted to forty tons of 3-ounce ore, and a like shipment was made this week.

The Portland G. M. Co. will this month begin a system of development work that will eclipse all past records of production on this property. Work is temporarily suspended on the Last Dollar until January, to put cages in the shaft. The ore output for November consisted of four cars of smelting grade ore and twenty-four cars of second grade shipped to the cyanide plants. The plans for the Gold Coin mill at Cripple Creek will be in Denver during the coming week. The company has decided to build a mill with a capacity of 300 tons per day, but will so arrange the machinery that a duplicate mill can be erected when considered necessary. The crushing machinery and power will be of the full capacity for the treatment of 600 tons per day.

HINDSdale COUNTY.

A shipment of 16,100 pounds of ore from the Wyoming mine, Engineer mountain, netted \$1585. The mine is operated under a lease.

LAKE COUNTY.

Leadville Miner: The May Queen Leasing

Co., working the Ground Hog mine on Battle mountain, has two cars of ore on the track for shipment to the Pueblo Smelting & Refining Co., which will average \$14,000 per car. The shipment is in charge of armed men. Mgr. J. S. Doddridge is mining the metallic gold. He keeps the stopes guarded. The Garden City mine, worked under lease by Rainey & Murphy, is shipping a small amount of iron each month, which carries from three to six ounces silver and a good excess. The lease on the property of the Seneca M. Co., worked through the Ponsardin shaft on Yankee hill, has been worked for the past five years at a cost of \$20,000, and has opened a large body of low-grade zinc sulphide ore which carries 8 to 10 ounces silver, 8 per cent lead and .06 of an ounce gold, also zinc to the amount of 12 per cent. The Ballard output amounts to twenty tons daily. This ore nets \$35 per ton according to settlement sheets.

The production of gold ore from the Ibox mines for November was above 8000 tons. The payroll carried 506 names. The output from the Mab mines, Leadville, last month was taken by five different smelters and amounted to 4000 tons of lead sulphides. The chute has been proven 200 feet wide. The payroll carries sixty names. The Penn mines are shipping 100 tons of gold quartz to the smelters every day, and have twenty stamps at work on the mill dirt.

OURAY COUNTY.

Ouray Herald: It is stated that with the opening of spring the electric power plant for the Meldrum tunnel will be built. The water wheels will have a head of 1000 feet. This power will furnish force for driving the tunnel from the Ouray side and when completed run the drills and cars.

PARK COUNTY.

At Alma the Orphan Boy mine is shipping ten to twenty cars of ore per month. The mine employs fifteen men. The ore is hauled three miles by wagon to the railroad.

SAN MIGUEL COUNTY.

Telluride Examiner: The South Park mine, near Telluride, is developing a vein that carries 4 feet of galena with a value of seventy ounces in silver, \$2 in gold and 21 per cent lead.

Telluride Journal: The Pennsylvania tunnel, on the Smuggler-Union, has reached 2100 feet, with 2000 feet yet to run to intersect the Union shaft. Thirty men are employed in the copper mines at La Sal, and nine freight outfits are hauling high-grade ore to Placerville for shipment. The lower grade awaits the completion of the smelter. The Hydraulic Co. have recently put twenty-five men at work on their mines near Paradox. The Hector M. Co. is equipping its mill at the Cimarron with a new engine, which weighs over 40,000 pounds. It will be packed over the mountain trails. The flywheel is in two pieces, each weighing 5500 pounds.

IDAHO.

The Twin Springs M. Co. of Idaho, which has recently purchased the Deer Lodge mines for \$100,000, of which sum \$15,000 was paid down, has closed a contract for a 40-stamp mill.

Near Wallace, on Sunset peak, a region neglected for want of transportation facilities, W. A. Clark has begun on a tunnel running under the peak, which, when done, will be 2500 feet long and cost \$50,000. Without much spent in development, but working on the ore in sight, the Consolidated Tiger and Poorman M. Co. has paid off the indebtedness incurred through the destruction of its mills two years ago and has begun paying dividends again. The shaft is below the 1500-foot level, practically 1900 feet, that being the depth below the highest workings above the mill.

The Huntington Herald is informed that the Northwest Railway Co. has secured an option on Kleinschmidt's nine-sixteenths in the Peacock mine at Helena. Seven Devils district, for \$900,000, and it is said the company has paid ex-Gov. Hauser and associates \$200,000 on account for the balance of their interests in mines at Helena.

Albion, Idaho, Times: F. & J. Langford made a shipment to Salt Lake of ten tons of Melcher ore to find out what method will work the ore to advantage. There are four men at work in the shaft on this property, and are taking out some good ore. If the test proves satisfactory machinery will at once be introduced to handle the water which is now bothersome, and the mine will be worked to depth. Ore is being shipped from the Pritchard creek group of mines near Murray. A carload of ore from the Copper Queen mine near Lemhi went \$16 a ton in gold, five and one-half ounces silver and 27 per cent copper.

The Boise Statesman is informed that the dredge that has been in operation near Warm Springs yielded \$240 a day net. The mill on the Twin Sisters mine near Centerville has closed for the winter, after making an experimental run, which was satisfactory. The company was not prepared to run during the winter and will devote the time to opening up the mine.

Idaho City World: The Bunker Hill & Sullivan's Kellogg tunnel is in over a mile and is adding 12 feet a day. No very hard rock has been encountered, nor has there been any sign of mineral wealth. A dredge will be built this winter and put in operation next spring to work the placer mines at Stanley Basin. On Moose creek, in Lemhi county, they have a dredge of a capacity of 5000 cubic yards a day that saves 98 to 99 per cent of the gold. Freight teams loaded with mining supplies left Baker City, Oregon, last week, for Cuprum, over the Seven Devils wagon road, carrying 14,000 pounds for the Northwest Copper Co.

MONTANA.

The Thompson Investment Co. last week secured a controlling interest in the Sunrise mine, near Phillipsburg, by securing 265,000 shares of the stock under execution, in the

suit of the Merchants' and Miners' Bank of Phillipsburg against Sherman & Durfee, for \$25,000. The Sunrise property has not been worked for a year. There is said to be a vein 8 feet in width which, according to assays recently made, carries \$7.40 in gold to the ton. There goes with the property a 20-stamp mill. Work will soon begin on the property. The Florence mine at Neihart is operated steadily and high-grade ore is shipped.

J. R. Bordeaux, with Butte men, operating the Ella claim in Meaderville, at a depth of 300 feet uncovered a body of ore 2 feet in width which assays \$283 in silver and 3 per cent copper. About \$20,000 worth of ore has been taken from the Ella. Development will continue to the 400 level.

Near Basin work is pushed on the Katy mill and the smelter is nearing completion. When it is finished electricity will be used as the motive power and also for lighting the lower workings of the mine. The stockholders of this property have recently increased the capital stock from \$600,000 to \$1,000,000.

Clancy Miner: From Jefferson county, in the First Shot, Lyons & Sherlock shipped 700 pounds of ore that netted \$1160. From samples of a new strike they received twenty ounces in gold, 1194 ounces in silver, 65.4 per cent lead, a trace of copper. The lead is wide and the streak from which the samples were taken runs a foot in width. The First Shot is about three miles north of the Eva May mine, the property of the Basin & Bay State M. Co., which for years has been a good property, but of low grade ore.

Butte Intermountain: The Washoe Copper Co. has seventy-five men driving a tunnel into Silver lake to tap it. The Washoe Co. has let the contract for the driving of a tunnel 4000 feet long that will tap the lake 30 feet below the water's surface. It is said that the intention is to use the lake reservoir in the spring, raising the water above its level by means of a dam. The property of the Mammoth G. M. Co. at Coloma will be sold at sheriff's sale on Dec. 30th. The claims against the company are held by S. E. Larabee of Deer Lodge, \$7320.47; W. B. Hosmer of Boston, \$17,000; Missoula Mercantile Co. of Missoula, \$2300. An engineer and pumpman are keeping the water out of the mine and a watchman at the mine and mill are retained.

Basin Progress: J. Davidson of Butte, who recently leased the Baltimore mine, near Basin, last week made a shipment of three cars of ore to the Butte smelters. The ore is copper, carrying gold and silver. The ore body is 5 feet wide. Years ago this mine was worked, and at that time it paid well from the surface ore. But the men who had it, after gouging out what ore there was in sight without doing any expensive development work, threw it up.

Marysville Mountaineer: The report of the last meeting of the shareholders of the Montana M. Co., Ltd., held in London, has been received. Among other things the report shows that for the six months ending June 30, 1898, 38,215 tons of ore were milled, yielding in bullion bars and concentrates \$265,879.82, or an average production of \$6.94 per ton. The expenditure on mining and milling operations amounted to \$248,320.97, equivalent to \$6.50 per ton, and the net profit obtained is \$17,558.85, or an average of 44 cents per ton. From the 18th of April to the 30th of June, 1898, 27,760 tons of tailings were treated and produced cyanide precipitates realizing as per smelters' returns, \$64,153.55, or an average of \$2.31 per ton. The expenditure, embracing the treatment and transport of the tailings and redemption of cost of the tailings plant, amounted to \$46,376.58, equivalent to \$1.67 per ton, and the net profit obtained is \$17,776.97, or an average profit of 94 cents per ton. The development of the mine the past half year represented 4650 lineal feet. Owing to the low grade of ore the result for the half year was disappointing. The average realized value of the ore passed through the mills was \$6.94, as compared with \$7.98 per ton in the previous half year, showing a decrease of \$1.04 per ton. On the other hand the expenditure was \$6.50, as compared with \$6.74 per ton in the previous half year, the net result being a decrease of 80 cents per ton on the 38,215 tons which were passed through the mills.

NEVADA.

The Cannon Co., controlling the Tea Cup group in Cherry Creek, in cleaning out a shaft that had been abandoned for eighteen years, found a good ore body and will begin the production of ore soon. The shaft had attained a depth of 400 feet during the early days, and while ores were uncovered, the grade was not sufficient to justify the owners in undertaking the long haul and the high treatment charges. The Chispa 10-stamp quartz mill in Montgomery mining district, Nye county, was destroyed by fire recently. The mine was owned by the Sterling M. Co. The ore pulp escaping in the form of tailings from the Hailey-Logan mill process at Como assays about \$20 per ton, of which \$13 is gold and \$7 silver.

Two carloads of ore shipped from Silver Peak to Salt Lake yielded, gold, \$80; silver, 25 ounces; lead, 33 per cent; the concentrates showed \$250 in gold to the ton.

The April Pool mine of De Lamar this week placed auro-cyanides of the value of over \$5000 in Salt Lake. It is locally stated that the capacity of the mill is to be increased early next spring.

A force is repairing the north branch of the Sutro tunnel drain flume leading to the C. & C. shaft. The shaft in the Robust mine at Ely is down 96 feet in ore all the way. A crosscut will be made at 100 feet.

White Pine News: The largest producing mine at White Pine being worked is the Homestake. The ore body has been tapped by a shaft at the depth of 250 feet. The ore averages 65 per cent lead, 15 ounces in silver and nets about \$20 a ton after paying the cost of transportation to San Francisco and charges at the smelter. Over 1200 tons of ore were shipped between July 1, '97, and July 1, '98.

The present lessees have employed twelve men all summer and shipped forty tons per week. On the Young Treasure the shaft is down a considerable distance and hoisting is done by a gasoline engine. Shipments of twenty tons per week have been made the past season. The San Francisco company controlling the Enterprise mine in Seven-mile canyon is sinking a shaft. Twelve men are making repairs in the Sutro tunnel, and Supt. Leonard says the company will be ready to handle the water when the pump is in place. Salt Lake experts are examining mines in Cherry Creek with a view of purchase.

Dayton Times: The Logan & Hully mill, in Como, has been running for two months and has returned enough to pay expenses of mine and mill. The tailings from the ore, however, go about \$20 to the ton—\$13 in gold and \$7 in silver—and to work these Logan & Hully will erect a leaching plant next spring. The Rock Point mill, at Dayton, was started up last week by Pierson & Davis. Ten stamps only are operating, but the other ten will be dropping soon unless the water is frozen. They are crushing custom ore; they are running on a lot from the Hartford mine in Silver City. They also leach tailings and guarantee to extract 78 per cent of the assay value. The Garrison mine at Cortez and the mill are both running. A strike is said to have been made on Seventy-six hill, Tuscarora, last week of a 4-foot vein of high grade. Tests of ore from the Benner mine, near Virginia, are being made by E. Williams, and, if the results are satisfactory, a tramway will be built for the transportation of ore from the Benner mine to the Nevada mill. The Adelaide ores are reduced at the plant in Goldconda; the output will be increased to 200 tons a day as soon as the railroad between the plant and property is completed.

Austin Revue: Hodge & Barago will soon ship a carload of antimony ore to San Francisco. They have a lease on Bray's mine at Big Creek.

NEW MEXICO.

On the Aztec mine, near Bland, the mill is running twenty stamps on \$40 ore, with several hundred tons on the dump. Machinery for the 150-ton mill to be built in the Timber Peak mining district must be hauled up the mountain from Socorro, where hitherto it has been thought hazardous for a saddle horse to go, and some of the pieces of machinery weigh 1200 pounds. The enterprise is backed by Philadelphia capital. The ledges vary from 100 to 200 feet in thickness. The average value of the ore is not over \$6.50 per ton. The Montezuma G. M. and Placer Co., of Morino valley, have twenty-five men in their employ.

Silver City Enterprise: The shaft on the Texas mine near Central has reached the 500-foot level and a crosscut is being run. At Hanover, Brockman & Hughes have eleven men taking out ore. F. Bell has six miners extracting copper pyrites from the Philadelphia mine. There are sixteen men employed on the Bear, Star, Whiffle, Tip Top, Sadie and Blue Jay mining claims, belonging to the Southwest Coal & Iron Co. W. Swancoat has twenty men extracting zinc ore from the Mineral Point Zinc Co.'s claims. The product is shipped to the company's smelting works at Mineral Point, Wisconsin. Twelve miners are taking out zinc ore on contract from other claims owned by the same company. At Santa Rita the Santa Rita Copper & Iron Co. is making shipments of iron ore to Pueblo. The Hearst Co., which has a lease and bond on some of the Santa Rita copper mines, has 100 men employed, most of the work being done under the tribute system. The shaft being sunk on the Carrasco mine has attained a depth of 205 feet. It will be sunk to 300 feet.

OREGON.

W. N. Wiley, from his mine near Antelope, shipped five tons of ore which milled \$43 per ton.

J. Haskell, who mined the past season on the Elk Creek placer mines at Susanville, brought to Baker City recently \$6018 in gold dust—a part of the last cleanup.

Sumpter News: The Badger M. & M. Co. is shipping between 50 and 100 tons of ore and concentrates per month. A good strike is reported at the E. & E., on the 300-foot level, 1½ feet wide in the 7-foot vein, which assays \$312 per ton. Thirty-dollar ore has been uncovered in Excelsior No. 2 tunnel. W. L. Vinson, representing Washington capital, has under bond the Magnolia, in which a 14-foot ledge has been crosscut. He has also secured a bond for \$25,000 on McAvoy & Sheridan's Little Giant group and contracted for a 300-foot tunnel.

Baker City Democrat: McAvoy & Sheridan have bonded their Little Giant group of mines near Baker City to W. L. Vinson, representing Washington capital, for \$25,000. Vinson has let a contract for a 300-foot tunnel. In a shaft above the proposed crosscut tunnel the ledge is 7 feet in width and shows good ore. The Magnolia, also under bond to Vinson, is being developed and looks promising. In the lower level work is being driven on the vein. A ledge 14 feet in width has been crosscut. In the Cracker Creek district a strike was made recently in the E. & E. mines on the 300-foot level of high-grade ore. The width of the ledge is 7 feet. In the Excelsior No. 2 tunnel a 5-foot ledge has been uncovered, assaying \$30 to the ton. In the Collateral a new vein was opened last week that will enable the Virtue Con. M. Co. to start their mill soon on a steady run of good ore.

Jacksonville Times: The Star Gulch M. Co., near Jacksonville, has the ditch completed and everything will be in shape for work when the rainy season sets in. Wyant & Co. are operating a placer mine near Ashland. Harmon & Green are making a good run in upper Galice Creek district. They have enough water to operate a 6-inch nozzle. J. Young of Steamboat precinct is crushing ore

with an arrastra.—F. G. McWilliams of Ashland, who is working a quartz vein in Farmer's Flat district, will have ore crushed in a short time.—The Hansen mines in Althouse district, recently bought by S. N. Butters and others, is being put in shape for extensive operation.

Ashland Record: The Gold Hill Q. M. Co. last week resumed work on the old Gold Hill ledge which produced the \$200,000 pocket in early days. The company have bought the Copper Queen, Daisy and Flora quartz claims and will have them developed also.—P. H. Oviatt owns a coal mine on Evans creek, which has a 14-foot vein.—R. Van Brunt has started up his placer mines for the season.

Ashland Tidings: The Seattle Co-operation Co. is preparing to hydraulic near Watkins.—At the Shorty-Hope M. Co.'s property work is pushed.—It is locally reported that the Brownings have made a second discovery near the Greenback mine that is promising.—The coal mine owned by Andrus & Reynolds on Evans creek is prospecting good.—The Free Silver mine of Barron & White, near Ashland, will be started soon.—Men are reported making \$1.50 per day at the Cameron placer mines.—The Gold Hill Quartz M. Co. has bought the Cooper, Flora and Savage claims in the Gold Hill district.—The Jump-off-Joe M. Co. has received two carloads of pipe at their mine near Leland.—The Lewis placer mine near Leland was started up last week.

Grant's Pass Journal: At the Ray Cook mine, near Grant's Pass, there are twenty men at work and they are in about 200 feet. The drift is from 50 to 100 feet wide and covers the old river channel. The gravel is being taken out of the tunnel in dump carts and thrown into sluices.—In the Hannum mine the new ledge is about a foot wide and assays \$80 a ton.

SOUTH DAKOTA.

The Big Bonanza mine at Terry outputs thirty tons per month.

UTAH.

The Cigale mill, the first plant erected on the West Dip at Mercur, has begun operations. The roasting or drying of the ore at the Golden Gate demonstrated that better results were to be obtained through the aid of heat and the installation of a roasting plant followed. The mill, that has a daily capacity of 400 tons, will be restricted to 100 tons on the start, the intention of the management being to mix the raw ores with the roasted mass, as has been done at the Golden Gate with satisfactory results. The Cigale mill is equipped with a set of seventeen self-dumping leaching tanks, the tailings from which may be removed, single handed, in a few minutes. The ore bodies have been blocked out to a depth of 900 feet.—The Wachusett of Lion Hill is taking out ore that assays eighty-three ounces silver and 83 cents in gold.

Shipments of ore from Park City for the past week were 1,654,210 pounds.

The Gold Dust M. Co., at Mercur, have resumed operations. A shaft has been put to a depth of 180 feet; ore running from \$6 to \$10 in gold has been found.—At the Bromine mine in the Henry mountains of southern Utah, a 5-stamp mill is crushing eight to ten tons per day and plating \$40 a ton. About 60 per cent of the ore is saved by amalgamation, and the tailings are concentrated and saved awaiting transportation facilities to the railroad.—About 150 men are at work on the placer properties on the Colorado river between the cataract and the mouth of the Grand river.

Blanchard & Firth sold a two-fifths interest in the South Mammoth in Tintic for \$20,000.

The Centennial Eureka mine at Eureka has opened an ore chute in which copper and gold predominate. Of this class ore bodies are exposed from the 900 down to the 1100-foot level. Of this class regular shipments are made, six cars having reached the sampler yesterday. The settlements show an average of \$7 in gold and 15 per cent copper. In addition to this some high-grade silver ore has been blocked out, while it would be difficult to approximate the amount of milling ore that awaits the erection of a plant with which to handle it.—The Dewey mill at Bingham is running on ores from the Red Wing, and another lot of concentrates was shipped last week.—On the Horseshoe group at State-line from the 100-foot level in the shaft drifts are run on in both directions, a recent sampling averaging \$17.60 per ton in gold.—On the Grand Central the tunnel has been run 300 feet.—From Frisco the Horn Silver shipped a carload of copper ore and three cars of concentrates.—At Tintic in the Pic Nic mine last week ore was broken into that yielded forty ounces silver and 50 per cent lead.

The Millard Progress is informed that the antimonial deposits at Coyote are showing profitable results. Nine claims are owned by the American Antimony Co., while another group has been tied up by C. Solomon of the Chapman smelter, San Francisco. The American Co. has leased its group for two years, the output going to New York and San Francisco, and consisting at present of about 100 tons per month. The miners are paid \$17 a ton and the freighters are paid \$6 per ton to the railroad. There are forty men engaged in extracting and hauling the ore.

The Tintic Miner reports shipments of the district the past week of 100 cars of ore, six cars of concentrates and five cars of bullion.

Mercur Mercury: In the South Daisy last week a strike was made that assays from \$9 to \$15.—The Ophir mill is shut down temporarily, but in the mine a large force is at work.—A boulder of ore was sent from the Northern Light to the company's office in Salt Lake that weighed eighty pounds and carried 1500 ounces silver and \$90 gold per ton.—The new roasters at the Golden Gate were fired up last week. Several of the new tanks are working and it is expected that everything will be completed in two weeks.—At Stockton in the Shamrock a strike has been made which

shows 62 per cent lead, 145 ounces silver and \$1.90 in gold per ton.—From the Argent shipments will soon begin on a large scale.

—The Honoria has been unwatered and sinking is in progress.—Shipments of high-grade ore from the No. You Don't have been temporarily suspended and the shaft is being sunk 150 feet deeper, which will give it a total depth of 550 feet.—At Mercur the Goyer-Marion mill treats 100 tons of ore daily.

Eureka Republican: A sample of ore from the Joe Bowers at Eureka showed 29 per cent copper and 138 ounces in silver to the ton.—It is pretty well authenticated that work will be resumed on the North Swansea about Jan. 1.

WASHINGTON.

Near Index, development is being pushed on the Keystone mine.—The Sunset is making an upraise from the lower to the upper tunnel, 110 feet. It has 4 feet of ore.—A force has been put to work for the winter on the Westland group near Galena.

H. M. Cooper claims to have discovered near Cle-Elum in Kittitas county an antimony mine and that assays show the test to run \$150 antimony and \$19 gold per ton.—The Lynch mines near Cle-Elum are bonded for \$100,000 to a Scotch company which is developing the property.

At Republic the Georgie Reed and Bull Dog group is said to have been sold to an Eastern company for \$12,000 cash.—Near Bossburg the Little Giant mine is working twenty men. The mine had been closed for a year.—At Republic two shifts are driving the tunnel on the Lone Pine and making 3 feet per day.

Two properties in Republic camp have been added to the Clark-Kingsbury-Frank group. They are the Rebate and Relief claims and work has begun on the Rebate. The company will be known as the Rebate M. Co., and will operate on the assessment plan.—The Treasury tunnel is in 330 feet on the ledge and quartz of good grade is taken out.—The Big Six M. Co. have put two shifts to work.

Near Bossburg the ledge running from the surface has come into the bottom of the shaft at the 490-foot level of the Bonanza mine, developing nearly 100 feet more depth of ore, with a 30-foot vein. The Bonanza is producing 100 tons of ore a day. As soon as the sled train is equipped it will convey four carloads a day to the railroad. The Bonanza is considered the largest lead producer in the State.

A strike of platinum is reported to have been made on Mad river in the Okanogan country. The property is owned by a Chicago company and is located about twenty-five miles north of Leavenworth. Tests of the ore made in New York are alleged to have shown 72 ounces of platinum worth \$14 to \$15 an ounce. It is unusual to find platinum in a quartz vein. It is usually found in the form of rounded or flattened grains of "sand," occasionally in irregular nuggets as large as peas and rarely in large nuggets, the largest yet found weighing twenty-one pounds, and coming from the west coast of South America. The ore is described by mineralogists as of a steel gray color, showing a shining light gray streak when rubbed on a hard surface, having a high specific gravity from 16 to 19, and being infusible in the hottest furnaces and insoluble in any single acid. It is soluble only in hot nitro-hydrochloric acid (aqua regia).

At Bossburg two carloads of machinery have arrived for the Young America concentrator.

The Ben Franklin M. Co. will keep men at work all winter. The company has a 12-foot ledge which assays \$20 to the ton.—At Springdale the Cleveland mine is pushing work and the ore is showing up satisfactorily.—At Palouse considerable work is being done in the Hoodoo and Jerome creek mining districts.—At Colville the Great Northern mine has a ledge full of gold-bearing ore that runs from \$22 to \$80 per ton.

WYOMING.

The output of coal in Wyoming will be increased 400 tons daily from the newly opened district in Crook county by Dec. 15, when a 20-mile branch of the Northwestern Railway system will be completed from Belle Fourche to the new mines.

FOREIGN.

BRITISH COLUMBIA.

The Athabasca mine near Nelson recently shipped a gold brick valued at \$9000. The company is clearing about \$1200 a day from the plates and they have the concentrates from the tailings left. There are 9000 tons of ore on the dump.—A concentrator is to be built at Sandon by the Ruth. The mine and mill will be connected by tramway.—Burns & Wilson bought a three-eighths interest in the California near New Denver for \$15,000. About \$7000 has been spent in development.

Last week the shipments from the War Eagle amounted to 1750 tons. The new electrical compressor plant is nearly complete.—In the Josie three machines are at work in the 200-foot level. The ore is of good grade and from 2 to 6 feet wide.—At the Center Star eighty men are at work.—The final payment of \$40,000 on the Mollie Gibson group of claims in the Kootenay has been made. The total paid for the property is said to be \$110,000.

The ore shipments from the mines adjacent to Rossland from Jan. 1 to Dec. 1, '98, are 118,971 tons. The shipments from Nov. 26 to Dec. 3 were 2300 tons.—The No. 1 will soon be equipped with a cage for lowering the men. The vertical shaft, which is down 200 feet, will soon be extended to the 300-foot level, and

a regulation cage of the Anaconda Co.'s type will be put in.

MEXICO.

Two Republics: The discovery is reported of a large body of free milling ore at Pulpito, Chihuahua, by J. S. Collinson, who brought to town half a ton of samples, which assayed 50 per cent lead and fifty ounces of silver to the ton. He will put on machinery and push development. He intends to work about thirty men.—A mine has been discovered near Conchas, the ore of which runs 45 per cent copper and thirty-two ounces silver.—C. Solis has discovered near Chihuahua an old Spanish mine. Besides the mine he found the remains of an old adobe smelter. The samples of the ore he brought assay 55 per cent copper, with traces of gold and silver.

The Molina mines in Chihuahua are yielding good results. The ores have silver, lead and gold. The Mexican Ore Co. of Kansas City has contracted for all the product. The ore assays fifty ounces of silver to the ton. The company has ready for shipment over 100,000 tons.—Flannagan & O'Donnell started from Chihuahua for Rio Fuerte with a 10-ton smelter, with which to treat ores on their properties in the district of Morelos. The assays from these properties show from \$400 to \$500 per ton. One of the properties is free gold and one is silver and copper showing 175 ounces of silver to the ton and 40 per cent copper.—The Rio Cancho M. Co. are working the placer deposits at Santo Domingo. They have expended \$250,000 on the property. The company is composed of Milwaukee capitalists. They expect to handle 5000 tons of dirt per day.

Nogales Oasis: The Ahogado mine near Hermosillo, Sonora, has been unwatered and started to sink and open up new workings. This promising property is owned by a company of which J. McNab of San Francisco is president.

ONTARIO.

At Mine Center, the Golden Star mill started up recently and is running night and day. The underground work is progressing and the ore in the fourth level is high grade.

The Independence mine made a test run of twenty-six days of their small mill, taking out \$2000 in gold.

Industrial Notes.

—The Sierra railroad will be finished to Sonora, Cal., by Jan. 1st, '99.

—Los Angeles, Cal., now gets a part of its coal from Gallup, N. M.

—The incubator has been introduced on the ostrich farms in southern California.

—The first railway to advertise in a Manila newspaper is the Denver & Rio Grande road.

—Three-fourths of the Washington State shingle mills have shut down to keep up prices for '99.

—The loss to the Standard Oil Co. by the recent fire at Los Angeles, Cal., is figured at \$325,000.

—The Sacramento, Cal., Iron Works, of Root, Nielson & Co., were burned last Wednesday; loss, \$60,000; insurance, \$20,000.

—The Santa Fe Railroad Co. abolished its land department Nov. 1st. Nearly all the large railroad corporations are doing the same thing.

—The U. S. Supreme Court has decided that the Territory of New Mexico has no right to tax the right of way improvements of the Atlantic & Pacific R. R. Co.

—The Standard Electric Co., has applied to Stockton, Cal., for a franchise to string wires to supply that city with electric power and light from Blue Lakes.

—The postmaster of Manila, Philippine islands, U. S. A., is W. W. Montague of San Francisco. The Manila P. O. is officially known as "Station No. 1, Philippine islands, San Francisco, Cal."

—On the Australian steamer last Wedne day came in gold from Australia to San Francisco \$3,413,933; this makes a total of Australian gold thus received since Aug. 22, 1897—less than sixteen months—of \$38,375,875.

—Last year there were over 400,000 Kangaroo hides received in this country from Australia and New Zealand. Prior to 1895 kangaroos were killed and eaten in Australia and their hides were cut up and made mostly into shoestrings and belts.

—The Nicaragua canal bill is being discussed in the U. S. Senate. As usual the railway interests vehemently oppose it. It is now proposed to lend the guarantee of the Government to the builders to the amount of \$115,000,000, the Government to be secured by a general lien.

—The Hudson Reservoir & Canal Co. proposes to build a reservoir sixty miles north-east of Phoenix, Arizona, at a cost of \$2,500,000 to hold water sufficient to irrigate 1,000,000 acres in the Salt River valley. The contemplated artificial lake will be 150 feet deep and cover eighteen square miles.

—Judge Belcher of San Francisco has decided that in ordinary commercial transactions the value of an English pound sterling is to be determined according to the fluctuations of exchange. The act of Congress fixing the value of a pound sterling at \$4 86 was held by the Court to be applicable only to the customs revenue of the United States.

—Benj. Belanos and Pablo Royal, civil engineers, have obtained a concession from the Mexican Government to construct a canal

which will put Mexico in direct communication with Guatemala. The canal will have a length of about 275 miles and will be 36 feet wide and 6 feet deep. The estimated cost of the undertaking is given at \$5,000,000, and two years is given as the probable time to complete the work.

—The report of the government engineers examining the Sacramento and Feather rivers, Cal., with the idea of their improvement, finds it possible by means of wing dams and dredging to make a channel with 7 feet to Sacramento, 4 feet to Colusa and 3 feet to Red Bluff at a cost of \$280,000 for the first section and \$25,000 for the last two sections. In the Feather river no work is deemed advisable until the flow of debris be stopped.

—In the State of Washington coal mines the following table shows the increase of tonnage mined since 1892, the number of lives lost annually and number of tons mined for each death:

| Year. | Total Tonnage. | Fatal Accidents. | Tons mined for each life lost. |
|-----------|----------------|------------------|--------------------------------|
| 1892..... | 1,140,575 | 55 | 20,737 |
| 1893..... | 1,308,850 | 9 | 127,750 |
| 1894..... | 1,131,860 | 50 | 22,633 |
| 1895..... | 1,163,737 | 35 | 33,249 |
| 1896..... | 1,302,524 | 8 | 150,315 |
| 1897..... | 1,302,192 | 7 | 190,027 |
| 1898..... | 1,717,515 | 9 | 190,613 |

Average number of tons mined for each life lost from 1892 to 1896 inclusive, 37,243. Average number of tons mined for each life lost during 1897 and 1898, 190,320.

—Talking of Japan's monetary condition, a recent arrival from there says the recent change of the monetary standard from silver to gold has exerted no appreciable effect on Japanese foreign trade, because their gold standard rests practically on a silver basis—that is, the ratio of value between gold and silver has been placed at 32 to 1 instead of 16 to 1, as advocated by American bimetalists, so that, though Japanese money is gold money, it has practically the value of silver money. Thus their 10-yen piece is worth only \$5 in our money, although it is a gold coin. Exchange stands at 50, just as it was before the change was made. The remarkable industrial advance has exerted an inevitable influence in the direction of raising prices, and many commodities have been more than doubled in price.

—More than \$1,000,000,000 worth of goods are every year imported into the countries adjacent to the Philippine Islands, and more than half that amount is composed of the class of articles produced or manufactured in the United States and offered for sale by her people. The importations into Japan, China, British Australasia and British India and Straits Settlements, amount to nearly \$1,000,000,000 a year. Those of Japan, which a decade ago were less than \$50,000,000, are now more than \$100,000,000, and steadily increasing. Those of China have increased 20% in the last decade and now amount to nearly \$200,000,000 a year. Those of British Australasia are nearly \$300,000,000 a year, and those of British India and the Straits Settlements, which show an increase of about 10% in the decade, are \$300,000,000 annually. More than half this sum of the imports of these four countries are classes of articles produced in the United States and offered for sale by her people. Of the eleven great classes of articles, China imported in 1897 \$90,000,000 worth, and of that sum \$11,000,000 worth came from the United States. Japan imported in 1897 \$58,000,000 worth, and of that sum \$12,000,000 worth came from the United States; British Australasia imported \$64,000,000 worth, of which \$12,000,000 worth came from the United States, and British India \$10,000,000 worth, of which \$3,500,000 worth was furnished by the United States. The following table shows the imports into the four countries in question of goods of the leading classes produced in the United States and offered for the export trade:

| Articles Imported. | China (1897). | Japan (1897). | British India Australasia (1897). | British India Australasia (1896). |
|---------------------------|---------------|---------------|-----------------------------------|-----------------------------------|
| Cotton mfrs. | \$61,357,358 | \$9,831,503 | \$6,708,287 | \$8,568,359 |
| Iron and steel. | 3,764,197 | 8,790,377 | 1,329,018 | 18,133,124 |
| Wool mfrs. | 544,694 | 713,220 | ..... | 4,958,606 |
| Leather mfrs. | 2,434,202 | 249,340 | ..... | 4,359,895 |
| Wood mfrs. | 2,119,055 | 3,902,466 | 805,176 | 9,007,730 |
| Machinery | 3,777,738 | 2,592,992 | 270,365 | 2,996,896 |
| Mineral oils and paraffin | 10,773,326 | 3,322,174 | 694,863 | 1,809,190 |
| Breadstuffs | 952,782 | 787,883 | 124,973 | 10,714,958 |
| Provisions | 69,455 | 445,062 | 348,769 | 1,716,456 |
| Coal | 2,860,242 | 288,417 | 231,200 | 2,598,863 |
| Cotton, raw | 1,762,949 | 21,744,656 | 28,758 | ..... |
| Total..... | \$90,031,058 | \$58,136,100 | \$10,511,651 | \$84,822,974 |

Recent Mining Incorporations.

Dewey Gravel M. Co., Grass Valley; capital stock \$3000, all subscribed; J. F. Goodwin, A. W. Hawley, D. Jones, C. E. Clinch, I. Haas.

The Globe M. & M. Co., Stockton; capital stock \$250,000, subscribed \$7000; J. A. Inglis, W. W. Worthing, R. B. Terry, H. Rumenapf, C. Roeder, W. W. Fitzgerald, C. L. Flack.

The Ralston Divide G. M. Co.; capital stock \$120,000, all subscribed; W. C. Ralston, R. R. Grayson, W. Bowers, F. Rigaud, P. G. de l'Estolle.

Kenai Lake M. Co., to mine in Alaska and elsewhere, San Jose; capital stock \$297,713, all subscribed; W. A. Towle, W. A. Smith, W. H. Adams, T. H. Farthing, C. M. Martin, J. H. McGee.

Coronado Copper M. Co., San Francisco; capital stock \$20,000, subscribed \$18,000; J. Blumenthal, R. Mohr, H. A. Hornlein, F. H. Hilbert, B. Adler.

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING DECEMBER 6, 1898.

615,516.—UMBRELLA CUP—J. Allesina, Portland, Or.
615,425.—PESSARY APPLIHER—E. A. Butler, Prescott, Ariz.
615,435.—CRAVAT—C. W. T. Davies, S. F.
615,544.—TENT—H. O. Flipper, Nogales, Ariz.
615,548.—BROILER RANGE—T. Guinean, Portland, Or.
615,449.—METALLIC SHEATHING—T. F. Hagerty, S. F.
615,553.—WIRE CUTTER—D. O. Hite, Sacramento, Cal.
615,554.—CAR DUMPING APPARATUS—W. Hogan, Washington, Cal.
615,621.—BURIAL APPARATUS—E. C. Jobson, S. F.
615,403.—MUSIC TURNER—A. McRae, Milton, Or.
615,589.—AIR SHIP—F. R. Merritt, Prairie City, Or.
615,588.—OFFICE INDICATOR—Moore & Oliver, Stockton, Cal.
615,489.—ORE WASHER—L. J. Mytinger, Sacramento, Cal.
615,571.—DOOR LOCK—J. Ohring, S. F.
615,572.—CARBURETOR—O. Owens, S. F.
615,389.—ORE STAMP—D. M. & J. E. Smyth, Pasadena, Cal.
615,334.—SHIPPING PACKAGE—C. Toohy, S. F.
615,598.—DUMP WAGON—G. M. Wallace, Yuba City, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BURIAL APPARATUS.—E. C. Jobson, San Francisco, Cal., assignor of two-thirds to Fannie F. Williams and Ada M. Jobson of same place. No. 615,620. Dated Dec. 6, 1898. This invention relates to a device which is especially designed to be employed during the burial of persons, and it acts to receive and lower the casket, at the same time closing in over the casket, as it descends, an ornamental or flower-covered screen. It consists essentially of an open framework adapted to rest about the periphery of the grave, and arched or ornamental screens pivoted to the framework, extending along upon each side and normally open from each other, leaving the space above the grave. Within this space is a casket-supporting frame with attachments and pulleys by which it may be lowered into the grave, and as soon as the casket commences to descend the pivoted segments upon each side are closed in above it. These segments may be ornamented permanently, or they may be made of wire screenwork and adapted to receive flowers, with which they may be entirely covered, so that when closed together they resemble a bank of flowers and entirely conceal the casket and the grave.

DUMP WAGON.—George M. Wallace, Yuba City, Cal. No. 615,598. Dated Dec. 6, 1898. The object of this invention is to provide a wagon designed to carry loads of earth or loose material, and a novel means for suspending, opening and closing the bottom boards of the wagon. It comprises a body with closed sides, transverse end beams, bottom boards having pivot pins projecting from the opposite ends, near one edge, so that the bottom boards swing to and from each other in pairs, transversely slotted timbers are provided in which the pivot pins are loosely movable, transverse shafts journaled and turnable at opposite ends of the wagon have lever arms projecting above the meeting edges of the bottom boards, and links pivoted to the ends of said lever arms have transverse slots made in the lower ends, hangers are provided, the upper ends of which are pivoted in the transverse slots, and the lower ends connected respectively with the swinging edges of the adjacent boards so that the hangers diverge freely when the boards swing apart and are correspondingly drawn together when by the action of the controlling mechanism they are again drawn up into place.

CAR-DUMPING APPARATUS.—Wm. Hogan, Washington, Cal. No. 615,554. Dated Dec. 6, 1898. This invention relates to a device which is especially useful for dumping cars to discharge the load therefrom, and again right the car. The object is to provide a convenient means for discharging loads from cars and other similar vehicles, and to easily return the vehicle to its normal position. The tracks upon which the cars approach connect with a short section of track sufficiently long to receive the car to be dumped, and this section is supported upon rollers or segments which rest upon rollers beneath so that when the car has been run in upon the section of track it is latched by a special holding device which secures it to the segment, and the segment is then turned about on the supporting rollers until the car stands at such an incline that it will discharge its contents through the lower side, this side having a swinging gate which opens for the purpose of allowing the discharge. Stops are arranged with relation to the segments so that when it returns to its normal position the section of track will be exactly in line with the main track.

DOOR LOCK.—John Ohring, San Francisco, Cal. No. 615,571. Dated Dec. 6, 1898. The object of this invention is to combine an arrangement and lock for doors in which a suitable bolt is so connected with operating mechanism that it may be used as an ordinary latch, operated by turnable knobs from either the inside or the outside, or both, and with it is a stop by which the operation through the outer knob is prevented except by the use of a latch key, said knob being pro-

vided with tumblers arranged to receive such key and means for so locking the bolt that it cannot be turned from either outside or inside. In conjunction with this is an independently operated tumbler lock acting upon the same bolt and serving as a night or permanent lock to prevent its being withdrawn by an operation of any of the previously described mechanisms.

Personal.

C. C. BEAN is Supt. of the Ajo copper mines, Yuma, Ariz.

F. KING is Supt. Hanson mines near Jacksonville, Oregon.

CAPT. DE LAMAR of Utah and Nevada is in San Francisco.

C. D. LANE now becomes Supt. of the Utica mine, Angels, Cal.

C. C. CLARK has been appointed Supt. Lone Star mine, Bland, N. M.

GEO. E. AMES, resident engineer Anaconda M. Co., in visiting San Francisco.

W. A. BELL of London, England, is visiting his Gopher-Boulder mine at Kelsey, Cal.

V. M. CLEMENT has been appointed Gen. Mgr. De Lamar mines, De Lamar, Nevada.

M. HEALEY, representing Capt. DeLamar, is visiting the Baker City, Or., gold fields.

J. J. CRAWFORD has returned to San Francisco from Calaveras and El Dorado counties, Cal.

P. KERVIN, Virginia, Nevada, is examining the Silver Peak mines in Esmeralda county, Nevada.

F. E. LELAND of the Risdon Iron Works has returned from a business trip to Virginia City, Nevada.

F. ZEITLER, Supt. Champion mine, Nevada City, Cal., has returned from the Unity mines at Single Springs, Cal.

D. KIETH, managing owner Silver King mine, Park City, Utah, passed through San Francisco last week enroute to Mexico.

J. A. TURNER has been appointed Gold Commissioner at Nelson, B. C., for the Nelson, Arrow Lake and Goat River mining division of West Kootenay district.

F. KLEPETKO, Gen. Mgr. Boston & Montana M. Co., Butte, Mont., is at the Highland Boy smelter at Bingham, Utah, to decide upon the plant's electrical requirements.

F. SEARLES, mine owner and attorney, Nevada City, Cal., is in San Francisco, in attendance upon his father, Judge Niles Searles, who has been seriously ill.

Recently Declared Mining Dividends.

Mercur, Utah, \$20,000; payable Dec. 20.

Florence M. Co., Montana, 3 cents per share, \$25,000; payable Dec. 20.

Centennial Eureka, Utah, 50 cents per share, \$15,000; payable Dec. 20.

Nugget M. Co., Colorado, 2 cents per share, \$20,000; payable immediately.

Matoa G. M. Co., Colorado, 2½ cents per share, \$25,000; payable Dec. 24.

Portland, Colorado, 2 cents per share, \$60,000; Dec. 15.

Mercur, Utah, \$25,000; payable Dec. 20.

Bullion-Beck, Utah, \$10,000; Dec. 15.

Commercial Paragraphs.

THE Hercules Gas Engine Co. are removing from the former location, 405-7 Sansome street, to commodious quarters at 305 Market street, San Francisco, Cal.

THE Curtis-Newhall Advertising Co., the southern California representatives of the MINING AND SCIENTIFIC PRESS, have removed to enlarged offices at 223 W. Second St., Los Angeles, with superior facilities for work.

THE Denver branch of the Jeannette Iron Works Co. report recent sales and shipments: Moon-Anchor gold mines, Cripple Creek, one 8½x18 electric power pump, lift 600 feet; one Jeannette sinker, No. 9 B., size 14x13, 650 feet 10-inch column pipe and fittings; Colorado Fuel & Iron Co., Watsonburg, one 8x12 electric power pump; Bunkers mines, Leadville, duplex station pump, 600 feet lift; Penn M. Co., station pump.

A CHANGE of name has taken place in the business of the Rix Compressed Air Machinery Co., which will hereafter be known as THE Compressed Air Machinery Co., Wm. A. Hewitt and P. H. Reardon, proprietors, who will continue at their present location, 11 and 13 First street, San Francisco, Cal. This company do a large business in manufacturing improved air compressors and the Giant Rock Drill, and also handle the well-known Chandler & Taylor steam engines and boilers and general mining machinery. Among the orders now being filled is a large steam-driven compressor of the Corliss type for the well-known Kennedy mine, and a number of smaller compressors and drills are also under construction.

Obituary.

HENRY MORTIMER PLATT died this week in New York City, aged seventy-six years. Fifty years ago he established in that city the first gold and silver refinery in the United States.

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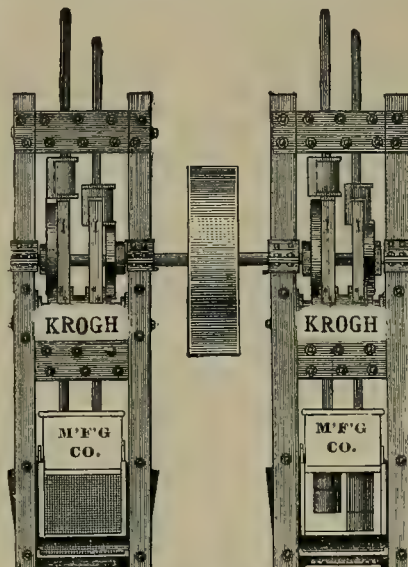
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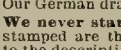
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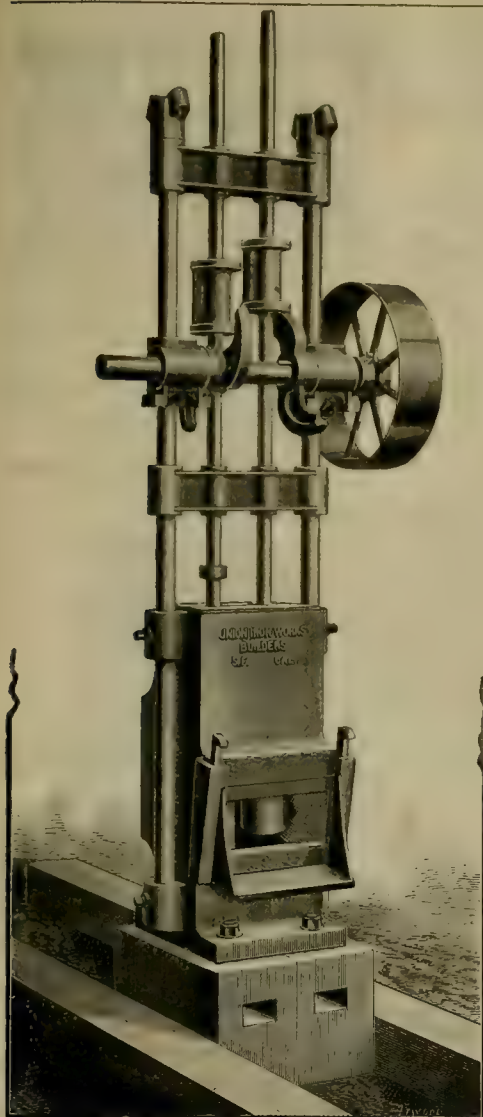
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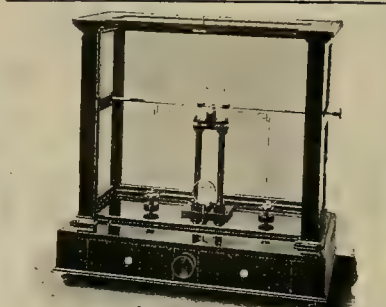
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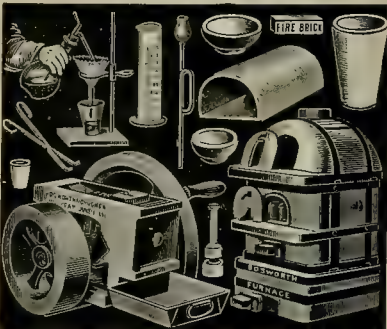
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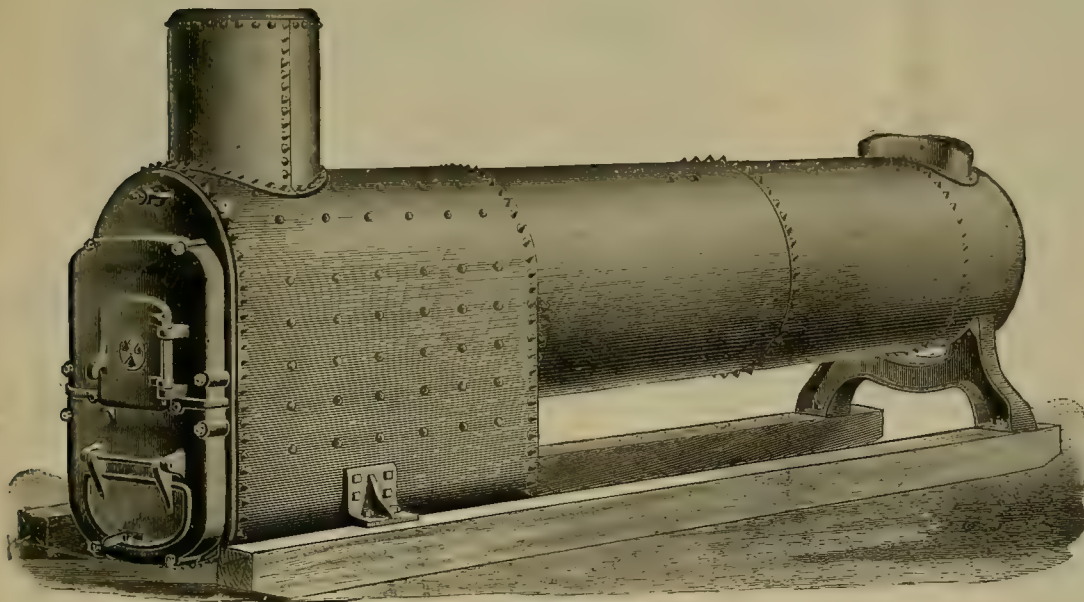
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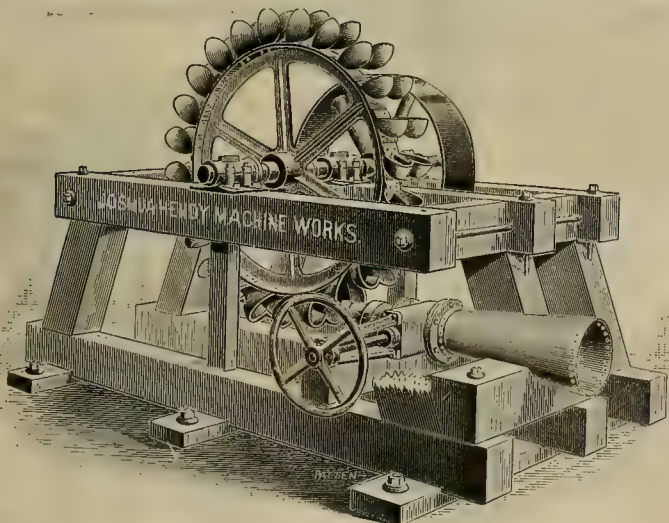
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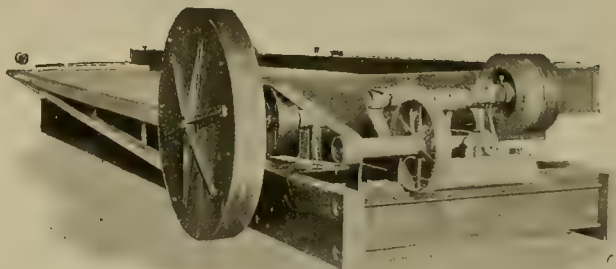


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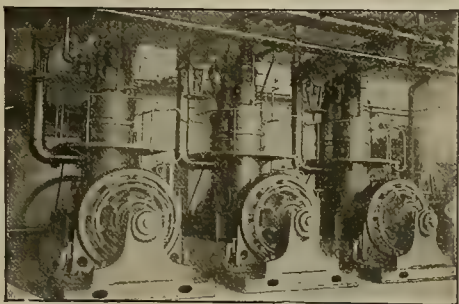
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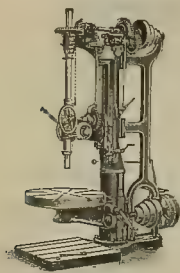
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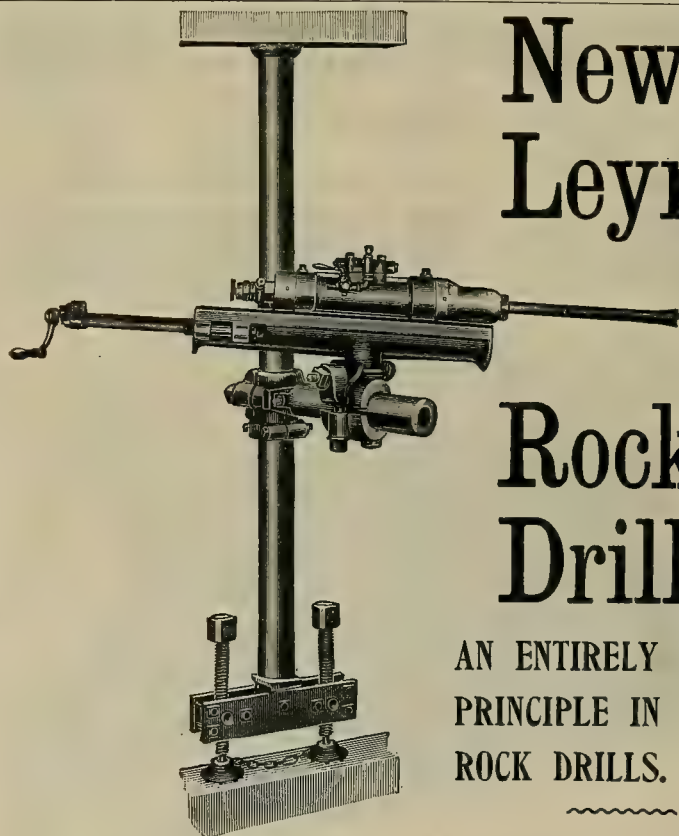
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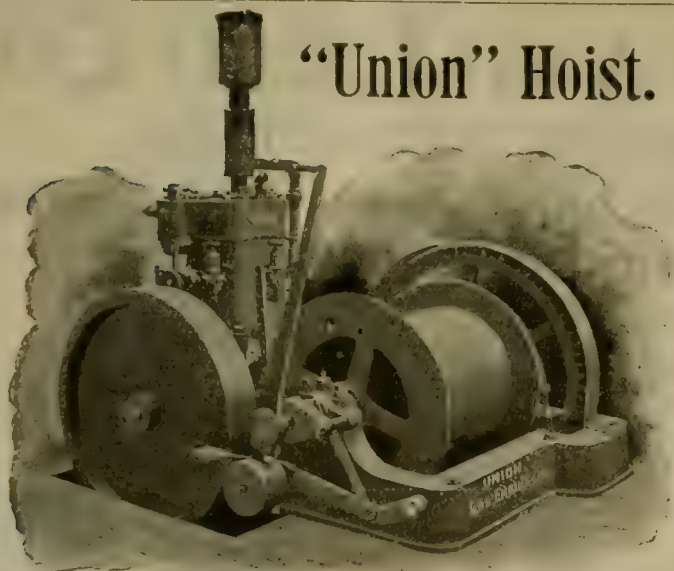
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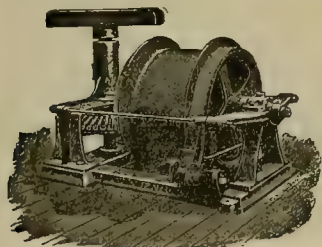
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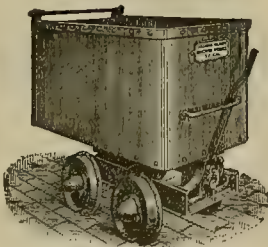
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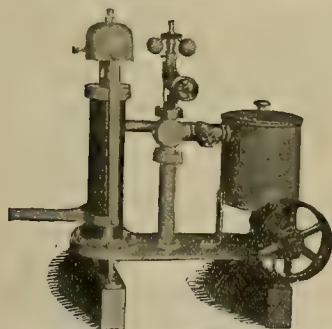
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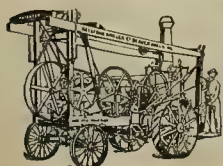


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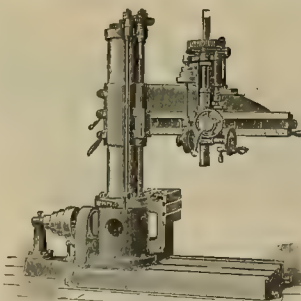
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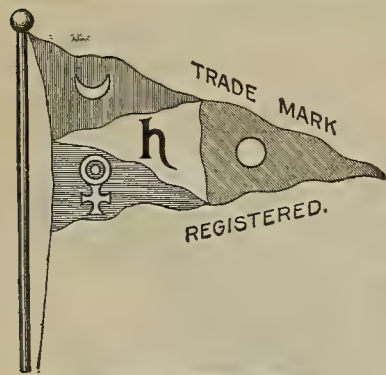
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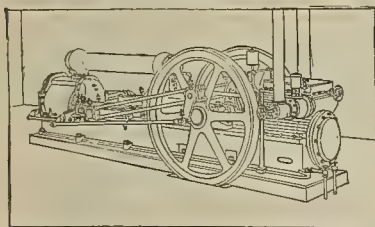
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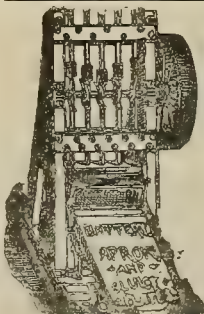
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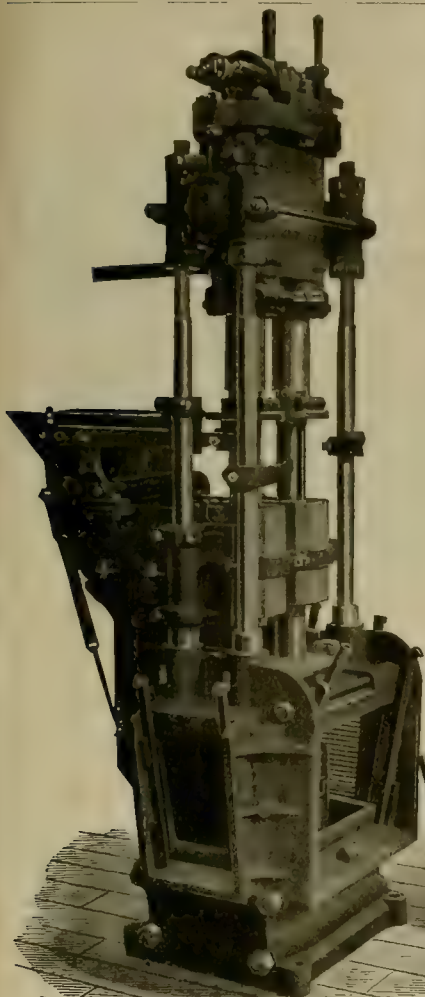
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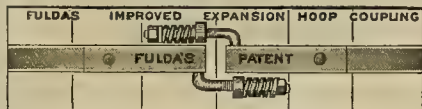
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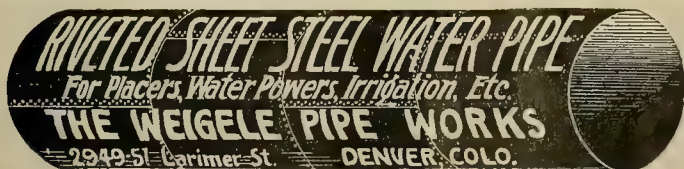
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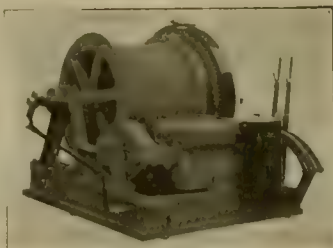
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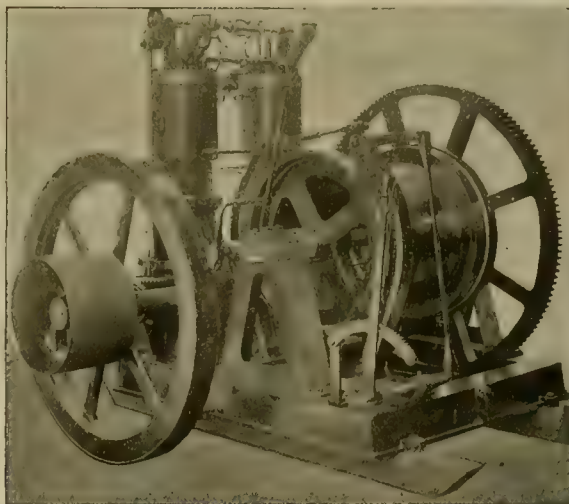
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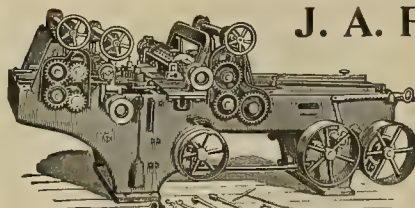
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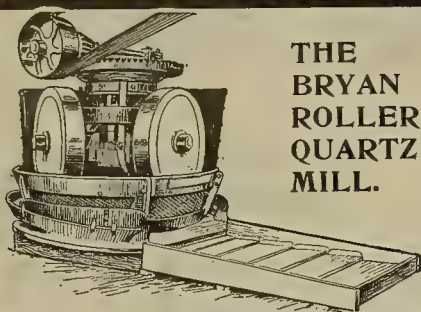
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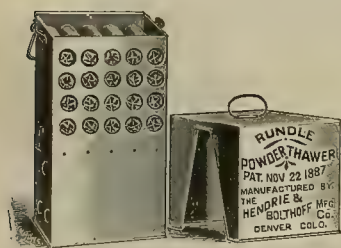
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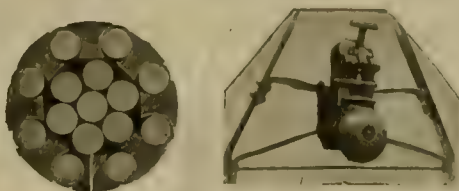
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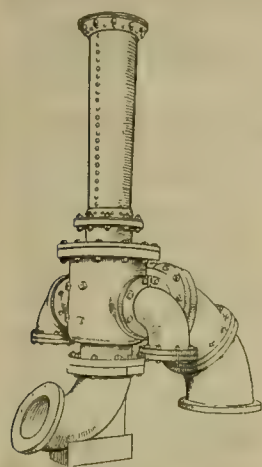
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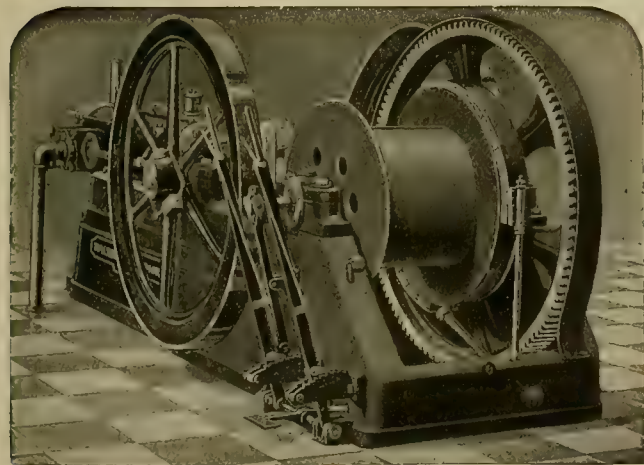
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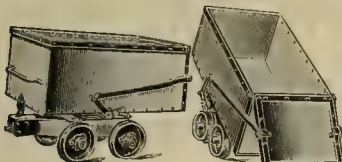
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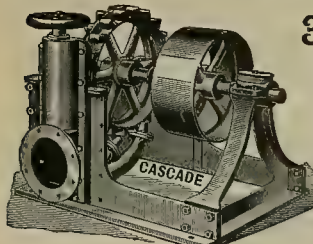
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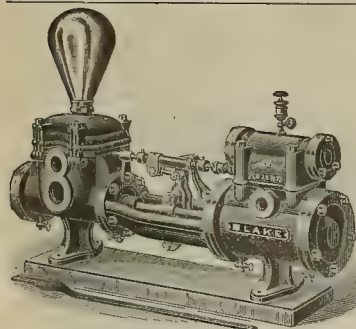
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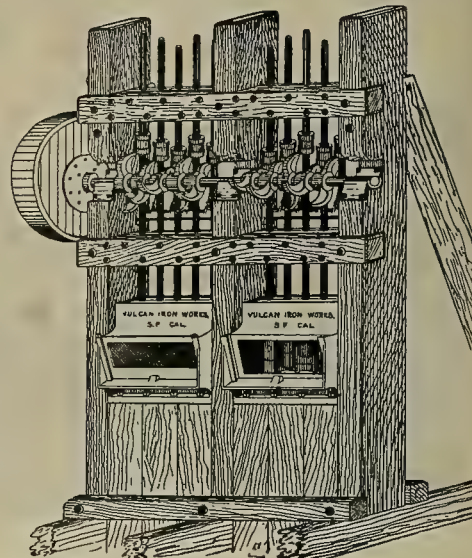
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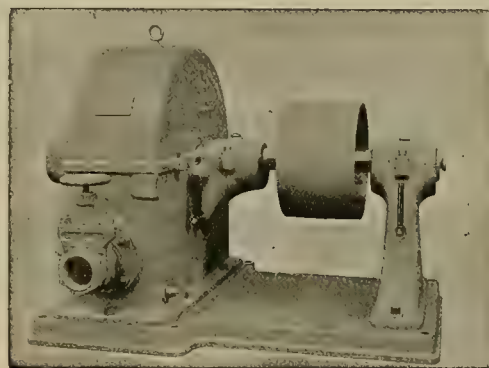
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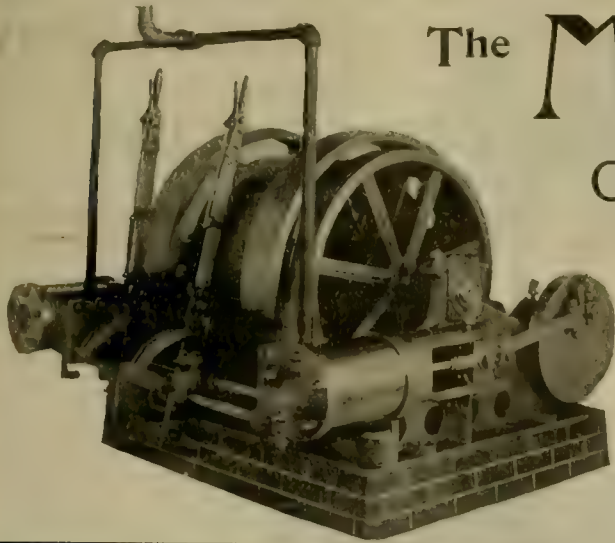
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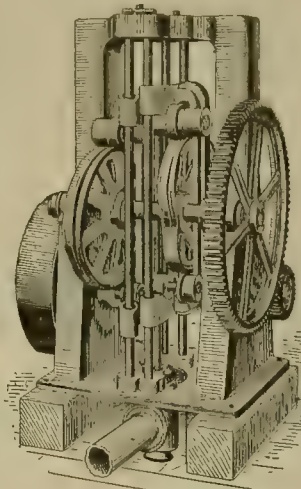
ELECTRICAL APPARATUS AND SUPPLIES.

WHEN IN NEED of

Dynamite and Black Powder,
Caps and Fuse,
Steel, Hammers and Sledges,
Wheelbarrows, Belting,
Wrought Iron Screw Pipe & Casing,
Corrugated Iron Roofing,

Write to **Harper & Reynolds Co.**

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THE **LUITWIELER**

System of Pumping
Water is Perfect.

Keeps water moving in uniform volume and speed and in one direction. No cranks, dead centers or air chambers. No water hammer. Has less friction loss than other pumps. No crank pump can show such results.

Write for circulars giving full particulars.

S. W. LUITWIELER CO.

200-202 N. Los Angeles St.,

LOS ANGELES, CAL.

Our 12-in. Duplex Deep Well Pump,
4 ft. 4 in. high, weighs 1000 lbs.

**Mining
Timber**

WRITE TO-DAY

and let us make an estimate on your next order for LUMBER, SHINGLES, SHAKES and R. R. TIES. We make a specialty of MINING TIMBER and PLANK for Arizona and Mexico shipment.

The **L. W. BLINN LUMBER CO.,**

Main Office, 348 E. Second St. - LOS ANGELES, CAL.

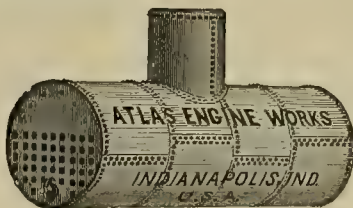
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LOS ANGELES, CAL.

Stamp Mills a Specialty.

ATLAS ENGINES AND BOILERS.

HOISTING
ENGINES.

Agents for Henry R
Worthington
Steam Pumping
Machinery.



MANUFACTURERS OF

**MINING AND MILLING
MACHINERY.**

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Work
And All Kinds of
Heavy
Forgings.

PIPE!

We manufacture Water
Pipe for



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and Irrigation.**

IRRIGATION SUPPLIES OF ALL KINDS.

WELL CASING, OIL TANKS,

—AND—
General Sheet Iron Work.

Write to us for an estimate on your next job.

Lacy Manufacturing Co., Office, Room 4, Baker Block,
LOS ANGELES.

For Miners' Supplies, Tents, Awnings,
Sporting Goods, etc.,

SEE THE PRICES OF

WM. H. HOEGEE,
138-142 S. Main Street,
Los Angeles, Cal.

WHOLESALE AND RETAIL.

The Mait Dry Gold Saver.

The only thoroughly practical Dry Washer ever invented. Will save a larger per cent of gold than any other machine. Is CHEAP, LIGHT and DURABLE. Has a better riffle board and action than other machines. Has taken first premium over a dozen competitors. Made in three sizes—small, medium and large.

WRITE FOR COMPLETE INFORMATION AND PRICES AT ONCE.

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 15 1898.

SILVER.—London, 27½d; New York, 59½¢; San Francisco, 59½¢; Mexican Dollars, 47½¢; 47½¢. New York exchange, sight, 15; telegraphic, 17½ cents premium.

LEAD.—New York reports, "very firm," \$3.70 bid, \$3.75 asked. The firm naming the settling price for leading miners and smelters at the West quotes Lead \$3.50.

Local, pipe, 6½¢; sheet, 6¼¢; pig, 5½¢; bar, 6¢.

COPPER.—New York reports Lake "unchanged," 12.75 bid, 12.85 asked. Local, bar 20¢ per lb.

IRON.—American, soft, \$21.75 and \$23.75 per ton; Scotch, \$24.25. Local bar, 2¼¢ per lb.

SPELTER.—8½¢@9.

TIN.—Pig, 22¢ per lb.; Bar, 25¢.

ANTIMONY.—14.

BABBITT METAL.—No. 3, 7¢.

QUICKSILVER.—Steady. Local, \$42; export, \$37.00 @ \$37.50; carload lots, special rates.

The continued dry weather and consequent curtailment of mining operations had made the local market dormant, but indications this week favor renewed activity.

POWDER.—F. O. B., San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15½¢; less than one ton, 17½¢. No. 1* 60%, carload lots, 13½¢; less than one ton, 15½¢. No. 1** 50%, carload lots, 11½¢; less than one ton, 13½¢. No. 2, 40%, carload lots, 10¢; less than one ton, 12¢. No. 2* 35%, carload lots, 9½¢; less than one ton, 11½¢. No. 2** 30%, carload lots, 9¢; less than one ton, 11¢. Black blasting powder in carload lots, minimum car 725 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$8; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington, \$8 00 Coos Bay, \$8 00

Seattle, \$6 00 Southfield, \$7 50

Cargo lots, Eastern and foreign:

Wailend, \$7 50 Cumberland, \$8 90

Brynbo, \$7 50 Cannel, \$9 50

Pennsylvania, hd., 14 50 Welsh Anthracite, 12 50

Scotch, \$8 00 Rock Springs, \$7 60

Mines

or prospects operated on contract to purchase, 60 or under lease on fixed royalty or percentage.

Mining leased, MINING companies organized, their property acquired, financed and managed. MINES, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated.

EXAMINE mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

EDW. N. BREITUNG, Marquette, Mich.

Cable address: Edw. N. Breitung, Marquette, Mich. U. S. A.

FOR SALE.

4 Woodbury Concentrators with new belts. Machines in good condition. For price and particulars, apply to EDWARD GOODWIN, Supt. Montauk Con. G. M. Co., Newcastle, Cal.

FOR SALE CHEAP.

2 Edison Bi-Polar Dynamos, 540 Lamps, with Switchboard and Apparatus Complete;
1 50-H. P. McIntosh & Seymour Engine;
2 60-H. P. Babcock and Wilson Boilers;

All in first-class condition. Address
PACIFIC TELEPHONE & TELEGRAPH CO.,
216 Bush Street, San Francisco, Cal.

Mining Man of Experience,

Owner of four gold quartz mines, 3 to 20-foot ledges, about \$10 ore, 20,000 tons of quartz in sight near surface; considerable developments; quartz works by cyanide process; facilities for working quartz first class.

ONE-HALF INTEREST

Will be given to parties who will erect a milling plant of fifty tons daily capacity.

A. P. ANDERSON,

Oriental, Esmeralda County, NEVADA.

J. D. BETHUNE,

(Late Associate Justice Supreme Court.)

Attorney at Law,
Mining Law,

PRESCOTT, ARIZONA.

A Valuable Gold Property for Sale.

UTAH

Mines—Dividend Paying
and Investment Stock.

W. E. HUBBARD & CO., 15 W. 2d St. Street,
SALT LAKE CITY.

ANTIMONY.

We buy Antimony Ore in any quantity and pay prompt CASH for same. Write us and let us know what you have.

Chapman Smelting Works Co.,

(INCORPORATED.)

422 Battery Street, San Francisco, Cal.

INVENTORS, Take Notice

L. PETERSON, MODEL MAKER,

226 MARKET ST., N. E. Corner Front (Up Stairs), SAN FRANCISCO. Experimental machinery and all kinds of models. Tin and brasswork. All communications strictly confidential.

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.05 per gal.; bbl., \$1.03; pure No. 2, cs., 85¢; bbl., 80¢; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.06; less than 200 gals., \$1.10; in bbls., 4¢ per gal. less than case; Baker's Crystal, \$1.26; China Nut, 52¢; Linseed, strictly pure, boiled, bbl., 44¢; cs., 49¢; raw, bbl., 42¢; cs., 47¢; lots of 5 bbls., 1¢ less;

Lucol, boiled, bbl., 39¢; cs., 43¢; raw, bbl., 36¢; cs., 41¢; lots of 5 bbls., 1¢ less. Kerosene—Pearl, cs., per gal., 17½¢; Astral, 17½¢; Star, 17½¢; Eocene, 19½¢; Extra Star, 21½¢; Elaine, 22½¢; Water White, bulk, in tanks, 11½¢; Mineral Seal, iron bbls., 21¢; wooden bbls., 23½¢; cs., 26¢; Mineral Sperm, 27¢; Deodorized Stove Gasoline, bulk, 13¢; do., cs., 18¢; 8¢ deg. Gasoline, bulk, 20¢; do., cs., 25¢; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11½¢; do., in cs., 16½¢; Lard Oil, Extra Winter Strained, bbl., 56¢; cs., 61¢; No. 1 bbl., 46¢; cs., 51¢; Neatsfoot Oil, bbl., 65¢; cs., 70¢; No. 1 bbl., 55¢; cs., 60¢; Sperm, crude, 60¢; Natural White, 65¢; Bleached do., 70¢; Whale Oil, Natural White, 40¢; Bleached do., 45¢; Cocoa, cs., 55¢; Pacific Rubber Mixed Paints, white and house colors, \$1.25@1.35 per gal.; wagon colors, \$2@2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31¢ per lb.; carloads, 29¢; in 10-lb. tins 37¢; sulphuric acid, 2½¢ per lb. 60% B.; soda ash, \$1.60 per 100 lbs. 58½%; hyposulphite of soda, 2½¢ per lb.; blue vitriol, 4½¢ per lb.; borax, refined, 5½¢ per lb.; chlorate of potash, 9½¢@10¢; roll sulphur, 2½¢; alum, \$1.90@2.00; flour sulphur, French, 2½¢@3½¢; California refined, 1½¢@1½¢; nitric acid, in carboys 8¢ per lb.; caustic soda, in 10-lb. tins 15¢ per lb.; Cal. s. soda, bbls., 65¢; sks., 60¢ @ 100 lbs; chloride of lime, spot, 2.10 @ 2.25¢; saltpeter, 15¢; chlorate of potash, 25¢; caustic potash, 12¢.

CANDLES.—Electric Light Candles—6s, 16 oz., 7½¢; 6s, 14 oz., 6½¢; 6s, 12 oz., 5½¢; 6s, 10 oz., 4½¢; Granite (Mining) Candles—6s, 16 oz., 8½¢; 6s, 14 oz., 7½¢; 6s, 12 oz., 7½¢; 6s, 10 oz., 6½¢. Paraffine Wax Candles—1s, 2s, 4s, 6s, 12s, white, 8¢; colored, 9¢.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.40; cut, \$2.25; 10 to 20d, wire, \$2.45; cut, \$2.30; 8d, wire, \$2.50; cut, \$2.35; 6 and 7d, wire, \$2.60; cut, \$2.45; 4 and 5d, wire, \$2.70; cut, \$2.55; 3d, wire, \$2.85; cut, \$2.70; 2d, wire, \$3.10; cut, \$2.95. In carload lots, 10¢ per keg less.

CORDAGE.

| | Sisal. | Manila. |
|------------------------------------|--------|---------|
| 1¼-in. cir. (7-16 dia. and upward) | 9½ | 9½ |
| 12-thread (¾ dia.) | 9½ | 10½ |
| 6 and 9 thread (¾ and 5-16 dia.) | 10½ | 10½ |
| Bale Rope (3 and 4 strand) | 9½ | 9½ |
| Bale Rope (2, 6 and 8 strand) | 9½ | 10½ |

In quantities not less than 10,000 lbs.

San Francisco Stock Board Sales.

SAN FRANCISCO, Dec. 15, 1898.

9:30 A. M. SESSION.

| | | | |
|-------------------------|--------|------------------------|-----|
| 300 Best & Belcher..... | 38c | 700 Sierra Nevada..... | 97c |
| 300 C. Cal. & Va..... | \$1 15 | 500 Union Con..... | 20c |
| 300 Con. & Curry..... | 28c | 300 Utah..... | 13c |
| 200 Mexican..... | 31c | 100 Yellow Jacket..... | 16c |
| 300 Overman..... | 18c | | |

2:30 P. M. SESSION.

| | | | |
|-------------------------|--------|------------------------|--------|
| 700 Mexican..... | 32c | 600 H. & N..... | 15c |
| 100 Gould & Curry..... | 28c | 100 Confidence..... | 57c |
| 300 Best & Belcher..... | 38c | 400 Sierra Nevada..... | 93c |
| 400 Con. Cal. & Va..... | \$1 15 | 100 Caledonia..... | 23c |
| 200 Savage..... | 14c | 400 Occidental..... | \$1 15 |
| 500 Potosi..... | 20c | | |

Quicksilver

FOR SALE IN LOTS TO SUIT.

Agents for Redington Quicksilver Mine.

REDINGTON & COMPANY, Wholesale Drug-
gists, 23-25-27 Second Street, San Francisco.

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ROSSLAND
Mining Stocks

Bought and sold for non-residents. SOLID DIVI-
DEND PAYERS as an investment. Prospective
producers as a speculation. Write for information.

H. P. PALMER & CO.,

Exchange Nat. Bank Bldg., SPOKANE, WASH.

HERRIN & REINER,

Mine and Stock Brokers.

Reliable Quotations given on all the Standard
British Columbia, Washington and Idaho
Mining Stocks.

Rooms 9 and 10, Zeigler Block, Spokane, Wash.

Silver City Reduction Co.,

SILVER CITY, GRANT COUNTY,
NEW MEXICO.

Purchasers and Smelters of Gold,
Silver and Copper Ores.

This Plant is Owned and Operated by the Estate
of the Late Senator George Hearst of California.

Diamond Drill for Hire.

DRILL CAN BE HIRED, TOGETHER
WITH EXPERT TO OPERATE.

DIAMONDS FOR SALE.

Apply to J. A. MURRAY, care of Risdon Iron
Works, San Francisco.

Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.

FRESNO, June 25, 1898.

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gaso-
line engine and hoist purchased
from you is doing fine work
and is perfectly satisfactory in
every respect.

Yours truly,

TUOLUMNE MOTHER LODE
M. & D. CO.,

Per N. W. Moody, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

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Are always the CHEAPEST. All the latest and best works on Mining, Metallurgical, Electrical and kindred subjects can always be obtained through the office of the MINING AND SCIENTIFIC PRESS. Below will be found a list of standard books in their various lines. If you do not find what you want in it, send for catalogue and price list of Standard Mining Works and Scientific Publications.

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For the use of Mining Engineers and Technical Schools. Treating of Preparatory and Exploratory Work, Methods of Mining, Hoisting Machinery, Pumping, Ventilation Shafts, Tunnels, Blasting, Timbering, etc. By Prof. Magnus O. Ihseng, E. M., Ph. D. Third, revised and enlarged, edition. 348 pages, 8vo., cloth.....\$4 00

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Assessment Notices.

MABINA MARSICANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of November, 1898, an assessment (No. 16) of 2 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 24th day of December, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 16th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
CHARLES BOVONE, Secretary.
Office—217 Sacramento street, San Francisco, California.

ARRASTRAVILLE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of November, 1898, an assessment (No. 2) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 213 Jackson St., San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of December, 1898, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the 17th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
J. MIDDLETON, Secretary.
Office—213 Jackson street, San Francisco, California.

INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business, San Francisco, California; location of works, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 8th day of December, 1898, an assessment (No. 32) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 31, 10th floor, Mills building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 26th day of January, 1899, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on THURSDAY, the 23d day of March, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
CHARLES E. ANDERSON, Secretary.
Office—Mills building, room 31, 10th floor, San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of December, 1898, an assessment (No. 23) of three (3c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 9th day of January, 1899, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
CALVERT MEADE, Secretary.
Office—106 Leidesdorff street, San Francisco, California.

NATIONAL CONS MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 5th day of December, 1898, an assessment (No. 5) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 773 Mission street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of January, 1899, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 15th day of February, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
GEO. W. FLEISSNER, Secretary.
Office—773 Mission street, San Francisco, California.

EUREKA CONSOLIDATED DRIFT MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of December, 1898, an assessment (No. 15) of 1/4 of 1 cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, No. 1209 Claus Spreckels building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of January, 1899, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 2nd day of February, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
J. J. CRAWFORD, Secretary.
Office—No. 1209 Claus Spreckels building, San Francisco, California.

ANNUAL MEETING.
The Regular Annual Meeting of the Stockholders of the CONSOLIDATED ST. GOTHARD GOLD MINING COMPANY will be held at the office of the company, 113 Crocker building, San Francisco, California, on THURSDAY, the 15th day of January, 1899, at the hour of 2 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Monday, January 9th, at 4 o'clock P. M.
J. F. HOLLING, Secretary.
Office—113 Crocker building, San Francisco, California.

ANNUAL MEETING NOTICE.
The Annual Meeting of the Stockholders of the EUREKA CONSOLIDATED DRIFT MINING COMPANY will be held at its offices, Nos. 1209-1211 Claus Spreckels Building, San Francisco, at 1 o'clock MONDAY, December 19th, 1898.
J. J. CRAWFORD, Secretary.



Side - Dumping Ore Car,

All Steel Construction,

WITH ANACONDA SELF-OILING WHEELS AND AXLES.

THE BEST CAR BUILT.

Cars Built to Meet Any Requirements.

American Engineering Works,

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F. R. FIELD, Representative.

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AFFORDS THE BEST ROUTE TO THE GREAT NORTHWEST.

Is the only line operating through Pullman Palace and Tourist Sleeping Cars from Denver to Portland, Oregon.

THE GREAT GOLD MINING DISTRICTS

—OF—
MERCUR (UTAH), KOOTENAI, KLONDIKE,
Are best reached via
THE OREGON SHORT LINE RAILROAD.

IRRIGATED LANDS OF IDAHO.

Thousands of acres of the choicest lands of the West are located along the line of THE OREGON SHORT LINE RAILROAD in Utah, Idaho and eastern Oregon. Splendid opportunities for the Investor, the Farmer and Fruit Raiser.

D. E. BURLEY, Gen'l Passenger Agent,
SALT LAKE, UTAH.

THE OREGON SHORT LINE RAILROAD.

Colorado Midland Railroad

Reaches the Grandest Scenery in the World:

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The Most Beautiful Summer Resorts in Colorado:

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W. F. BAILEY, Gen. Pass. Agt., Denver, Colo.

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Supported by the State of Michigan. Practical work. Electric system. Special advantages for men of age and experience. For catalogue address
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Weber Hoists.

6 to 100 H. P.

Cost to Run, 1c per hour per H. P.

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IS PRODUCING
Over \$1,000,000 per Month
IN GOLD.

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DENVER, COLO.

La Sal Mountains.

NEW, RICH MINING DISTRICT.

Best reached by way of the

Rio Grande Western Railway
from CISCO or THOMPSONS stations.

Daily stage from Thompsons to Moab—here outfits can be secured at very reasonable rates—thence by wagon or saddle to LA SAL MOUNTAINS, twenty miles distant.

The formation is igneous and all the metamorphic rocks abound. Veins of quartz, quartzite, porphyry, granite and spar are well defined. The district promises a great future.

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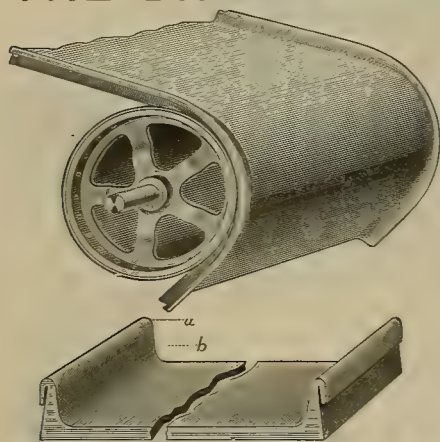
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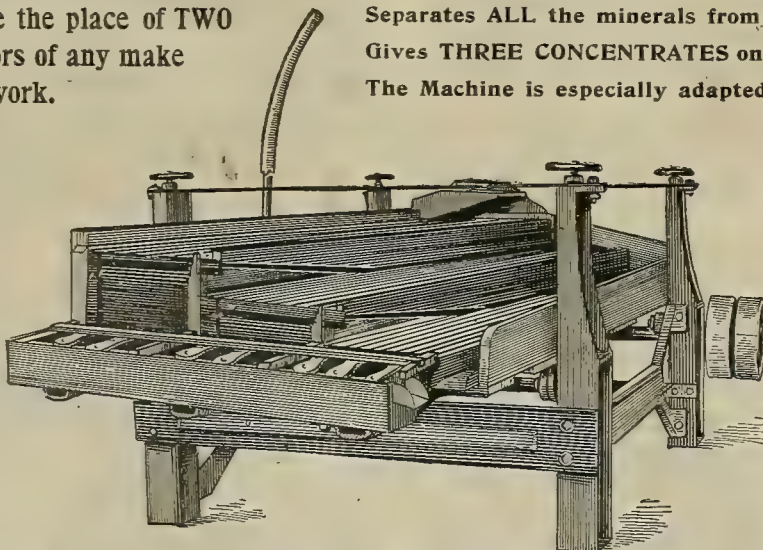
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AND PACIFIC ELECTRICAL REVIEW.

No. 2007.—VOLUME LXXVII.
Number 26.

SAN FRANCISCO, SATURDAY, DECEMBER 24, 1898.

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Motor Road Locomotion.

The railroad locomotive was not the first "horseless carriage." The idea developed from the velocipede, and when a moto-velocipede was almost perfected, motives for reduction of friction caused it to be put on rails; hence the origin of the modern railway. The truth of this is shown in the designs of automobiles in the eighteenth century, which were fashioned after velocipedes, and not after the carriage. The modern successful automobile has been designed on the plan of the latter. While, ordinarily, invention or improvement originates in this country, or is best practically developed here, in the case of motor road locomotion (as applied to the carriage of passengers) the invention is a European one, and in that country is so far carried to greatest perfection. In England and France, automobiles are becoming as common as the bicycle in San Francisco or Denver. The machine has developed along the ugly lines of a buggy or carryall, rather than seeking an individuality for itself through designs which would be more fitting to its peculiar qualities. Although much of the bicycle gear was added to improve the fleetness of some of these automobiles, the basic idea of four wheels, two axles and a body box remained. Naturally, the requirements of inventors and manufacturers omit the question of beauty in the machine. They want vehicles that may be run cheaper than anything in that line drawn by horses; they want speed, and capacity for carrying passengers. It does not matter to drivers or owners how ugly the machines look as long as they bring in more money than do the vehicles drawn by horses.

This fact was recently emphasized at an exhibition held in Paris, where the only vehicles admitted to competition figured in the following categories: Closed carriages for two persons; open carriages for two persons; mixed carriages for two persons, capable of being instantaneously closed or opened; carriages for four persons, with space for baggage, sixty-five pounds to each person; open carriages, with hood, for four persons; closed carriages for six persons, with space for baggage, sixty-five pounds to each person. The vehicles had to be so constructed that all persons could be comfortably seated therein, and had to be provided with an odometer or kilometer counter with two brakes, one progressive and the other instantaneous. Out of the twenty-six vehicles booked, sixteen were electric and ten gasoline, which would indicate that steam as a motive power in the automobile would not be employed in general use for the lightest variety of road carriage, though, in London, steam road vehicles have been further developed

than in the case of either gas or electricity. In the latter city there are several designs of steam omnibuses, motor omnibuses, and "petrole" cabs. In the first of these vehicles steam is generated by a slow combustion stove which consumes only a very



RIKER ELECTRIC VICTORIA.

small quantity of coke or petroleum. The omnibuses are of 20 H. P., and one vehicle, it is asserted, can accommodate twenty-eight passengers. The cost per passenger is stated to amount to one-tenth of a cent per mile. Speed would be developed from eight

which has since worked satisfactorily, the motive power being a 2 H. P. gas engine. The machine was calculated to carry three persons on a single broad seat, though operated by one, with surplus power sufficient to take on a trail vehicle, according to the character of the road. It carried twelve hours' supply of gasoline—two and one-half gallons—and attained a speed of from ten to twelve miles per hour on favorable ground. Being geared in such a manner that the movement of a lever increased or decreased the speed, enabled it to climb grades of considerable pitch. It was safe, simple in construction, the design of the inventor being to have as few pieces and parts as possible. In the broader field of freighting, the Daniel Best Manufacturing Co. of San Leandro, Cal., have shown what skill and enterprise can do in that direction, building powerful, successful and practicable road engines, with a capacity for hauling a loaded train of wagons weighing 100,000 pounds on ordinarily level roads, and lighter loads on grades of one foot in eight, this firm, however, confining their successful scope of work to supplying the requirements of the freighter. In New York City an electrical vehicle company is putting out some cabs and coupes, and in Brooklyn the Riker Electric Motor Co. are building similar handsome vehicles. In the one herewith illustrated the tires are 3x32 inches front, 36 inches rear; wheel base, 63 inches; tread, 50 inches; weight, 1800 lbs.; carrying capacity, two passengers; one motor, 2½ K.

W.; controller gives three speeds ahead and two to the rear; maximum speed, twelve miles per hour; total mileage, twenty-five miles on level asphalt or macadam, per charge; combination voltmeter and ammeter; electric side lights; driving from rear wheels and steering from front wheels. In some of the more recently constructed electrical carriages a speed of twenty hours has been attained under favorable circumstances. In a "wagonette" propelled by steam, built by an English concern, a speed at the rate of twenty-five miles per hour was secured. This vehicle carries twenty-two people, and can climb a grade of one foot in seven, fully loaded. Another steam vehicle built by the same company, carrying six persons, has, on country roads, covered a distance of one mile in one



CALIFORNIA GAS ENGINE TRICYCLE.

to ten miles an hour, and may be increased to fifteen miles.

In the United States, wherever the grade of the road or street will permit, automobiles will sooner or later find their way. Already several American firms build them. Over four years ago a San Francisco firm manufacturing gas engines—A. Schilling & Sons, 211-213 Main St.—on an order from a resident of Santa Maria, Santa Barbara Co., Cal., built a gas engine tricycle, illustrated herewith, and

minute and ten seconds. Of course, the words "country roads" have in England, or on the continent, a different significance from what they have in this country. In the United States, as it "fills up" and we are able to devote needed time and money to the important question of better roads, traction engines, electric motors, steam and petroleum wagons, and automobiles in general, will come into more general use. As a rule, the American people are learning the utility and economy of good roads.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....Publisher

San Francisco, December 24, 1898.

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UTAH is developing considerable business in its mining stock exchange at Salt Lake City. Transfers for the week ending December 17 aggregated 381,339 shares, selling for \$121,623 88.

THE California State Miners' Association is enlarging the scope of its operations. Designed originally to secure justice for the hydraulic miner, it has severally taken up the mineral lands fight, the securing of additional State and national legislation, the creation of a national cabinet department of mines and mining, and is now essaying the handling of the California mineral exhibit at the Paris Exposition and the conservation of the waters of the State.

COLORADO furnishes a wonderful example of recuperation from untoward mining conditions. When the slump in silver wreaked ruin on the leading industry of that commonwealth, and gold was in the ascendant, the miners of the Centennial State tacitly said: "Very well. Just mention what you want; if it is gold, we will furnish that," and straightway forged to the front as gold producers—Colorado's gold yield this year being estimated to aggregate nearly \$25,000,000.

Some Surprising Statements.

With some surprise is read in the *New York Bankers' Magazine* an article from Mr. T. A. Rickard, State Geologist of Colorado, in which that usually accurate gentleman says:

Nine mines out of ten are sold for more than they are worth. More money is made by selling than by buying them. Much of the so-called business of mining is based on a scant knowledge of its operations, and a profound recognition of the essential foolishness of human nature. A man usually buys a mine, not because it is worth the price he pays for it, but because he is justified in the expectation of finding some one who will pay more for it. The syndicate sells to the public; the public sell among themselves. The second man hopes to meet a third with more money and less sense. So the game proceeds.

It is seldom that so prominent a man in so prominent an industry decries his own business and endeavors to degrade its standing. Such misleading utterances are always gladly seized on by those who attempt to justify wrong action by the miserable plea: "they all do it; why not I?" According to the above, the business of mining is mainly a game of cheat and bluff, on the part of fakirs, swindlers and dealers in "green goods." Mr. Rickard's own experience directly contradicts his published utterances, and the general facts patent to all make unnecessary any attempt to show the fallacy of such assertions. Ordinarily, such flings at mining are attributed to private pique, peculiar ignorance, or personal disappointment, and go unnoticed; but in the case of Colorado's State Geologist, who is genial, well-informed and successful, it is to be regretted that his recent visit to the old country should have so warped his views. It were unfortunate for Colorado or any other great mining State did such statements have substantial basis—an unlikely contingency.

Should Have Representation.

In 1900 will be taken the Twelfth Census of the United States. Originally intended to be a correct compilation as to the number of inhabitants, their birthplace and avocation, the U. S. census in the last few decades has become the most complex thing of the kind in existence. So extended and involved are the myriad statistics now gathered that each census costs several million dollars, and the facts so secured are not published in their entirety till it is about time to prepare for the next one. Thus, it is only recently that the mass of figures obtained in the census of 1890 has been finally given out. Everything conceivable has been figured on and with—except mining, distinctively. The number of Indians in the State of New York under fourteen years of age who have attended school three hours each school day; the average individual amount of money brought by immigrants from South America to New Orleans in January, 1892; and the difference between the earnings of the French-Canadian operatives in Massachusetts cotton factories and the negroes in South Carolina rice fields has been figured out in minute detail and published in substantial shape—but nothing about mining, specifically. On June 16, 1898, Senate bill 4545 passed the U. S. Senate. It provides for the twelfth census in 1900. It didn't pass the House, so will come up before this present short session or before the 56th Congress which convenes March 4, 1899. Section 24 of that bill enumerates what shall be considered; what statistics shall be secured in that census which costs so much of public money, and which ordinarily will be within public purview about 1906. In that section, and in fact in the whole bill there is not a word that would lead any one to suppose there was such a thing as a mine in the United States. The country's greatest basic industry; the one thing upon which primarily the prosperity of the whole country depends is utterly ignored. The only industry of the only prosperous section of the United States, is not of sufficient importance to have separate and distinct place in the Twelfth Census of the United States, though were it not for that industry the country's western boundary would be the Mississippi river, and the census would be a comparatively small affair. Where were the Senators from the great mining States when this bill passed the U. S. Senate? Of what use is a census that does not enumerate things of value, and what in this country exceeds in value or importance the mining industry? In the Congress of the United States now in session at Washington, D. C., sit 90 Senators and 357 Representatives: of these 447 men 22 Senators and 43 Representatives were elected from great metal mining commonwealths. It is within bounds to suggest to these 65 gentlemen, singly and collectively, that any one of them could be of some service to the nation, and possibly to himself, were he to interview the chairman of the Committee on Twelfth U. S. Census, or, if in the House, take fitting action, to see that in the bill authorizing expenditure therefor is a clause making specific appropriation of an amount sufficient to insure publication therein of official statistics of the mineral industry of this country. Distinct from all other industries, mining in '97 produced in this country values aggregating \$623,312,347. Possibly detailed statistics thereof would be as beneficial and interesting to some of the public who pay for the census as are elaborately illustrated volumes on the difference between the entomological structure of the lady-bug found on the leaves of Vermont cabbages and the moths that infest the buckwheat fields of northeastern Maine.

A SUIT involving \$750,000 was decided in a Boston, Mass., court this week in favor of the California defendants. In September, '95, Messrs. Nevills, Martin & Ballard of San Francisco gave G. M. Pinney authority to sell 100,000 shares stock in the Rawhide Gold Mining Co. at \$15 per share. On March 23rd, '96, C. W. Norton of Boston made proffer of the amount—\$1,500,000—for the stock, but Messrs. Nevills, Martin & Ballard declined then to transfer the stock for less than \$25 per share. Norton thereupon brought suit for \$750,000 damages. Defendants claimed that at the time of making the arrangement with Pinney they had reserved the right to change the minimum price at which the

stock was to be sold, that plaintiff understood this, and that between September 23rd, '95, and March 23rd, '96, had notice of such change, and that Pinney had no authority, at the time of the proffer of the \$1,500,000 by Norton, to sell the stock at that figure. The case will be appealed to the U. S. Supreme Court.

Storage of Water.

At its meeting last month the California State Miners' Association recommended the appointment of a committee of five "to consider the question of the storage of water." Whether that is or is not in the province of the Association, the subject is of prime importance to every California producer, be his product of the field, the forest or the mine. The question is one of ways and means. Water exists in abundance. Its manner of existence, the topography of the State, the great annual waste, the resultant loss, and the manifest need of water storage, constitute a problem for hydraulic engineers to successfully solve, and is a matter that deserves attention.

At various times the United States and State governments have realized this; considerable money has been spent and valuable data secured, forming a basis for intelligent action. It would seem that utilization of the larger streams, construction of storage basins and storm water reservoirs, controlling the flow of the smaller streams and utilizing the mountain lakes, could rationally be made the basic principle of the proposed work. Objections in plenty will arise: vested rights; mining ditches and dams, long acquired private storage systems built and maintained at great cost must be protected. The general character and manifest cost of the work militates against the idea, and occasions a generally felt idea that, if expressed, would be about this: "The surplus water should be stored, and the need of some such scheme is plain; it must be done sometime, but how it is to be done is beyond suggestion." And yet, with the water at hand, and the great need of the State, mountain lakes full of what is needed to make miner and farmer continuously prosperous, it would seem that the same genius of American invention that has succeeded in equally arduous work could find a way to settle the intricate question. Reservoir sites and natural reservoirs are abundant. Lake Tahoe, filled from a catchment basin of 500 square miles, has water enough to cover 500,000 acres in the valley below one foot deep. This water is susceptible of storage by providing for the discharge of four feet of water from the surface of the lake through each summer, and the conservation of the same amount annually through each rainy season. At the altitude of Lake Tahoe, over a mile vertically above the thirsty valleys it could fructify, evaporation is at its minimum, the water is the purest; the adjacent land can be utilized for no other purpose but summer pasturage. That is but one; scattered along the axial of the Sierras are a hundred lakes, natural reservoirs, whose aggregate area approximates 1000 square miles, each with the same general characteristics briefly noted in reference to Lake Tahoe. There is enough water in these natural reservoirs to furnish power to every mine in California and irrigate every arid acre in the State. This is exclusive of the reservoir sites and the natural unrestricted flow of the streams.

Other sections have the same problem on a smaller scale, and are attempting its solution. The reservoir plan appears the most feasible. It is manifest that this question must ultimately be settled; it may be postponed year after year, but must sooner or later be ultimately disposed of. It is also believed that, while the California State Miners' Association deserves commendation for intelligently noting such general need, it is not for that Association or any other private organization to take up the work. That rightly rests with the general Government, and California would be justified in calling for adequate national appropriation therefor.

A LONDON contemporary disbelieves recent published statements regarding achievements in long-distance electric power transmission in California and Utah. England has no water power and it is, perhaps, difficult from an insular standpoint to credit or understand what is being done elsewhere.

Concentrates.

Pure copper weighs 555 pounds per cubic foot.

"The top width of an earthen dam 64 feet high" should be 18 feet.

OREGON papers call for a law in that State against "salt-ing" mines.

The Portland G. M. Co. of Cripple Creek, Colorado, has paid this year \$510,000 in dividends.

A 3-inch iron pipe 1 foot in length contains .4418 cubic foot, 3,905 gallons, weighs 27.5 pounds.

For the 39th time the MINING AND SCIENTIFIC PRESS wishes its readers "A Merry Christmas."

AVERAGE soft coal is made up of carbon .812, hydrogen .048, oxygen .054, nitrogen and sulphur .031, ashes .055.

MINING location blanks may now be secured at the office of almost any newspaper published in a mining country.

PAY gold is alleged to have been discovered in Utah coal. Over twenty years ago gold was found in coal at Tallawang, N. S. W.

The dielectric strength of an electric insulator is its ability to stand the mechanical and electrical stresses due to the voltages used.

The gold output of the Witwatersrand, South Africa, gold fields for October, '88, was 27,165 ounces; for October, '98, 400,791 ounces.

The 18 knots per hour recently made by the torpedo boat Farragut, in San Francisco bay, equals a rate of 34 7/8 statute miles per hour.

ONE "candle power" is the light given out by one standard candle, the basis being the burning of two grains of sperm candle per minute.

DEPUTY MINE INSPECTOR NYE of Colorado reports 3000 men on the payrolls of Cripple Creek mines. The daily wages are \$3 for underground work.

U. M. VOICE of Malaga, Fresno Co., Cal., claims to have discovered gravel there "yielding over 50 cents to the pan, as well as a large percentage of platinum."

SEPT. COLCORD attributes the closing of the Carson, Nevada, mint coinage department to its being ignored by home producers sending their bullion away for coinage.

The Los Angeles, Cal., Mining Review and the Redding, Cal., Searchlight are good examples of local publications north and south that aid in the State's mineral development.

In the U. S. Senate this week was introduced a joint resolution providing for a division of mines and mining, under the Geological Survey. The resolution provides for \$115,000 to carry on the work.

THERE are eleven miners' unions in Montana, with a membership of about 4000. They pay weekly benefits of from \$6 to \$10 for sickness or disability; four pay a small amount in case of death or total disability.

CALIFORNIA manufacturers of giant powder are debarred from a profitable market by the Johannesburg monopoly, which secures what appear to be enormous prices. The annual consumption is about 250,000 cases there.

At Malakoff, Nevada Co., Cal., years ago the North Bloomfield M. Co. sunk a shaft 207 feet through gravel before striking bedrock of the channel. It was gold-bearing throughout, yielding from 40 cents to \$2.50 per cubic yard.

SILVER is among metals the best conductor of heat and electricity, its property in that regard decreasing with rise in temperature. Coin silver contains 7 per cent copper. The tarnish caused by sulphur is a thin film of sulphide of silver.

Boston has 1232 electrical lamps to each 1000 inhabitants, New York 859, Chicago 730, San Francisco 660, St. Louis 660, Cincinnati 551, Philadelphia 375, Baltimore 373, Brooklyn 286, Vienna 246, Edinburgh 243, Paris 185, London 184, Berlin 178.

NOTING that the next meeting—the 76th—of the American Institute of Mining Engineers will be held in New York City next February, it is in order to suggest that the following meeting—the 77th—of that organization could with great propriety be held in San Francisco.

"DENOUNCEMENT," in the mining law of Mexico, means that proceeding by which under the law a legal right of possession is obtained to mining property in that republic. The word has no English synonym, but is used by all English-speaking foreigners mining in Mexico.

"REV." JERNEGAN of Middletown, Conn., who induced credulous Boston men to put \$300,000 in his hands "to extract gold from sea water," has proffered from Brussels, Belgium, to disgorge \$75,000 if the Massachusetts men will let him come back to the United States and enjoy the remainder in peace and comfort.

WATER is at its greatest density at 39.1° Fahr. If heated from 30° Fahr. to that temperature it contracts, then expands until at 46° Fahr. it has the same volume as at the freezing point—32° Fahr. Heated to 212° Fahr., it expands .0465 of its volume at 32° Fahr. The volume increases in a greater ratio than the temperature.

TO FIND "the actual rate of expansion in the first cylinder of a compound engine," divide the period of admission, plus the clearance, with the length of stroke, plus the clearance. That is: suppose cut-off at one-fifth, and clearances at one end equal to one-twentieth the piston displacement, then 1.05 divided by .25 equals 4.2.

MINERALOGICAL information as to the Philippines is meager. Recent inquirers are referred to the issue of Nov. 26, which contained advance sheets of Prof. Becker's forthcoming official report thereon. A Philippine exploring expedition was recently projected in San Francisco. Geographically speaking, there is considerable room for such an organization.

The minimum interval of rest which can be allowed in the operation of stamps in a stamp mill is one-tenth of a second. With a 1-in. drop a stamp will occupy .073 sec. in dropping; with a 2-in. drop it takes .11 sec.; 3-in., .134 sec.; 4-in., .154; 5-in., .174; 6-in., .19; 7-in., .206; 8-in., .22; 9-in., .233. With a cam-lift of 7 in., 90 drops per minute, the time of the lift is .297 sec.; of the lift and drop together, .667 sec.

In 1884 a 50 K. W. dynamo was considered a large machine, while a 100 K. W. Edison steam dynamo was justly called a "Jumbo." At the present time the largest size of generator built or building is of 4600 K. W. capacity. The price of dynamos sixteen years ago was about 20 cents per watt of output; dynamos of similar running speed in comparatively small sizes without switchboards now cost about 2 cents per watt.

SAM'L NEWHOUSE of the Utah Con. G. M. Ltd. claims that he has 750,000 tons ore in sight, sufficient to keep his 200-ton smelter running for the next twelve or fifteen years. The

formation is quartzite and limestone, alternating; the oxidized ore contains silica, 8%; iron, 15%; copper, a little gold and about 2½ oz. silver to the ton. There are no shafts; the mining is all done through tunnels; he says he can drive a timbered tunnel 400½ ft. for \$8 per linear foot, and can mine and deliver ore at the tunnel's mouth for \$1.35 per ton.

This native alloy sent is similar to that found in the black sand and sea beach gold at Gold Bluff, Port Orford, and other places on the California and Oregon coast. It occurs in thin scales about one-fiftieth of an inch in diameter, resembling nickel in color. It is strongly magnetic. Its specific gravity is 18. It is composed in 100 parts: of platinum, 48; osmioridium, 44; iron, 6; indeterminate, 2. So far as known, it has not as yet been discovered in place. A Washington man recently wrote that he had "a ledge" of it, but that is extremely doubtful.

The initials "E. M. F." form an abbreviation for electro-motive force, which may be briefly defined as anything that produces or tends to produce an electrical flow, including all such agencies. For instance, when copper and zinc plates are immersed in dilute sulphuric acid the copper becomes positive and the zinc negative. An E. M. F. is created, tending to carry electricity across the liquid from the zinc to the copper. An "ohm" is the resistance offered to the electric flow by a copper wire one-twenty-fifth of an inch in diameter and 150 feet in length.

The illustrated little article on page 635 on "A Home-Made Dynamite Thawer" is a good example of correspondence. The New Mexico subscriber sent a rough sketch, embodying the idea, which our engraver redraw as published. A sketch or drawing, however crude, is always of value as in no way can a better idea be secured of any device. In this particular case it is in order to say that the Hendrie & Bolthoff Mfg. & Supply Co. of Denver, Colo., furnish a simple and excellent device for thawing powder, though the apparatus illustrated and described by Mr. Sanders would be of value to many an isolated miner.

SEC. 2339, Revised Statutes U. S., says: Whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing or other purposes have vested and accrued, and the same are recognized and acknowledged by the local customs, laws and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same; and the right of way for the construction of ditches and canals for the purposes herein specified is acknowledged and confirmed. But whenever any person, in the construction of any ditch or canal, injures or damages the possession of any settler on the public domain, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

This week's rains were a Godsend to the California miner. Not since '51 was there so long-continued a drought, and every miner hopes it will be forty-seven years more before there will be so serious a cessation of mining. To illustrate recent existing conditions is published an excerpt from a press dispatch dated Dec. 20th, from a section of the State that because of its situation in the foothill region is ordinarily exempt from inconvenience: "The town of Forest Hill, the center of the mining region, has been in need of water even for drinking purposes, and but a few weeks ago, during a fire at that place, giant powder was resorted to, to save the entire town from destruction. Never in its history has this mining section suffered so for water, and never was the outlook brighter for a large output of gold in 1899 if backed up by a wet winter."

At Savonas, B. C., is the only producing quicksilver mine, so far as known, under the British flag. In the United States, California is the only State producing quicksilver in commercial quantities. Recent correspondence with this paper has indicated cinnabar finds in Arizona, Washington and Oregon. In the daily papers of the 20th inst. appears an absurd "dispatch" of the discovery of a "mountain" of cinnabar in Lake Co., Or., through which three tunnels have been run, "all through pure cinnabar ore!" The discovery was made by "farmers" mining the adjacent farm land, who sold the "mountain" to Tacoma, Wash., men, who say they will "erect a smelter and monthly ship 800 flasks." The shipments will be "to New York in car load lots." Inspirers of such silly statements fail to grasp the force of understatement or the weakness of exaggeration.

RAT PORTAGE, Ontario, does not propose to be behind in early announcement of "great gold strikes;" but not desiring to wait for the slower process of the mails, sends by special telegraph a "press dispatch," dated at Winnipeg, the day prior to its appearance in sundry newspapers, an alleged find of gold ore "filling a slope 40 ft. high, 2½ ft. wide." The ore is "on a conservative estimate worth from \$25,000 to \$35,000 per ton in free-milling gold." Another estimate, equally "conservative," figures "\$250,000 now in sight." The vein, it appears, is "11 ft. wide; its length and breadth not yet determined." Some time ago the leading advertising agency in the United States widely advertised its ability to secure publication of "anything" marked "by telegraph," and having the appearance of a genuine news item, in daily newspapers—if the financial inducements were sufficient.

REGARDING the fullers' earth recently discovered at Famosa, Kern Co., Cal., in general, is a clay-like substance, which has the property of decolorizing or clarifying oils. An ultimate chemical analysis shows it to differ from most ordinary clays in having usually a high percentage of combined water and a low amount of alumina. There is probably a large amount of hydrous silica present. Fullers' earth possesses little or no plasticity, and in order to work properly has to be ground very fine. A chemical analysis is of little value at present in determining its quality; only a practical test suffices. Up to about three years ago all of the fullers' earth used in this country was imported from England; deposits have since been discovered in Florida. Next to the Florida deposits of fullers' earth, those of South Dakota are the most extensive thus far discovered in this country. The Kern Co. deposits are being tested preparatory to extensive development work if conditions warrant.

The late decision of the United States Supreme Court in the case of the Enterprise Mining Company vs. Rico-Aspen Consolidated Mining Company (Colorado) affirms the right of tunnel companies to locate on veins which they may encounter, and, to a certain extent, the Colorado State law with regard to tunnel claims is practically set aside. The following is quoted from the decision: "The discovery in the tunnel is like a discovery on the surface. Until one is made there is no right to locate a claim in respect to the vein, and the time to determine where and how it shall be located arises only upon

the discovery whether such discovery be made in the surface or in the tunnel. We hold, therefore, that the right to a vein discovered in the tunnel dates, by relation, back to the time of the location of the tunnel site, and also that the right of locating the claim to a vein arises upon its discovery in the tunnel, and may be exercised by locating that claim the full length of 1500 feet on either side of the tunnel, or in such proportion thereof on either side as the locator may desire."

CONCERNING the character of the auriferous wall rocks of gold quartz veins, practical research makes it seem true in most cases for deep mines, that the gold in the walls is contained in the sulphurets; that it is of smaller fineness than the vein gold; that the sulphurets are pyrites; and that gold and sulphurets diminish rapidly in quantity as the distance from the vein increases. Sometimes the wall rock pyrite is almost barren. There appear to be two sorts of wall pyrite, one the result of the action, on ferro-magnesian silicates, of the sulphides of hydrogen or of the alkalis; this variety is sometimes almost worthless. There are other impregnations of pyrite which seem to have permeated from the vein fissures, in solution, as double sulphides of the alkalis and iron. Solutions of alkaline carbonates, partially charged with hydrogen sulphide, will take up notable quantities of many sulphurets, and also of gold. Wall rocks appear to be much more permeable by solutions of some substances than by those of others. Native gold, quartz and all the sulphurets excepting pyrite, are for the most part retained in the veins, while carbonates seem to penetrate freely into the wall rock. This indicates an osmotic separation of the metal-bearing solution. That some undecomposed rocks (granite, andesite), contain free gold in clearly visible particles appears to be quite certain. There is also strong evidence for the strange hypothesis that some sulphurets in massive rocks are original constituents. It is believed that some eruptive rocks associated with veins are truly metalliferous. Nevertheless, the possibility presents itself that in such cases vein and rock each derived its metallic contents from a common source, miles beneath the surface. Such an hypothesis is not without difficulties of its own, but accords better with the osmotic phenomena than the theory of derivation from wall rock.

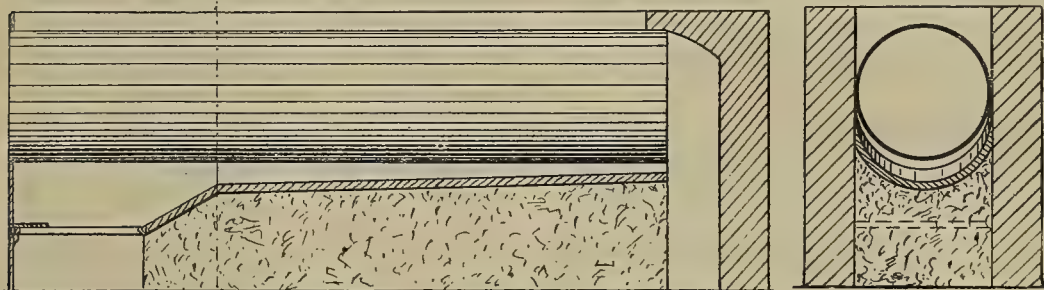
In California the right to the use of running water flowing in a river or stream, or down a canyon or ravine, may be acquired by appropriation. This must be for some useful or beneficial purpose, and when the appropriator or his successor in interest ceases to use it for such a purpose, the right ceases. The person entitled to the use may change the place of diversion, if others are not injured by such change, and may extend the ditch, flume, pipe or aqueduct by which the diversion is made to places beyond the first use. The water appropriated may be turned into the channel of another stream and mingled with its water, and then reclaimed; but in reclaiming it the water already appropriated by another must not be eliminated. A person desiring to appropriate must post a notice in writing, in a conspicuous place at the point of intended diversion, stating therein: First, that he claims the water there flowing to the extent of (giving the number) inches, measured under a 4-lb. pressure; second, the purposes for which he claims it, and place of intended use; third, the means by which he intends to divert it and the size of the flume, ditch, pipe or aqueduct in which he intends to divert it. A copy of the notice, within ten days after it is posted, must be recorded in the recorder's office of the county in which it is posted. Within sixty days after the notice is posted the claimant must commence the excavation or construction of the works in which he intends to divert the water, and must prosecute the work diligently and uninterruptedly until completion, unless temporarily interrupted by snow or rain. Completion means conducting the water to the place of intended use. By a compliance with the above the claimant's right to the use of the water relates back to the time the notice was posted, but a failure deprives the claimant of the right as against a subsequent claimant who complies.

METALS differ widely in their behavior under the cutting tool. Some, like iron or steel, require a slow speed and light feed, a tool shaped differently from that used for other metals, and usually oil must be applied to the work in order to obtain a free cut. Others, like cast iron, are worked with a speed somewhat higher, and a cut considerably heavier than that employed for iron or steel, and commonly no oil is applied, while others cannot only be cut without oil, but the speed can be very high. An example of this last class is brass, an alloy employed in the arts for purposes demanding a free-working material possessing moderate strength. The name "brass," however, is a term of considerable latitude. It is generally associated with a material of excellent cutting qualities, but the variation is great in this respect. As a rule, the lower the brass the more difficult it is to cut. As the composition approaches pure copper it becomes, like this metal, one of the most troublesome substances known to machine. If the alloy is made from pure copper and spelter (zinc), the result is a material wholly unsuited for certain uses; its chips are long and tenacious; a slower speed must be employed in cutting, and even oil must be applied in many instances. If drilled at a high speed, the drill is liable to become drawn in and broken, and a burr is left on the reverse side which requires extra treatment to remove. If employed in an automatic machine, such as a screw machine, the chips are liable to obstruct the mechanism. In filing, the file soon becomes clogged with particles of metal, which abrade the work in grooves difficult to obliterate. For certain classes of work, such as spinning or cartridge brass, these qualities are essential; but for others, like clock brass or screw rod, they are almost prohibitory. Practice has decided that for the latter purpose all elements of a refractory nature shall be removed, and an alloy produced which can be worked free at a high speed. The difficulty can be partially overcome by making an alloy which will give short chips, but an alloy of this description must still possess sufficient ductility to roll and draw. The methods of making such an alloy are as follows: 1. By making the brass very high, say, not below copper, 55, and zinc, 45 per cent. Such a mixture could be broken down hot, but even then would be unsuitable on account of its hardness and difficulty of rolling or drawing. The chips of the alloy are fairly short, but the speed of working would have to be slow, on account of the hardness. 2. By the addition of tin. Tin, even in small quantities, hardens brass and gives a metal similar to that proposed in the first case. The chips are short if the content of tin is sufficient, but the hardness is too great for a high speed. 3. By the addition of lead. This method of producing free-working brass is now practiced in all the brass manufacturing establishments in the world.

How to Set a Wood-Consuming Boiler.

In the issue of Nov. 19th appeared an article on "Horizontal Tubular Boiler," treating of the merits of the type, its setting, coal consumption, etc. Much of the surface loss, noted by Rankine, is due to reflection and the slight internal loss to a laminated condition of plates. Appearance of such articles upon boilers and methods of setting in relation to economic coal consumption is not infrequent, and it is thought that a similar article relating to the best methods for wood might be of practical value. There are many wood-consuming boilers. Their use require, in some essentials, a setting different from that for coal. The subject as here presented relates to setting for wood consumption by the same type, *e. g.*, the horizontal tubular boiler set in masonry.

In setting of a boiler for wood, it should be underlaid with a continuous curved flooring of permanent material, as brick and mortar, made uniform and smooth as possible, laid eccentric to the boiler, deepest at the bottom center and carried up on the ma-



sonry walls and terminating in O, having a space between it and boiler at that point or line extending through its length of from 1½" to 2", depending upon the size and length of boiler, the larger and longer requiring the more space.

The throating should be done at the rear end, where the cross-sectional area of the opening should be about three fourths that of the corresponding area of tubes. In building this flooring forward it should continuously drop down by a uniform incline to the point where it meets the incline from rear end of grate bars, the amount of drop and consequent increased space again depending upon size and length of boiler, say with a 4' diameter boiler 20' long a difference of 3" between the two points. From this indicated point to the top rear end of grate bars should be laid a smooth incline, which should end at O at the bars and be continued up on the sides to a harmonious union with above described flooring. The practice of laying masonry in steps under boilers is pernicious, as are all abrupt angles. The pitch of this drop-down incline should not exceed 45° from horizontal, and with a long boiler it may be advantageously carried to 30°, in its giving more directness to the current and less liability to injury of the plate directly above it from overheating.

The grate bars should be covered across their front to about one-quarter of their length back with plate iron or some stable incombustible substance which will prevent the passage of air.

The only ash pit, except the one under the grate bars, should be the return chamber at the rear end, and that should have no more extension beyond the end of boiler than is requisite for the care of boiler.

Of course, every engineer knows that the end sought, in setting boilers, is to obtain as perfect combustion as possible, but all do not seem to realize that it is essential that the heat obtained should be continued in unbroken contact with the boiler until a

transference to the water is effected, instead of being allowed to wander around in broken space and exhaust itself.

By this method of setting the draft is greatly increased, so much as, even after reducing the air-admitting surface of grate bars, the necessary air for combustion will need be regulated in its admission under the bars; but the covering of the bars has an important independent function, as will appear further along.

With the ordinary setting the conditions of combustion and the method of firing combine to the effecting of most of the combustion toward and at the rear end of fire box, or chamber, the fuel being continuously fed back to the rear, leaving an open space between the fuel and fire front, in which there is no combustion, in fact, nothing to burn. Cold air in excess passes up through this opening, among the fuel, and a large surplus over it, just where it should not be, thus disturbing and checking combustion. With this described modification the firing should be maintained well to the front. Coals will accumulate upon the plate, a uniform destruction of the fuel will obtain, and a uniform combustion follow. Any free air required for combustion farther back passes under the fire, over the hot coals and ashes of the

ash pit to the rear, thence up and along the floor, between it and the flame, and so continues along until required for combustion, without disturbance to the flame, which is thus continued, undisturbed and unbroken, against the boiler, and any surplus will so pass on into the tubes.

This method heats the fire front and doors more than the usual practice, but can be largely provided against by lining and filling in between with non-conducting material.

The practice of carrying water in the ash pan or pit is objectionable, in that it involves heat which would otherwise be available for generating steam, besides which it generates steam which is of questionable utility, as against air, under the boiler.

To summarize, the results obtained by this method are: increased draft, more uniform combustion, avoidance of introduction of surplus free air among and over the fuel, introduction of the requisite free air beneath and in the rear of the fuel, the continued separate movement of the carbon and oxygen until ready for combustion, the effecting of so perfect combustion in the furnace and under the boiler that little heat passes to the stack—so little that one can rest his hand upon the bonnet without being burned; all of which, when concentrated, means a considerable saving in fuel.

Imperfect combustion means, for one thing, a deposit of solid carbon upon the boiler surfaces, and it being almost a non-conductor, while remaining on deposit greatly impedes the transmission of heat, and if it occurs far back, as in the tubes, the probability is that it will remain as a permanent deposit until mechanically removed.

In construction the introduction into boilers of tubes too small to carry the elements of combustion in sufficient amount as to allow of, and maintain it through their entire length when requisite should be avoided; the longer the tubes the larger they must

be to enable this, some tubes introduced being so small as to choke out combustion.

It is noticeable that ample cross-sectional area of tubes effects an economy in fuel.

NOTE.—If the law governing the wave lengths of sound vibration equally applies to heat, vibration not in harmony will strike down each other through interference. Hence the importance of holding them in close contact with the body which we wish to receive their impulse.

Black Oak Group of Mines, Tuolumne Co., Cal.

From a Special Correspondent.

The Black Oak group of mines is on the east belt, Soulsbyville mining district, Tuolumne Co., Cal. General formation: grano-diorite, granite-hornblende, porphyritic-granite, gneiss, quartzite and slate, with diorite and diabase dykes intersecting and paralleling the veins. The group comprises Black Oak, Carra, Live Oak and White Oak. The latter is a westerly vein. The main shaft is 750 feet on the incline, 525 feet vertical from surface; seven levels are opened from shaft; average length, 600 feet. The vein averages 6 feet. There is an unbroken shoot, 500 feet in length. Owing to the solidity of the walls, very little timber is required to hold the ground. There being gouges or selvages on both walls, the rock breaks free. The average value of the rock is \$20 in free gold, as worked in their mill; as raised from shaft, the ore is assorted; the high-grade sulphuret ore and concentrates are shipped to Selby's, San Francisco. South of Black Oak mine, in the Carra and Live Oak, similar shoots are found determined by prospect shafts.

The machinery and plant consist of water and auxiliary steam power. The water is conveyed through 16-inch iron pipes from ditch and reservoir, giving 500 feet pressure to the Pelton water wheels, of which there are several. The main wheel is 16 feet in diameter, driving by direct action, from main shaft of wheel, a seven-drill Rix compressor of double cylinder construction. This wheel is set in the center between cylinders, making unnecessary any belting, gear or pulleys. The main working shaft has a one-ton skip and two 10-inch plunger pumps. The machinery is connected with a Cornish bob-gear, capable of sinking 2000 feet. Steam power can be readily attached. The steam plant consists of two 150 H. P. boilers and a compound 100 H. P. engine for pumping. For hoisting there is a 50 H. P. engine, which runs an eight-drill Norwalk compressor. Water for power can be had nine months in the year. The mill has twenty 900-pound stamps, twelve Frue concentrators, run by water power, under a 500-foot head. At tail of concentrators is a Morris canvas plant, 103 feet long, 50 feet wide; this catches the fine sulphurets. Below the canvas tables is the cyanide plant. There are two agitators for treating high-grade pulp, five tons capacity each every twenty-four hours, and a leaching plant to treat tailings of fifty tons capacity.

The ore hoisted from the mine is taken to the sampling house, assorted and the high-grade sacked and shipped to San Francisco. The second grade is passed into the mill. The pulp, after leaving the batteries, is sized, the finest being diverted to one set of concentrators, the coarse to another set, each set of concentrators being operated by separate power. The slimes and coarse sand are run over the canvas tables separately; thence are conveyed to the leaching plant and subjected to the cyanide treatment in different vats, so that they are still kept separate. Experiments have here demonstrated that more profitable extraction can be made in this way, a weak solution of cyanide being used in the vats. From the batteries to the tail of cyanide plant an extraction of 90 per cent is made.

The whole of this property was brought to its present state of efficiency and paying condition by Messrs. Scott, Dowe & Co., the owners, with W. P. Scott as superintendent since its inception.



MILL NO. 1, BLACK OAK MINE, TUOLUMNE CO., CAL.

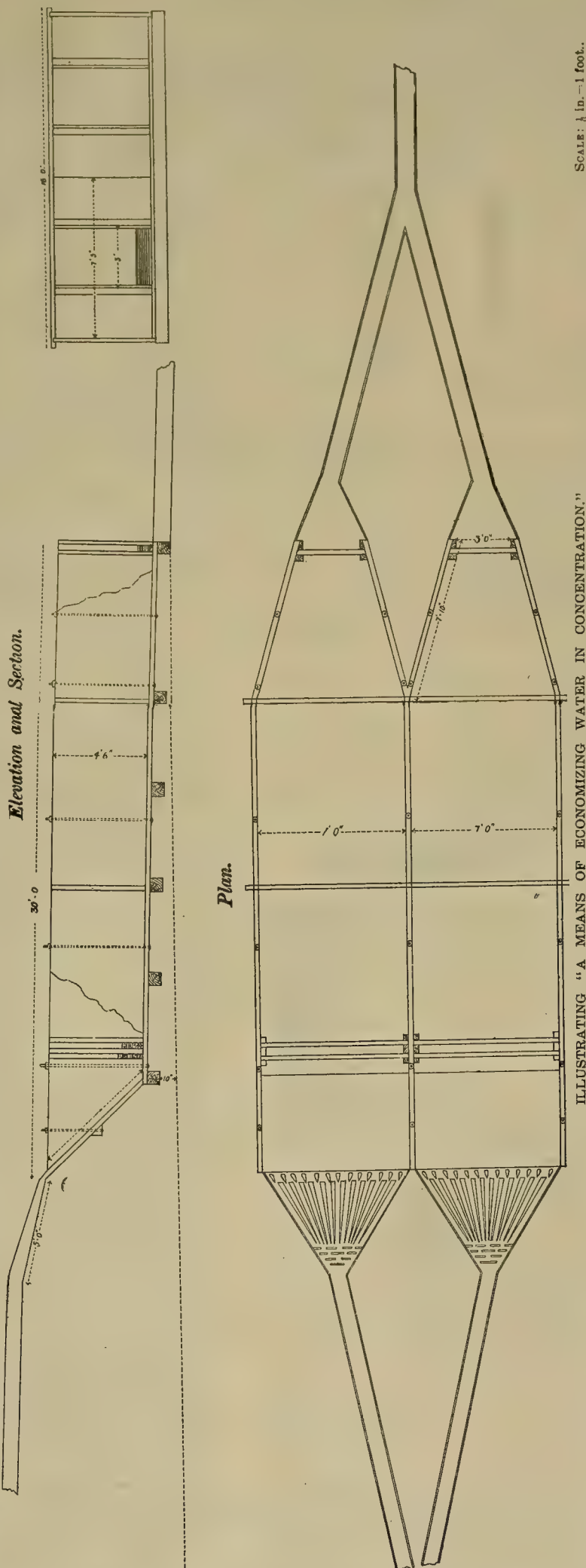


VEIN IN 750-FOOT LEVEL, BLACK OAK MINE, TUOLUMNE CO., CAL.

Economizing Water in Concentration.

At a recent meeting of the Chemical and Metallurgical Society of South Africa, as reported in its Journal, E. H. Johnson read a practical paper on "A Means of Economizing Water in Concentration," in which he stated that the apparatus—the (drawings of which are herewith reproduced), was designed with the object of obtaining a concentrate suitable for cyaniding, in which the only water used should be that with which the ore had been crushed and which carried the pulp leaving the mill to the collecting vats of the cyanide works. He said he was led to depart from the usual Spitzlute practice and seek other means of effecting classification on account of there being no water available for hydraulic classification as ordinarily practised, and as these fields are not over-well supplied with water generally, he brought this device to notice in the hope that the information may, perhaps, be of value to others who may be similarly placed.

Little explanation of the method of working the apparatus is needed. Briefly, the apparatus consists of two similar boxes in which the pulp from an 80-stamp mill is distributed over a width of 7 feet, causing a reduced flow. Near the entrance of the pulp two weirs are formed by the periodic addition of pieces of wood 3 inches by 3 inches square. These serve to break the force of the flow of pulp, and are always kept a little higher than the bed of accumulating concentrates. The end of the box is similarly built up by $\frac{1}{2}$ -inch laths as the concentrates accumulate. The boxes are used alternately, the one being discharged while the other is filling, each box holding a day's product. Bottom discharge doors of simple design are fitted to the boxes, which are elevated on trestle work, enabling trucks to be run underneath which convey the product to the storage vats. Mr. Johnson's experience was that although it is necessary to employ white men to attend to the boxes, the expense does not exceed the pumping charges where spitzlute are used. Attendance on the collecting vats is also performed by the same men. Everything being open there is no possibility of choking or other temporary failure in the working of the boxes. They have been working now continuously for five months—the only stoppages being due to the ordinary occasional stoppage of the mill. The average product for the five months' run has been equal to 10.5 per cent of the gross quantity of tailings, producing a concentrate of 18.5 dwts. per ton value. The average value of the tailings entering the boxes has been 4.7 dwts., the value of the tailings leaving being 3.25 dwts. per ton or 30.8 per cent of the gold is obtained in 10.5 per cent of the sands. The



dimensions given on the drawings are of those constructed for taking the product of an 80-stamp mill, which might need modification for mills of other capacities.

The recent scarcity of water on this coast lends interest to the matter.

The Mount Morgan Gold Mine.*

By EDGAR HALL.

Like all the truly great, the mine will be found very modest, and will deprecate being placed on a pedestal apart from other mines as to quote a recent magazine article, a "geological puzzle, the despair of scientists."

The mine has not been described very often by men competent to read it aright, or to see its features accurately. Some scientific accounts of the ore deposits are comprised in the three reports of R. L. Jack, the Government Geologist of Queensland.

Mr. Jack's first report is well known. Not much work had been done at the mine when it was written, and the author's personal experience of ore deposits was not then so extensive as it is now. It contains the famous Geyser theory. In it Mr. Jack allowed reins to his imagination in a way he has never since done. The simplicity of its story and its graphic portrayal of the author's theory make the first report as readable and attractive to the imagination as any fairy tale of science can be. As an example of imaginative writing by a man ordinarily the most careful and cautious of Australian geologists, it has high value. Unfortunately, it has little else. This report was the starting point of the marvelous tales of the mine which ran round the world.

In fact, the Mt. Morgan ores, far from being peculiar to it, are found in conjunction with huge pyrites deposits all over the world, and are a feature of those deposits, and there is nothing whatever unusual about them except the quantity of gold they contain. The development of the mine has shown that big pyrites bodies are present at Mt. Morgan, and that a portion of them, at least, is in such a state of crystallization that it disintegrates and decomposes with remarkable ease and speed.

Thus, the opinion of those in charge of the mine at first, that the deposit was the cap of an immense pyrite lode, has been proved correct. But whether these pyrites bodies are lodes or not is another question, and how they were formed is another. It is certain that they differ in a marked degree from ordinary quartz lodes, and there are many theories seeking to explain them. The explanation given by Dr. Peters in the *Australian Mining Standard*, when writing of Mt. Lyell in Tasmania, is one of them, and it is far removed from any thermal origin.

What is it, then, that has made Mt. Morgan wonderful, and led to the extraordinary tales about it? It is the peculiarity in mankind that makes them value gold, the heavy, bright, yellow metal possessing no useful quality in itself, but whose color and brightness have fascinated men's eyes from the infancy of civilization. No philosopher has yet explained that fascination, though many have inveighed against it. There are plenty of other metals quite as rare and quite as wonderful from the point of view of nature as gold, but nobody troubles to invent explanations of why they form in some places the 16,000th part of the rock instead of the 48,000th part or even some smaller proportion.

The chemist, when he comes to those small proportions, dismisses them briefly in the words "a trace," and the man who would write long papers about their minute presence would be set down a fool and get no readers. But gold has fascinated all men, and in its presence the usually cool man of science loses his head and begins to look for some special and extraordinary reason of Mother Nature's for putting it where it is.

Nature has no special reasons; she treats all her children impartially alike, and causes which operate to produce one element in one place operate similarly to produce another element in another place. The difference lies in men's minds and not in Nature's.

The Mt. Morgan gold mine is no "geological puzzle, the despair of scientists," but a simple result of the climatic conditions prevailing in the Queensland locality in which it is situated, and the extent of superficial deposits is evidence of the long continuance of similar climatic conditions to those now obtaining.

Those conditions were assisted in their decomposing effects upon the huge pyrites deposit by the fact that at one time the deposit had been intersected by dykes of dolerite, an igneous material which rapidly decomposes under atmospheric influences.

Dolerite and pyrites decompose rapidly enough when separate; but standing side by side they help each other, the acid products of the pyrites acting powerfully upon the basic dolerites, and thus was produced "surface decomposition of more than ordinary intensity," and the products of that extra rapid decomposition formed the ever-varying mixtures of material which once covered the crest of Mt. Morgan.

*Condensed.

Mineral Lode Locations in British Columbia.*

By WILLIAM BRADEN.

In view of the current discussion of a proposed change in the United States mining law, abolishing the feature known as the extralateral right of a lode location, it is an interesting circumstance that in the neighboring province of British Columbia this feature was tried for eight years and then abandoned. The results of that abandonment have been such as to disprove the proposition, so confidently advanced by many writers, that there is something in the nature of the mineral deposits of the Pacific coast which requires the grant of the extralateral right to mining locators. In abolishing this peculiar privilege, British Columbia has followed the example of all civilized countries except our own.

From 1884 to 1892 the mineral act of this province was modeled after that of the United States, and authorized lode locations 1500 feet long by 600 feet wide, carrying the extralateral right. But it was soon realized that, however equitable in intention, this principle was so liable to complications in application and such an endless source of litigation as to be a greater injury than aid in mining. The act was consequently revised in 1891, and since the end of that year the provincial lode law is in force. The manner is indicated in the diagram marked No. 1 and No. 2, placed on the boundary, and as nearly as possible on the vein. The distance between these two posts, known as the "location lines," must not exceed 1500 feet, and the course must be plainly marked by blazing trees or otherwise. Upon the two posts must be written the name of the claim, the name of the locator, and the date of the location. In addition to the foregoing, upon No. 1 post must be written "Initial Post," the approximate compass bearing to No. 2 post, and the number of feet of the claim lying to the right and left of the "location line." The locator must place a post marked "Discovery Post" where rock has been found in place. The four diagrams of Fig. 1 show the elasticity allowed in locating claims.

Within fifteen days after the location of a claim it must be recorded with the mining recorder of the district in which the claim is situated. To hold such a claim, after location and record as above, in each year from the date of recording \$100 worth of work must be performed and recorded, or in lieu thereof \$100 must be deposited with the mining recorder. Any free miner or company owning adjoining claims may perform the annual assessment work for all such claims on any one or more.

After \$500 worth of work has been performed (including \$100 for the survey of the claim) a "Certificate of Improvements" may be applied for, and after sixty days' advertising, in case no adverse claim is filed, the said certificate is allowed. Titles acquired between 1884 and 1892 cannot now be deprived of the vested extralateral right they have secured. As an illustration of the complications thus created, Fig. 2, showing a group of claims in the Slokan district, West Kootenay, B. C., is presented. Of the locations in this group, the Last Chance, World's Fair, Bonanza King, Crown Point, Treasure Vault, Ajax, Chicago and R. E. Lee were all located prior to the revision of the mining law, and consequently have extralateral rights, the boundaries of which must depend upon mining developments, conflicting testimony, expert opinions, jury verdicts and judicial rulings. After that revision the American Boy, Starlight No. 3, Duluth, Minneapolis, Erie (location lines not shown in the drawing), Rushford, Marlboro, Shunia, Random Shot and Ajax Fraction were located in the order, as to date, in which they are here named.

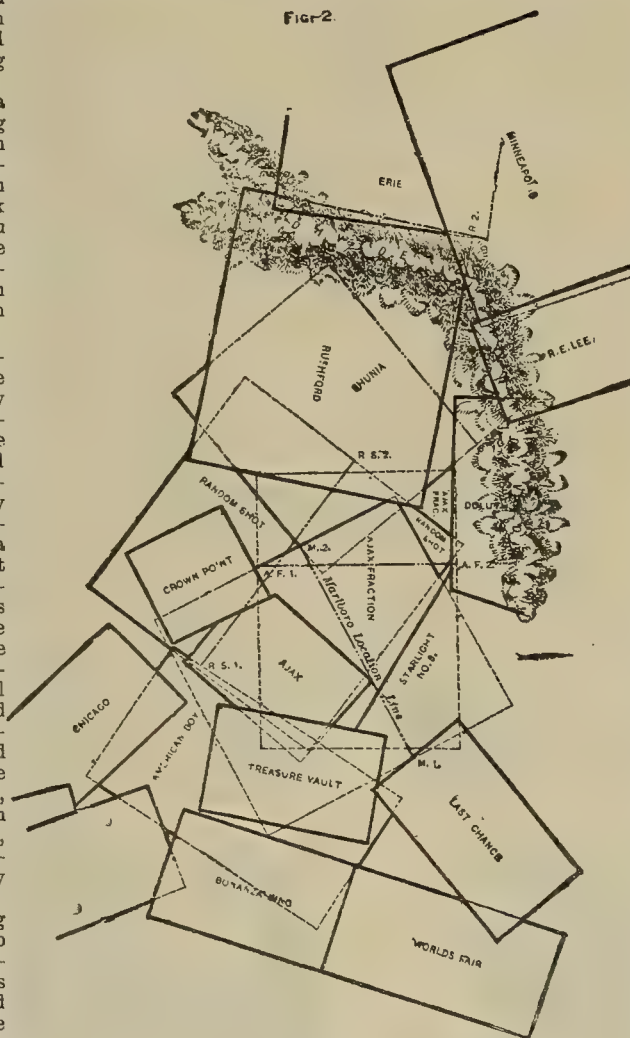
The Marlboro is no longer an existing claim, title having lapsed through failure to perform assessment work. The Ajax Fraction was located subsequently to cover this ground. The Marlboro having been located before the Shunia and Random Shot, the Ajax Fraction, though a later location than either of these, takes such parts of their claims as conflicted with the Marlboro. This proposition may sound strange to American ears; but the explanation is simple. All these claims were located after the abolition of the extralateral right; consequently their rights are confined within vertical planes through the boundaries of the surface actually appropriated. The Shunia and Random Shot locations having been, ignorantly or otherwise, so made as to overlap the Marlboro, their locations were entirely void as to the areas thus overlapping; and upon the lapse of the Marlboro title the whole of the Marlboro ground reverted to the public domain, and was

open to a new location, unaffected by the imaginary boundaries of earlier claims.

The Rushford, having been located before the Marlboro, takes all the area within its normal boundaries except the parts covered by the Minneapolis and Erie, which are still older. It will be seen that from these conditions no disputes as to title can possibly arise under the mining law which simple surveys and reference to dates upon record cannot settle. The situation presents no greater complex-



Fig. 2



Scale 900 feet = 1 inch.

ity than a similar division of agricultural land.

Suppose, however, that each of these claims had an extralateral right, like those lying further east in the group. The lode lines of the Shunia (S 1, S 2), Random Shot (R S 1, R S 2), Ajax Fraction (A F 1, A F 2), etc., indicate lodes of widely different courses, and the resulting extralateral rights would be inextricably confused.

No doubt trouble may hereafter arise in this district, in which some claims were located under the old law and others under the new, but the confusion cannot be as great as if they were all in the former category, and, apart from such local conflicts the present system will satisfactorily prevent fresh oc-

casions of controversy, and, in new districts, will work out, unhindered, most satisfactory results.

The simplicity of this system is its chief excellence. Difficulties of interpretation are entirely done away. In the complex cases of cross veins, blind veins, faulted veins, uniting veins, or other irregular deposits, the rights of the miner are clearly defined. The liberality with which he is allowed to make his surface location, with the vein anywhere within it conformable to one of the location lines (see Fig. 1), gives him every incentive to a careful preliminary exploration of the real strike and dip of the vein, and rewards his industry and skill in this respect with a grant which goes far to compensate him—in fact, in most cases, more than compensates him—for the loss of the delusive, indefinite and precarious extralateral right.

There is a tendency to perpetual small amendments of the law which works much temporary annoyance. After nearly every concession of the provincial legislature new rules are promulgated. The unnecessary annoyance of such frequent changes is an evil which should be avoided. So far as possible, changes in a mining code should be thoroughly considered by experts, and being found advisable, should be made final. The experimental manufacture of mining laws is emphatically to be deprecated. This principle should be borne in mind in any revision of the United States law, whether radical or partial.

Electrolysis of Cast-Iron Pipes.

As in San Francisco and other coast cities, so elsewhere throughout the country, the extent of electrolysis in piping has been a constant and menacing problem. Suit has recently been brought in the city of Atlanta, Georgia, to determine the responsibility for damage to pipes caused by the proximity of electric underground wires. H. P. Brown, an engineer, before the Municipal Improvement Association, had the following to say regarding electrolysis of cast-iron pipes:

The immunity of cast-iron pipes from electrolytic action has generally been accepted, although it was known that lead and wrought-iron pipes could be and were affected within a radius of half a mile from the power house. But recently some cast-iron pipes were found to be badly corroded underneath the covering of black paint. Seemingly they were in fair condition, but in scraping away the paint, the pipe could easily be cut with a knife. Sections of the pipe were removed and tested. Under the electrical test it was found that at a distance of one and one-half to two miles from the power house the pipes were positive to the rails and therefore susceptible to corrosion. In the town itself the highest voltage observed was four and one-half, but near the power house the voltage rose to nine, and the area of danger extended in one direction for three-quarters of a mile. Usually, the sand that adheres to the pipe and the coating of tar that it receives, protect it from electrolytic action, and in ordinary soils the layer of oxide of iron, formed by the action of the current, being a poor conductor of electricity, also helps to prevent corrosion. Mr. Brown points out that tar is not a sufficient protection for cast-iron pipe, as under the action of the current it is changed into a material resembling graphite and is an excellent conductor. He has observed that in the vicinity of pipes which have been corroded the stones and pebbles are actually coated with a thin layer of metallic iron, a new circumstance in the history of such cases. A chemical analysis of the corroded pipe showed that the percentage of carbon was more than doubled. In other words, the iron was removed and the carbon left. He thinks that the corrosion was due to the presence of carbonate and chloride of sodium in the soil, the passage of the current decomposing them with the formation of muriatic acid, which at once eats into the pipe and ultimately destroys it, without to any great extent altering the outside appearance of the pipe.

He then sought to determine the amount of electrical pressure necessary to injure the pipe. Starting with a maximum pressure of three volts he found that the graphite coating did not exceed the $\frac{1}{32}$ of an inch in thickness, and the iron was practically unaffected. Above three volts the thickness of the graphite layer increases with the length of time during which the pipe is exposed to the current, and soft spots, varying in depth from $\frac{1}{16}$ to $\frac{1}{8}$ of an inch, can be found. As the voltage increases the corrosion increases, and the damage is directly proportional to the pressure and time of exposure, but is inversely proportional to the distance between the pipe and the rail. Mr. Brown does not say so, but the electrolysis of pipe is largely a matter of proper bonding of the rails. The editor of the *American Manufacturer* says that he was recently shown in Pittsburgh, Pa., a piece of wrought iron pipe that was literally eaten up by electrolytic action. It had been laid about two years and was within 2 feet of the rails and about 300 yards of the power house. Under proper bonding the liability of corrosion is greatly reduced, but is not entirely removed.

* Trans. Am. Inst. Min. Engineers.

Industrial Notes.

—Tacoma, Wash., is exporting lumber to Hamburg, Germany.

—A weekly service will be established between Valparaiso, Panama and Ocas.

—It is now proposed to pay Spain that \$20,000,000 for the Philippines in silver dollars.

—The Santa Fe Co. has decided to build extensive locomotive, car and repair shops at Stockton, Cal.

—The El Beleo Co. has contracted for 200 laborers for work in the mines near Santa Rosalia, in the State of Colima, Mexico.

—At St. Helena, Cal., last week a sale of 5,000,000 gallons of red wine was made to San Francisco dealers at prices ranging from 12½ to 15 cents per gallon.

—Work on the proposed Monterey (Cal.) & Fresno railroad has begun, the first work under way being the building of an 1800-foot wharf at Pacific Grove.

—It is estimated that the acquisition of the Philippines, Cuba and Hawaii will cost the United States \$800,000,000 at the start and \$200,000,000 a year thereafter.

—Victoria, B. C., reports a "boom" in west coast mining. "The Rothschilds" (as usual) have bought properties on Barclay sound. The coal mines at Quatsino are proving valuable.

—The steel bridge building across the Snake river between Vineland, Wash., and Lewiston, Idaho, is to be 1435 feet long and 50 feet above high water. The total cost will be \$110,000.

—Owing to the short hemp crop in Manila, Yucatan expects that the price of henequen will be on the rise. The prediction has been made that the price will shortly go up to \$5505 the arroba.

—Colorado jobbers are pleased with the new tariff published by the Santa Fe. Shippers say that the result will be increase of shipments to points in New Mexico, Arizona and southern California.

—Jas. J. Hill is credited by the Spokane Chronicle with saying that the plans for Spokane's new depot have been drawn. The improvements which the Great Northern will make in that city will approximate \$500,000.

—A Santa Cruz, Cal., powder company has a contract calling for 65,000 kegs of blasting powder, to be used in building a railroad in Oregon. This is said to be the largest single order for blasting powder ever given in this country.

—Regarding the Nicaragua canal, Senator McMillin will have a new bill prepared and substitute it for the Morgan bill. He will demand that the United States put up all the funds to control the canal, and have no side partners.

—The torpedo boat Rowan, built by Moran Bros., Seattle, Wash., last week had her official trial test. During the first hour she maintained an average speed of 27.62 knots an hour, or 31.81 miles—1.62 knots above the contract speed.

—Skagit county is second in the State of Washington in the number of feet of standing timber, according to the report of the United States geological surveyors, having 10,362,422,999 feet. Chehalis is first with 18,579,053,000 feet.

—Montana sent 135,975 head of cattle to the Chicago market during the shipping season of 1898, against 147,972 for the year 1897, 180,335 for 1896 and 235,644 for 1895. This year's shortage is about 12,000 head as compared with last year.

—The Los Angeles, Cal., Herald has positive assurance that the Pacific Coast Steamship Co. has passed into the hands of the Great Northern Railway Co., the object being to bring the Great Northern system into the field as a competitor for California business.

—The Pecos Valley & Northeastern R. R. is pushing the extension of its road from Rowell, N. M., to Amarillo, N. M., to a connection with the Atchison R. R. One hundred and sixty-five miles of the extension have already been completed, leaving only forty miles yet to be built.

—The production of the mines in the Mexican State of Guanajuato rose from \$3,320,098 in 1898 to \$6,974,347 during the year ending July 1, 1898. A number of beneficiating haciendas have been abandoned owing to the fact that miners have found it more profitable to sell their ore.

—At Stockton, Cal., last Saturday, were sold all the appurtenances of the Stanislaus & San Joaquin Co.'s irrigation works for \$27,300. The system cost upward of \$400,000 and includes the dams in the Stanislaus river above Knight's Ferry and the distributing ditches extending throughout the northern part of Stanislaus county and the eastern and southern portion of San Joaquin. There are many thousands of acres under its ditches capable of irrigation.

—Swords have been made out of an aerolite. Some years ago an aerolite fell at Echizenbori, Tokio. Viscount Enomoto bought a piece of iron of which it was composed and named it Tenko-Tetsu (iron fallen from heaven). Recently he cut 1500 monmes (about thirteen pounds) from one lump and had three swords made of it by skilled workmen in the Tokio military arsenal, naming the swords Ruiseito (falling star swords). One of these weapons Viscount Enomoto has presented to the Crown Prince of Japan, while the other two he retains in his own possession.

—Stuart & Merriman, who have had charge of one of the surveying parties of the Nicaragua Canal Commission since Dec. 1, 1897, are in San Francisco en route to Washington City. Mr. Stuart says: "Personally I am a strong advocate of the Lake Nicaragua and San Juan river route. There is another scheme on foot

to follow the San Juan river from Lake Nicaragua east fifty miles to Machucha rapids, and then cut a ditch 102 miles long to Graytown. The latter is an ambitious scheme, and, while it would be a good road, I prefer the lake and river line. The people of Nicaragua want the United States to construct the canal. I found them extremely friendly about the matter."

—Some people in Monterey and San Luis Obispo counties, Cal., suffering temporary destitution because of mistaken judgment in trying to cultivate land fit only for pasturage, have asked for relief, and silly California newspapers print sensational statements about "starvation" in type three inches long. If an improvident farmer in Maryland or Virginia were to call on his neighbors for aid, the fact would hardly warrant proclamation of "starvation" running riot in New Jersey or Connecticut. The great stretch of coast known as California, extending 700 miles north and south, comprises so much area as to render any such local occurrence equally inapplicable.

—The total Puget Sound cargo shipments for the month of November were 31,655,815 feet of lumber and 6,167,640 lath, of which 11,102,698 feet of lumber and 896,440 lath went to foreign countries and 20,553,017 feet of lumber and 5,271,200 lath went coastwise. As compared with November of '97, the total increase for November of this year is 6,000,000 feet of lumber. The gain is in foreign shipments, which show for November of this year over the same period of '97, 7,000,000 feet. The lumber shipments from Washington by rail for the eleven months of '98 reach a total of 161,168,000 feet, as against 114,208,000 feet in the corresponding months of '97. The shipments of shingles in November were 1289 cars, as against 923 cars for the same month of last year.

—The following shows the present area and population of the United States and our possible new possessions:

| Area in sq. miles. | Inhabitants to sq. mile. | Population. | sq. mile. |
|-----------------------|--------------------------|-------------|-----------|
| United States in 1898 | 3,613,127 | 75,000,000 | 21 |
| Porto Rico | 3,500 | 806,708 | 331 |
| Philippines | 114,826 | 9,000,000 | 78 |
| Sulu Islands | 850 | 75,000 | 79 |
| Guam (Lad. Islands) | 120 | 8,561 | 71 |
| Isle of Pines | 1,214 | 2,500 | 2 |
| Cuba | 119,240 | 1,500,000 | 13 |
| Hawaii | 6,740 | 109,000 | 17 |

Porto Rico has ten times the and the Philippines nearly four times the population per square mile that we have in the United States, so that there is very little room for immigrants, and, according to the population test, like New Mexico and Arizona, they are already ready for statehood.

—D. P. Cameron of San Francisco has a contract with the Risdon Iron Works for three dredges to mine the bars of the Sacramento river, Cal. These dredges are to be set on barges, whose hulls will be 70 feet long, 30 feet wide, 5½ feet deep. They will cost \$35,000 each. The dredge buckets are to be armed with blades of manganese steel, capable of cutting through gravel, and also to a depth of 30 inches into the bedrock at the bottom of the river. The buckets will work 60 feet below the surface of the water, bringing up mud, gravel and gold dust into perforated screens of ½-inch steel on board the barges. One of these dredges is now working successfully in Boise basin, Idaho. The timbers for the dredges are being framed. When completed they will be shipped to Oroville, put together and placed in operation. Mr. Cameron expects to operate his dredges next spring.

—The construction work now going on between Robson and Midway, B. C., in building the Columbia & Western extension of the Canadian Pacific Railroad, is on a line of 105 miles in length, and the average cost per mile of construction is \$40,000. There are seven tunnels, nearly all requiring rock borings, which aggregate 5300 feet in length, the estimated cutting being 66,000 cubic yards, or about 200,000 tons of rock. In addition there are extensive rock cuttings in open cuts and on the mountain sides. The first tunnel is 200 feet long; the second is 300 feet long. More than one-third of it has been finished. The third tunnel is 3000 feet long. This will not be completed for nearly a year. Air drills are used in boring it. Hand drills are used in the other tunnels. Another tunnel is 700 feet long. At Greenwood there are two tunnels, each between 300 and 400 feet long. The plans require that each of the above tunnels shall be 16 feet wide, and 21 feet high. This branch will cost \$4,000,000, and it is said to be about the most difficult piece of work ever undertaken for that distance and the most expensive in Canada. There are over 3000 men employed.

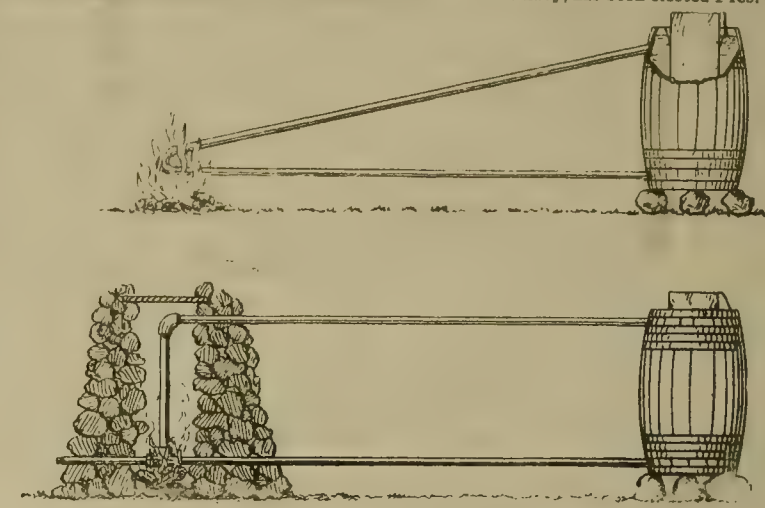
—Under date of October 19, Consul McCook writes from Dawson City: "I send herewith the price list of the North American Transportation & Trading Company, giving the prices of necessities in Dawson City the 1st of October. You can not, however, get butter at \$1 per pound at the company's stores, except in 10-pound quantities or over, and then only in case you purchase an entire outfit. The same custom holds good in regard to purchases of condensed milk and sugar. The duty on American goods is so high that almost everything used here comes from Canada and Great Britain. I think if the large companies would adopt the landing certificate methods and get rebates on tinned goods, sugar, and other articles, more American goods would be brought in. I have spoken to several companies on the subject, but so far only two of them have procured landing certificates—the Standard Oil Company and the Alaska Commercial Company. Strange to relate, in this Canadian town and vicinity, with a population of some 20,000 and a transient population of as many more, not a single trading or commercial company is owned by Canadian capital. Every business is oper-

ated by Americans, and the highest prices paid are for American manufactured articles, such as hats, rubber goods, shoes, and cigars. Three companies supply the Yukon river towns. With the increasing population of this region there will be room for more, especially if there are good returns from the American side this winter."

"Home-Made Dynamite Thawer."

TO THE EDITOR:—I enclose a rough sketch of a cheap dynamite thawer that I have made, tried and found to work quite well. It may be of use to some of your readers:

Take an empty 28-gallon whisky barrel, 8 or 10 feet of half or inch pipe and an empty 5-gallon tin oil can, all of which can be had at most



A HOME-MADE DYNAMITE THAWER.

mine camps. Bore a hole near the bottom of the barrel, another one 2 or 4 inches from the top, bend the pipe so that the two ends will go into these holes, then drive the pipe into them water-tight. Cut the lid of the oil can open, leaving the top clear, bend back the lid and put the can into the barrel, leaving it stand 2 or 3 inches above the top of the barrel, and fasten it securely to the barrel; then fill the barrel with water and build a fire at the bend of the pipe. Put the dynamite in the tin, and if ice water is used to start with, in twenty minutes the water will be warm enough to thaw the dynamite; afterwards a smoldering log or two will keep the can at the proper temperature.

Of course this can be elaborated, but there is not much gained by building a fireplace to hold the pipe, as the bend will prevent sparks. Cutting the pipe in suitable lengths and joining them up will do some good, if another piece of pipe is added projecting back from the end away from the fire and plugged, so that by withdrawing the plug the barrel can be emptied when not in use.

I suppose there is no need to explain the reason that the water in the barrel is heated by heating the water in the pipe.

Socorro, N. M.

R. H. SANDERS.

Catalogues Received.

CATALOGUE No. 3, the Connersville Blower Co., Connersville, Ind.; pressure blowers, rotary pumps, gas exhausters and hydraulic motors.

CATALOGUE No. 50, the Jeffrey Manufacturing Co., main office Columbus, O.; an unusually well arranged octavo, 224 pages, indexed and admirably illustrated, with description, details and prices of elevating and conveying machinery, chain belting, steel cable, general supplies for engineers, foundries and machinists. This company has recently added several new lines to their already large line of specialties, viz: Spiral conveyors, illustrated and described on pages 158-162; elevator buckets, pages 170-179; Jeffrey-Columbian separator, bolter and screen, page 46; and Jeffrey Century belt conveyor system, page 39. The catalogue will be mailed on request. The Jeffrey Manufacturing Co. has branch offices at 41 Dey street, New York City; 1325 Monadnock building, Chicago; 202 Main street, Buffalo, N. Y.; 311 Walnut street, Philadelphia; 512 Security building, St. Louis, Mo.; and 844 Equitable building, Denver, Colo.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING DECEMBER 13, 1898.

615,805.—CROSSCUT SAW.—J. H. Carse, South Seattle, Wash.
615,808.—RUBBER DAM CLAMP.—A. S. Cooper, McMinville, Or.
615,812.—NECKTIE.—C. W. W. Davies, S. F.
615,851.—STEERING GEAR.—A. Doyle, Seattle, Wash.
615,974.—DAMPENER.—F. E. Fay, Los Angeles, Cal.
615,975.—CLOTHES SMOOTHING.—F. E. Fay, Los Angeles, Cal.
615,980.—RIFLE.—C. F. Gay, Spokane, Wash.
615,719.—DIAL TRAIN FOR WATCHES.—E. Krahenbuhl, San Rafael, Cal.
616,005.—PIPE COUPLING.—A. W. McGahan, Salinas, Cal.
616,031.—FAUCET FILTER.—P. Stone, Los Angeles, Cal.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Personal.

The address of Prof. Frederic Endlich is sought.

P. R. BRADLEY, Supt. Spanish mine, Washington, Cal., is in San Francisco.

GEO. MAINHART, Supt. Omaha Con. mines, Grass Valley, Cal., is in San Francisco.

H. G. HEFFRON becomes Gen. Mgr. Shoe-bridge Bonanza mine, Silver City, Utah.

A. QUANTIC succeeds L. A. Harris as Gen. Mgr. Revenue mine, Revenue, Montana.

W. H. RADFORD, Supt. La Grange mine, Weaverville, Cal., has returned from San Francisco.

COMMODORE GEORGE W. MELVILLE, engineer-in-chief of the navy, has been elected Pres. of

the American Society of Mechanical Engineers.

CAPT. DE LAMAR has left San Francisco to examine some Central American mining properties.

D. T. DAY of Washington, D. C., and W. E. Barrows of Philadelphia are examining the country for platinum from Harrison gulch to Trinity Center, Cal.

W. M. CHANDLER, a mining engineer, who has been examining mining properties in Russia and Siberia for the Con. Gold Fields Co. of London, is in San Francisco.

G. BAYHA of Redding, Cal., who went to Germany four months since to interview his people concerning the building of a smelter at Stillwater, Cal., has returned, accompanied by a representative of the corporation.

R. P. HOBSON, who sunk an American vessel and raised a Spanish battleship at Santiago, reversing the regular work of the American sailor, leaves San Francisco to-day for Manila, where further distinction awaits him.

R. H. CAMPBELL of Shasta Co., Cal., returns from Horsey, Cariboo, B. C., next week. He has begun sinking a triple compartment shaft 5x15 ft. to tap the ancient river channel there, to be 400 feet deep, costing \$40,000.

PRESIDENT NEFF of the California State Miners' Association has appointed the following: Hon. J. M. Gleaves, chairman; Hon. Charles N. Felton, Hon. E. C. Voorheis, Curtis H. Lindley, J. M. Walling, Mark B. Kerr and E. H. Barton—as a committee to consider the conservation of California waters.

MR. GEORGE H. EVANS will retire from the management of the English syndicate mines in Butte county, Cal., in favor of Mr. Lindsay Scrutton on January 31st, '99. Mr. Evans, although retiring from the active management, will still retain his connection with the syndicate, in reference to the introduction of Californian and other mines on the London markets.

Recently Declared Mining Dividends.

South Swansea, Utah, \$7500; Dec. 21.
Sacramento, Utah, ½ cent per share, \$17,000; payable Jan. 2.
Gold Coin, Colorado, 1 cent per share, \$10,000; payable Dec. 25.
Napa Con. Q. S. M. Co., California, 10 cents per share, and 10 cents per share extra, \$30,000; payable Jan. 2.
New Idria Q. S. M. Co., California, 10 cents regular and 10 cents extra per share, \$20,000; payable Jan. 2.
Etna Con. Q. S. Co., California, 10 cents per share, \$10,000; payable Jan. 2.
The Parrot, Montana, Silver & Copper Co., 3%; payable Jan. 2.
Homestake M. Co., regular monthly dividend of 25 cents for November, also extra dividend of 25 cents; Dec. 24 at the company's office in San Francisco.

Recent Mining Incorporations.

Rio Vista G. M. Co., Sacramento; capital stock \$60,000; H. E. Harvey, J. U. Thompson, C. Rodoni, J. L. Peters, T. Fraser.
South Yuba Placer M. Co., San Jose; capital stock \$25,000, all subscribed; F. W. Campbell, G. W. Campbell, C. Valpey, G. D. Campbell, W. D. Foster.
Pilot M. Co., San Francisco; capital stock \$125,000; subscribed \$250; C. W. Reed, F. W. Jordan, S. Castle, J. Caley, W. Lewis, H. Huff, G. E. Wallace.
Mother Lode M. & E. Co., San Francisco; capital stock \$50,000; P. R. Klein, G. T. Weeks, J. C. Rice, W. A. Cross, G. L. Smith.

Electric Power Development in California.

The following, from the *N. Y. Sun*, though incomplete, and mistaken in regard to the amount of manufacturing in California, is published, to show how those things are looked at through Eastern eyes:

Wonderful things are being done in California in these days in the way of long-distance electrical transmission. Millions of dollars are going into the development of electricity in the mountain canyon streams and the transmission of the electrical energy to the cities and towns in the State. California far excelled the world's best record for the transmission of electricity of a high voltage for a long distance (that made over the Lauffen-Frankfort circuit in Switzerland and Germany) by the famous San Antonio and San Bernardino circuit in Pomona valley, and this season there are four places in the State where the best records so far will be surpassed.

On the Pacific coast, said ex-State Comptroller Phillips, the long-distance transmission of electricity is the greatest thing for the commonwealth since the Pacific railroads were built thirty years ago. Here, where fuel is very dear and consequently motive power is costly, and where labor has been so scarce, the Californians have been obliged to consume manufactured products. Go into any of the stores—no matter of what description—from Mexico to British Columbia and you will find that 95 per cent of all the goods the Pacific coast people buy comes from the other side of the Rocky mountains. Hundreds of merchants tell me that the only articles made in California are overalls and woolen blankets. The greatest financial problem with us has been to manufacture on this coast, and thereby save the tens of millions of dollars paid annually for railroad freight on articles brought 2000 and 3000 miles from the Eastern factories. Many men have lost fortunes in trying to establish shoe, hat, woolen and furniture factories out here, where we have the raw materials in abundance, because the cost of the power to drive the machinery was an obstacle which they could not overcome. The population of the Pacific coast has grown upward of 2,300,000 since 1860; and, with the exception of beet sugar factories, sawmills and railroad shops, there is no manufacturing done on the coast. At last achievements in harnessing the canyon streams and the transmission of electrical power from inaccessible spots in the mountains to centers of our coast population settle the power problem. In a year or two California will have the cheapest, cleanest and most convenient motive power in the Union.

The success of the electrical plant at Folsom, where 2000 H. P. is taken from the American river and sent over copper wires twenty-four miles to Sacramento with very little loss in energy in transmission, opened the eyes of capitalists and civil engineers in California to the possibilities of electrical development on streams on the slopes of the Sierras. It has been reckoned that if all the power in the streams on the western slope of the Sierras from Oregon to San Diego were brought into use by means of electrical inventions, about 280,000 H. P. could be obtained. If the canyon streams in California were thoroughly harnessed by modern electrical achievement, sufficient power could be produced to move every street car, elevator, printing press, threshing machine and mining drill in the State, besides illuminating every building in California.

With the beginning of the new year the boldest and most costly piece of electrical engineering in the country west of Niagara Falls will be practically finished. Its purpose has been to bridge the Santa Ana river, among the San Bernardino mountains, the most turbulent, foaming and powerful stream in southern California. By the bridging of this stream nearly 12,000 H. P. may be taken from the water and sent eighty miles to Los Angeles city, where

it will propel street cars, light and heat houses and run machinery. The enterprise has cost hundreds of thousands of dollars, but the company will be able to sell power cheaper than any steam company in the Eastern States and most water-power companies. For three years the enterprise has been in progress. Miles of tunnels have been blasted through a mountain, two big dams have been built, steel conduits hundreds of feet long have been laid around mountain sides, and tons of electrical machinery have been hauled from Redlands up into the San Bernardino mountains.

Electrical engineers from New York and Chicago say that the most notable fact in the harnessing of the Santa Ana river to do man's work is the transmission of electricity of a high voltage over eighty miles of wire with so little loss of energy. The company finds it can now send electricity of 33,000 volts, having a working efficiency of 4000 H. P., to a distance of eighty-three miles, with a loss of but 10 per cent in voltage. In 1890, when a current of only 8000 volts was sent through the Lauffen-Frankfort circuit in Switzerland for experimental purposes, and there was a loss of only 17 per cent, the feat became noted among electricians and engineers. After doing its work in the production of electrical energy, the mountain stream is gathered into an enormous conduit and led down the mountain side to irrigate the orchards and groves in San Bernardino valley.

The power station in Santa Ana canyon is a small stone building. In it is some of the finest electrical machinery yet made. The water is taken from the river through a canal, flume and tunnel along the side of the canyon, whence it is led into a pipe 2200 feet long, giving what is equivalent to a vertical fall in the water of 750 feet. The wheels are of the impact type, directly connected to the generators, of which there are four, each of 750 K.W. or 1000 H. P. The maximum line potential is 33,000 volts, to which potential the initial voltage will be raised by 250-K.W. step-up transformers. The generators are of an improved three-phase type, revolving field, external armature, and each has a capability of 1000 H. P. and generates electricity at 750 volts. This is conveyed to transformers, of which there are twelve. The current of electricity enters at 750 volts and comes out at 33,000 volts on a line of wire that has no connection with any dynamo.

Another turbulent mountain stream is being harnessed in San Gabriel canyon. Its power will be transmitted to

a half dozen towns, including Pasadena, Monrovia and Azusa, in southern California. It is believed that nearly 3800 H. P. will be had from the San Gabriel canyon stream. Thirty-two tunnels, aggregating 32,000 feet in length, have been bored through the solid granite to lead the stream to a steep grade, where a vertical fall of water may be had. Then 9000 linear feet of wooden and concrete pipe, 42 inches in diameter, has been laid for carrying the stream in bulk to the Pelton water wheels. Thus the canyon water is led some seven miles to the power house. In this distance there is a fall of 486 feet. The principal difficulties met by the engineers in the San Gabriel canyon were the walls of granite, where workmen had to be carried up to their work in baskets fastened to cables, and the conducting of the water after it left the water wheels back into the original channel for irrigating use in the valley twenty miles below.

The mining population in California is watching with interest the work now going forward toward the development of electric power from Kern river, in Kern county, 110 miles north of Los Angeles city. If this enterprise is accomplished, a revolution in mining methods will come quickly. The Kern river is the largest stream in the southern end of the San Joaquin valley. The plant first installed will have turbines developing about 12,000 H. P. at the lowest stage of the river. The situation will permit of further power development to meet increased demands. The company's project includes the construction of a dam at the outlet of an immense natural reservoir site, and by this means the impounding of water to a volume of 42,000 acre feet, the equivalent of 13,721,400,000 gallons. With the Kern River Electric Company's plans brought to successful completion, the Rand gold mining district in Kern county will have 3000 H. P. for use in its mines. All that is now done by steam or compressed air in the mines may then be accomplished by electric power. The drilling, the fanning, hoisting and blasting can be done cheaper and easier and with less danger by electricity. John W. Baker, a mine owner of Sacramento, recently said: "The use of electric power in mining will begin a new era in the industry. The expenses of mining will be cut down so much that poor mines may be worked at a profit, and, besides, the ore can be got out with less work. No one can yet estimate the changes in gold and silver mining that will follow upon the introduction of electricity into the industry."

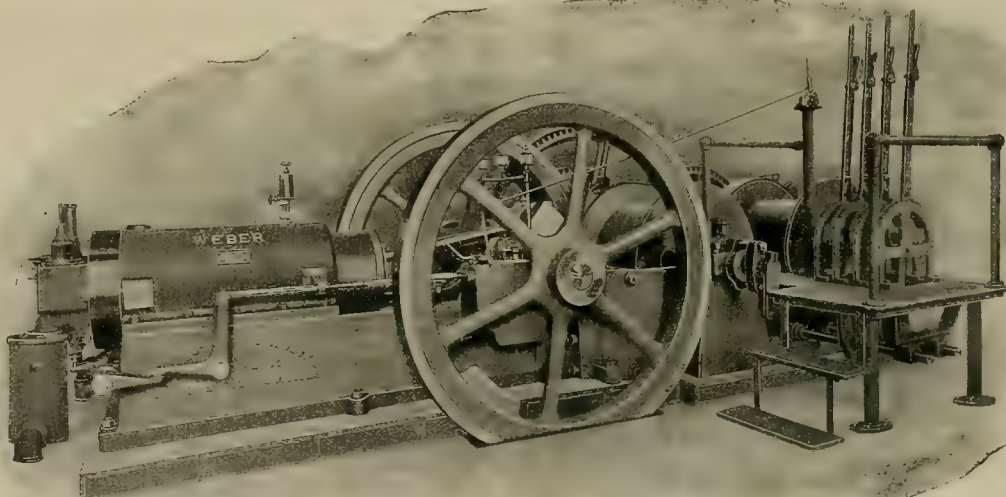
The electrical power plants at Fol-

som, Pomona and Fresno, in this State, show what electricians may expect from the seven plants in California now coming to completion. All the finished plants have exceeded the expectations of their projectors in the cheapness and convenience of electrical transmission. Something like \$3,600,000 has been invested in such electric plants in this State already. The Californians have a reputation of doing nothing by halves, and it seems not a wild statement that a dozen millions of dollars will be invested in electrical plants along the canyon streams and in copper wire and machinery here in the next few years.

For several months a corps of engineers has been making plans for the development of electric power from the Kaweah river in Tulare county. The engineers' estimate put the total expense of the work at \$800,000. About 1200 H. P. can be obtained and this may be utilized in Tulare, Porterville and other San Joaquin valley towns. Up at Redding, in northern California, under the shadows of Mount Shasta, work on the greatest electrical power plant in America, outside of Niagara, is progressing. New York, San Francisco and Buffalo capital is back of the enterprise, which will cost several millions of dollars.

Near San Diego is one of the most famous of the big irrigation dams of the world—that at Sweetwater, which has stood for ten years. It is proposed to get some 2000 H. P. at the dam and transmit it to San Diego, twenty miles distant. U. S. Grant, Jr., and Jesse Grant, sons of General Grant, are at the head of a company which has the plan in view. Electrical engineers have reported that nowhere can horse power be developed and transmitted cheaper than in San Diego county. There are other great water powers in the San Diego mountains and canyons, and it is believed the Atchison, Topeka & Santa Fe Railroad Co. is interested in having its civil engineers search there for a new power for its locomotives on the southern California division.

A project to harness the waters of the stream in Sanchez canyon, among the Sierras back of Stockton, in the upper part of the San Joaquin valley, is going ahead. Engineers are at work ascertaining what power may be developed there and the best means of conveying it from the mountain streams and waterfalls to Stockton, and possibly to San Francisco. Enough work has been done to show that at least 4000 H. P. may be sent in an electric current from the transformers over several copper wires through the San Joaquin valley.



Weber Gasoline Hoisting Engine.

This hoist is 17 ft. 6 in. long and 9 ft. 6 in. wide. These are the gross measurements. The drums are so arranged that they may be operated independently of each other. The two levers for operating the lead screws and the two levers for operating the brake bands, as well as the lever for actuating the governor, are all mounted on a suitable platform, as shown, enabling the operator to maintain control of the entire hoist without moving from one position. The hoist is fitted for both tube and electric igniter. The duty on each drum of this hoist consists of lifting fifteen metric tons 400 meters per hour, making 22.3

H. P. of 75 kilogrameters on each drum. The hoist has operating cages in a double compartment shaft. The machine weighs 25,000 pounds. The feature of arranging a gasoline hoisting engine, so that the operator can reduce the speed of engine between loads, is a very important one. This machine while in our testing room before shipment, running absolutely idle at 100 R. P. M., used only the exceedingly small amount of six gallons of 74° gasoline in ten hours' continuous running. On another test it developed 48 brake H. P. continuously for ten hours on a consumption of forty-eight gallons of gasoline. On a test developing 24.3 H. P. the consumption was twenty-nine gallons of gasoline in ten hours' continuous running. From the above three

tests it will be noted that the consumption of fuel in a gasoline hoisting engine is in exact proportion to the number of foot pounds lifted in a given time, basing the calculation on one-tenth of a gallon of gasoline to each H. P. expended per hour. Using the tank system for water circulation around water jacket and valve chambers, on a continuous 40 H. P. load, the evaporation of water amounted to only twenty-two gallons during the day and over night. In its present location this is a very important feature, since water is a very scarce and expensive article.

This hoist was built for the Minas de Santa Maria de la Paz, Matehuala, Mexico, by the Weber Gas & Gasoline Engine Co., Kansas City, Missouri.

Mining Summary.

ALASKA.

From Berner's bay news is given that the Mellon M. & M. Co. have completed their 20-stamp mill which was begun last September. There are also eight 6-foot vanners on the ground, and the surface tram has been extended 4500 feet.

ARIZONA.

The United Globe mines at Globe have installed an 18 K.W. General Electric machine at their smelter for lighting and power purposes.

Near Prescott T. Roach received from 100 tons of ore milled from the Mohawk mine \$12 a ton. The vein is 5 feet wide.

The Old Dominion smelter, near Globe, is said to be turning out 30,000 pounds of copper daily at a diminished use of coke, and with not over 1 per cent copper in the slag, against 3 to 5 per cent formerly. In seventeen days the company produced over 500,000 pounds of bullion, running 96 to 97 per cent fine. Both furnaces will be operated as soon as the new hoist is completed, and then the daily product should be 60,000 to 70,000 pounds. No copper will be shipped until the railroad is completed to the mine. The roadbed is graded to the smelter, and cars should be running to the mine in a few weeks.—G. R. Sutherland has bonded the Nighthawk mine, near Mohave, and begun operations.

A shipment of forty tons of ore from the San Juan mine at Graham was made last week by C. Qualey. It netted \$1147.—G. R. Sutherland has bonded the Nighthawk mine near Mohave and begun operations.—At the Ray copper mines near Globe new operators have cleaned out and timbered the 100-foot shaft of the Poorman claim and sunk it 50 feet deeper and crosscut. In the Ray claim the shafts have also been cleaned out and retimbered.

In Yavapai county new machinery is contemplated on the Storm Cloud mine near Prescott.—J. Robinson's mine on Big Bug creek contains ore carrying \$14 in gold and sixteen ounces in silver per ton, and 48 per cent lead.—Some of the ores being shipped by Allison & Weeks from their gold mines near the Fernald are high grade.

Chicago newspaper men, headed by G. W. Weber, have bought the Placitas mines.—The Monte Cristo mine near People's valley, owned by Sinclair & Wallott, has been bonded by the Revenue M. Co., and the inauguration of work on the mine is being delayed only by effort to develop water.—Twenty-five men are at work on the Fool's Gulch mine. At a depth of 800 feet a 3 foot vein of \$30 ore was recently struck. It is proposed to sink the shaft 2000 feet.—Colorado capitalists have secured the Hamlyn group in Wickenburg district and are developing therein. The McIntosh group near by is also being developed by a Colorado company. These are both copper and gold properties carrying a little silver.—The Crown Point mine in Castle Creek district, at the 300-foot level has an extensive body of good quartz. A. O. Brodie is the owner.—R. H. Burmister is developing the B. B. mine in Cherry Creek district and also the Standard and Royal groups.—Near Prescott, A. Elliot & Co. of Goffs, Kansas, are developing the Dream mine.—The Red Rock mine in Big Bug district works twenty men. The shaft is down 300 feet. The mill crushes twenty-five tons of ore a day.—In the same district the Annie works thirty men and has a mill. At the Lottie a 2000-foot tunnel is being run. The shaft on the Red Jacket is down 60 feet and prospects are good. A steam hoist is in operation.—The Oro M. Co. at Oro Blanco employs forty-five men; the new mill will be in operation within three weeks. The shaft in the principal mine has reached 260 feet, and a tunnel has been run 400 feet.—In Washington camp, Pima county, the principal operations are conducted by the Duquesne M. & R. Co., where policy has been to develop their property before erecting expensive machinery. Two and a half years have been spent in this work and machinery for the reduction of ores is being installed.

CALIFORNIA.

Amador.

Drifting is in progress at the Amelia mine, near Jackson.—Sinking continues at the Zeila mine; also, at the Anita.

Butte.

Oroville Register: The mining outlook near Magalia continues encouraging. Forty men are employed at the Magalia and the gravel pays well. Power drills are used, driven by compressed air. A 10-stamp mill crushes the cemented gravel.—Pay gravel in the Bader mine keeps a full force employed.—In the Pete Wood mine there are fourteen men employed and the main tunnel is in 2500 feet.—In the Perry mine ten men are at work.—Work on the Banner tunnel near Oroville is suspended until the power drills are ready to operate, which will be soon.—The Alm Bros. at the Crystal Peak mine continue to develop the property.—At the Red Point mine a drift is being run.

Oroville Mercury: Placer mining at Forbestown has been at a standstill by lack of water, but with rain the yield of gold will be considerable. The miners have everything in readiness for washing gravel.—At the Gold Bank the 40-stamp mill is running steadily. Several small power drills have been installed. Work is being pushed on the 560, 700 and 900-foot levels.—At the Carlyle mine development work is being pushed and ore is worked by occasional runs in the 10-stamp mill on the property. It is locally reported that some good ore has been found.—The Slater mine is taking out good rock.—A 5-stamp mill is being built at the Gem mine near Enterprise.—Prospect work continues at the Red Point mine. The small prospect mill has been taken down and it is reported that the owners intend to build a large mill

on the property.—Several men are working at the Sunnyside mine near Robinson Mills and the stamp mill is running steadily.—At the Dewey mine near Sunnyside a 2-stamp mill is running on good rock.—M. Pullen is working the Mt. Ida, taking out ore and running the mill.—D. Burroughs is taking out ore at the Keystone near Forbestown, which he will crush at the Bullion mill.—The Berry mine near Strawberry has closed temporarily. The 3-stamp mill on this mine has been running. Five stamps are to be added.—The Richelleu or Buchanan Hill mine at Yankee Hill is pushing improvements.—The Cherokee Co. are repairing the ditch and flume from Concow to Cherokee.

Calaveras.

San Andreas Citizen: The Lively mines, near San Andreas, are closed. J. B. Luddy has taken possession of the property by order of the Fellowship M. Co. Money is due for labor and to local business men.

San Andreas Prospect: Cross & Meyers have bonded the Lost Log quartz mine in Salt Spring valley for three years for \$4000 and have begun work. The 50-foot shaft will be sunk 100 feet deeper.—Last week five claims in Angels mining district, owned by J. A. Aegerter, were sold to the Great Western G. M. Co. for \$4000. The new company is to begin immediately to develop the mines.—Work is progressing at the Chili Hill gravel mine at Central Hill. On Friday of last week the old works were tapped and the water raised 40 feet in the main shaft. The shaft is being unwatered. The developments revealed a large quantity of virgin gravel.

San Andreas Prospect: The Oriole mine, near Angels, owned by Stockton people, has been extensively developed, and new machinery is being placed.—The Utica Co., at Angels, is sinking a new shaft between the Madison and Gold Cliff properties for working the former, as the old shaft can no longer be used. The new shaft will be sunk 2000 feet. Seventy-five men are engaged in the work. The water in the old works has risen to within 75 feet of the mouth of the shaft.—Work at the Lighter mine will be conducted on a large scale. A 150 H. P. compressor will be in position Jan. 1st, and the intention is to add twenty more stamps to the mill in the spring. The mill and hoist will be run by electricity.—F. Cuneo Sr. has completed the 3-stamp mill on his mine and ore crushing will begin about Jan. 1st.—The Blazing Star mine has been placed under attachment for wages for \$800.

El Dorado.

Placerville Nugget: Work in the new tunnel at the Unity mine near Placerville is being pushed. The tunnel is in 240 feet. This is one of a group owned by the Pine Hill G. & S. M. Co. of San Francisco.

Placerville Republican: Work is progressing on the Esperanza mine near Garden Valley. The shaft is down to the 600 level and tunneling will begin soon.

Inyo.

A 6-foot ledge of low-grade galena is said to have been found in the old Montezuma mine, near Independence.

The Molus mill at Bishop closed down last week because of cold weather.

Kern.

Los Angeles Review: At the Yellow Aster mine at Randsburg 140 men are employed. When the stamp mill now being erected is completed the force will be increased. In the Panamint district a 10-stamp mill and cyanide plant will soon be in operation on the Radcliff property. This mine at a depth of 180 feet has a 4-foot vein of \$30 rock.—The Burchams in the Argus have begun developing their claims.—At Copper City the United Copper Co. of New York have put a force at work developing their claims.—At the China borax works men and teams are at work preparing for the reducing and refining plant, which will be in operation there within the next two or three months.—The Little Butte, Big Butte, Kinyon and Wedge were all shipping ore last week.—The Little Butte has taken out some high-grade ore recently. They had twenty carloads of ore hoisted from the 350-foot level in their bins last week.—The Black Hawk shipped fifty tons of \$40 ore to the Cuddeback mill.—In the O. K. mine Supt. Collins has men at work in two shafts. In No. 1 they are down 75 feet and crosscutting both ways. In No. 2, which is down 85 feet, they are drifting in ore. Last week they struck \$25 rock.—Men are at work on the Monkey Wrench and Independence. On the latter four shafts are being sunk on the ledge.—The Smith mill, ten stamps, which has lain idle at Garlock for several months, has been bought by several members of the Little Butte Co. and will be removed to Dove Springs, where it will be put up. The owners of the mill expect to keep five stamps busy with their own ore, and the other battery will be given to custom work.

Randsburg Miner: The shaft in the Little Butte is down 535 feet. At 500 feet they are running a drift and taking out good ore. Their own mill is running night and day on their richest ore, while a carload is sent to Barstow each week. The new mill on the Hard Cash has started.—Wilson and Kohen have leased, and are taking out twenty tons per day and milling it at Kane Springs.

Mariposa.

(Special Correspondence).—After a shutdown of six weeks, due to lack of water, the Merced Co. resumed operations on the 20th, sufficient water having been secured from Maxwell creek by means of pumps and ditches.—Work is in progress for equipping the Mt. Gaines electrically, the power being taken from Merced falls, where a new station will be built just below the one transmitting nineteen miles to Merced for lighting purposes.—A few men have gone to work on the Virginia and it is reported the whole property will be in operation after Jan. 1st.—Lumber is being delivered for the Big Betsy mill and sales of that company's stock are being diligently pushed. Very interesting developments are looked for from this property as soon as the mill is in running order.—Capt. Ward is taking some excellent ore from the Spencer just now.—The case of Reynolds vs. Bruner, involving the mineral character of a school section near Coulterville, is on trial here this week.

Mariposa, Dec. 20th, '98.

Mono.

The new mill at the Standard Con. mine at Bodie is nearly completed. An addition of one wire to the pole line has been finished for four miles. At tailings plant No. 1 there were treated during the week 361 tons of tailings. The November product of the tailings was \$5400.

Nevada.

Grass Valley Union: It is stated on good authority that the Malakoff Co. at North Bloomfield have struck good gravel in their bedrock tunnel and the indications are that the streak will prove continuous.

Nevada City Transcript: The new mill at the Texas mine, ten stamps weighing 1000 pounds each, near Nevada City, will be running within a month.—The Nevada County Electric Power Co. has doubled the capacity of its plant, which in its entirety will be in operation Jan. 1st.

Grass Valley Union: The Kirkham mine, near Nevada City, will be unwatered and a drift from the bottom of the shaft will be run.

Nevada City Transcript: Near Nevada City C. Marsh took \$50 in gold from three pans of decomposed quartz.—The litigation over the ownership of the Midnight quartz mine, at Nevada City, which has been in the courts for five years past, has ended. E. Tilley is now the owner. He will lose no time in reopening the mine on an extensive plan. He has men at work and will in the spring erect hoisting works to continue on the ledge below the tunnel.

Grass Valley Union: After many years of idleness, work on the old Jenny Lind gravel claim, near Nevada City, will be resumed. C. Stocks has secured the property. The tunnel on the claim is in 800 feet, and by running 200 feet farther they hope to tap the channel worked years ago and abandoned because of a large cave occurring.—A company of local miners, headed by J. L. Gluyas, will open up the old Sazerac gravel claim, in the Rough-and-Ready district. This property has been in litigation since 1871. There is a tunnel 400 feet long on the property.

Plumas.

The Plumas Independent is informed that the Cayot Con. quartz mine near Quincy, owned by F. & G. Cayot, has been bought by a San Francisco company. The owners contemplate building soon.—J. August brought to Quincy last week \$300 in coarse gold.—Mrs. Gruss will add fifteen stamps to the quartz mill on her mine in Genesee.

San Diego.

(Special Correspondence).—Pittsburg, Pa. people have secured the Owens mine and mill at Julian to develop it, and to determine the question of a sale.

The Helvetia near Julian having been unwatered and partially retimbered, ore is being extracted, which when milled, if of sufficient grade, will lead to close of sale to Denver people.

Work on the buildings, etc., for the cyanide plant at Cuyamaca, for the treatment of Stonewall tailings is progressing and sixteen men are employed. It will be about six weeks before the tailings go into the vats, of which there are to be eight, of a depth of 5 feet, and diameter of 30 feet. It is thought it will consume one year to work over the large dump.

A recent strike in the Ranchita is turning out some "specimen" ore which mills well. This mine has recently gone into the hands of a receiver, a Mr. Lane having been put in charge to represent the Julian Mercantile Co., which had Supt. Coutts ousted and Mr. Lane substituted.

There have been several transfers of mining property in the Deer Park country lately, notably that of the Nobles Bros., the price reaching into the thousands.

Galena has recently been discovered in El Cajon butte, its extent not being as yet determined; it looks like good ore.

San Diego, Dec. 18th, '98.

Shasta.

Redding Free Press: A carload of 50,000 pounds of ore from the Ruby Hill mine, near Copper City, was shipped to the Selby smelter.—The Midas G. M. Co. at Harrison Gulch, in the spring will sink a shaft on the ledge from the lower tunnel to the depth of 1800 feet. Ten stamps are being added to the mill.

J. Cannon is leasing the Scorpion mine at French Gulch and is taking out high-grade ore.—G. R. Simmons has an 18-inch vein and is taking out shipping rock.—Blagrove & Collins, leasing on the Washington mine, have a 1-foot vein of \$70 rock. All the Washington leasers are doing well.—The 5 stamp mill being erected at the Washington will be in operation in ten days. Six hundred tons of leasers' rock is awaiting treatment.—P. Schnitzer is taking out gold from his placer claim.—The Oro Psyche mine, the property of G. T. Reinhaus, is showing well.—The Niagara mine is not being worked at present.

W. Driscoll has a 30-inch vein of \$20 rock on his Washington Hill property. He is in 250 feet.

Shasta Courier: Hubbard, Bull & Kingsbury are taking out good ore at the old Crystal mine near Igo and have been doing so all summer.—J. P. Wright & Sons are shipping high-grade silver ore.—J. K. Lewis will start his arrastra as soon as water comes.—E. L. Ballou is at work on his Falls and Manzanita claims, and expects to start his mill when water is available.

Sierra.

F. L. Coe has been appointed assignee of the estate of the Goodyear M. Co. at Downie-

ville.—Ponta Bros. are developing a 4-foot ledge, which they recently discovered.

Siskiyou.

A company has men at the Black Jack mine fitting up machinery preparatory to opening up the mine.—J. & G. Maine have secured the Horn mine at American Bar and will begin work early in the spring.—Bar & Samon have sold a half-interest in their Dewey quartz mine to two Colorado men, who are to erect a stamp mill and sink another shaft. The ore is said to run \$17 a ton free milling, and the vein averages 5 feet in width.—G. A. Warder, who owns near Callahans, is doing considerable development work this winter. The vein is about 30 feet wide and crops for a distance of 1200 feet. The ore is low grade, averaging \$8. He also owns the Bismark mine, which has a vein from 15 to 50 inches wide, with a tunnel on the vein 30 feet. The ore goes \$30 to \$35 free gold and 20 per cent sulphurets. Mr. Warder contemplates building a mill.

Yreka News: J. Keeder of Fools Paradise has struck a 4-foot ledge on his Bonanza mine that goes \$30 per ton gold.—The Miner & LaFlesh mill has shut down on account of the water freezing.—The China claims, near Honolulu, are paying well. They will continue work until the high water drives them out.

J. W. Downing has bought the Cole interest in the Klondike mine on Ash creek, and will put men to work soon.—The Roberts & Gillson mill is running day and night, but if the cold weather continues they will be obliged to shut down.

Trinity.

The Chamberlain hydraulic mine, near Lewiston, has been sold to the Adele M. Co., a corporation organized by San Francisco and Pennsylvania capitalists. Everything is in readiness for the operation night and day, as soon as the water supply will permit.

Tuolumne.

Jamestown Magnet: The Leap Year gravel mine at Jamestown has been bonded to Hawley & Cardwell for \$15,000. They begin work immediately.—A new 20 or 40-stamp mill for the Golden Rule mine at Stent is contemplated.—L. Radovich is doing development work on the Possible mine near Columbia.—Work on the Over mine near Saw Mill Flat has been resumed.—J. Parker has bonded the Lovell ranch near Columbia and has put a force at sinking a shaft.—G. Smith of Columbia has bonded his quartz claim to San Francisco people, who are preparing to begin operations.—Conlin Bros. have struck the vein on the old Experimental mine.

Sonora Democrat: Work will resume on the Mt. Zion in the Big Oak Flat country, recently bought by Cassaretto & Cramer.—It is locally reported that good rock was uncovered last week in the Hope.—The Black Oak mine near Soulsbyville is doubling its milling capacity, the second time this year, first adding ten and now twenty stamps.—It is estimated that 200 prospectors are working in the Moccasin Creek district.—Boring by the Columbia Gravel & Expl. Co. near Columbia is resulting satisfactorily. A depth of 200 feet has been reached. Wash gravel was struck at 155 feet and still holds out.

Sonora Independent: J. R. Parker of San Francisco has begun work on the Fox gravel lead near Columbia.—J. Stutz sold his interest in the Graham & Conlin mine to Ball & Stone of Sonora, who have also leased the Hudson & Calhoun mine in that vicinity, and will begin work at once on both properties.

COLORADO.

BOULDER COUNTY.

At Ward the B. & M. mine is producing about 300 tons of ore per month and has fifty men on the payroll.

At Eldora twenty veins are said to have been opened in the Mogul tunnel in driving 800 feet, of which ten are in pay.

CLEAR CREEK COUNTY.

The Georgetown Courier is informed that the Doric has placed \$50,000 in new paper on the London market, for the purpose of renewing work on the tunnel.

DOLORES COUNTY.

There are fifteen men on the Rico-Aspen properties, extracting ore on the percentage plan.

EAGLE COUNTY.

Ore shipments from Red Cliff last week were eleven carloads, a total tonnage for the year of 11,881.

EL PASO COUNTY.

Late shipments of two carloads of ore from the Guess mine at Cripple Creek returned from \$50 to \$75 per ton.—Three shipments recently from the Climax, operated by lessees, returned two and one-quarter ounces to the ton.

The three shipping leases on the Hull City Placer—the Fox, Russell & Allen and Vaughn & Christian—are crowding their output. The Kilton sampler is treating seventy to ninety tons a day for these lessees alone.—The Isabella Co., at Cripple Creek, contemplate the erection of a heavier plant of machinery over the Lee workings about Jan. 1st. They will also put in a new air compressor for twelve or fourteen drills. The shaft is down nearly 740 feet, but will be continued to 1000 feet.—A shipment of twenty-two tons was made last week from the Jack Pot. The ore is valued at \$15,000 and is taken from the Creston lease.

On the Republic it is said the output for the month will be 750 tons. Three carloads of ore, averaging \$40 per ton, have been shipped this week.—Three carloads of ore—two of screenings and one of coarse rock—were marketed last week from the Johnstone lease, whose output for the month, it is estimated, will reach 750 tons.—A standard gauge car of ore, containing twenty tons, was shipped last week from Anaconda, whose gross value is variously estimated at between \$15,000 and \$20,000. This shipment was made by the Creston (La.) Leasing Co. from the Jack Pot.—A lease for \$20,000, running eighteen months, has been given by Hale & Co. to East-

ern people on the Clyde mine, near Victor. Machinery and pumps will be installed and the property thoroughly developed.

GILPIN COUNTY.

The Topeka mine near Central City is producing both smelting and milling ore. Last week a shipment of eight tons yielded forty-one ounces of gold per ton. Another shipment of four tons ran over \$1000 per ton. In November the property produced ninety-two cords of ore, the average of which after treatment at the mills gave returns of five ounces of gold per cord. The production of this mine is between \$15,000 and \$20,000 per month.

Near Central City the Cook mine is taking out enough ore to keep 120 stamps dropping, and has 123 names on the payroll.—Last week was deposited a gold retort of 215 ounces by the Pierce mine, the result of a run on seventy-eight cords of ore. Besides the gold cleaned up on the plates there is a large tonnage of tailings. This mine is shipping thirty tons of mill ore a day. The smelting ore carries values of from three to seven ounces gold per ton.—In November the Kansas-Burroughs Con. M. Co. shipped 2700 tons of ore.—Last week H. P. Lowe, of the Topeka mine, Russell district, received \$4344.50 for four tons of ore and \$8500 for an eight-ton shipment.

GUNNISON COUNTY.

Gunnison News: About 200 men are at work in the coal mines at Baldwin and considerable bituminous coal is being shipped.—The Maid of Athens mine at Pitkin is producing and shipping a considerable quantity of high-grade ore. The output is twenty tons a day.—The Chloride is loading about a car of ore per week at Ohio City. The values are principally gold and the ore averages \$80 a ton net.—The Bimetallie M. & L. Co. is operating near Ohio City. The ore nets \$104 a ton.—The Black Queen mine at Redstone shipped the first car of ore over the Crystal River Railroad.

LAKE COUNTY.

The Resurrection G. M. Co. at Leadville is shipping ten cars of ore daily.—The total production of gold ore from the Ibez mines at Leadville for November was above 8000 tons.—Douglass & Newton, lessees of the A. Y. and Minnie mines, output in November 1100 tons of high-grade lead sulphide concentrates. The White Cap mine on Iron hill produces fifty tons per month, which carries one ounce gold and seven ounces silver.—The Ruby mine is shipping fifty-five tons daily of lead ore.—Thirty cars of ore are shipped daily from the Ibez group of gold mines.—Forty tons of good grade of silver-iron ore are shipped daily from the Great Hopes mine. Some lead is being marketed, which nets \$90 per ton.

The Mahala M. Co. is shipping 125 tons of iron and lead sulphides daily. The payroll carries ninety-five names.

MINERAL COUNTY.

The Solomon mine at Creede is operated under lease by Abbott & Rowley. They employ twenty-five men; the ore is lead and zinc. On the property is a 75-ton concentrating mill. The zinc is shipped to Joplin, Mo.—During the year the Champion has output 200 tons.—The Mollie S., operated under lease, has shipped seventy-five tons of ore since summer.—The Kreutzer Sonata has shipped sixty tons since September.

OURAY COUNTY.

Ouray Herald: The Grizzly Bear mine continues its shipments, and a train of forty burros makes trips twice a day during the week.—The Atlas in the Sneffles district, recently bought by Carroll & Co., is producing high-grade gold and silver ore.

SAN MIGUEL COUNTY.

The shipments of copper ore from Placerville averages two cars a week. The ore shipped is rich, the lower grade being kept for home treatment until the smelter at Paradox is completed.—The Gold King mill is running twenty-five stamps. The yield of the ore is satisfactory.—The Smuggler-Union mill is consuming close to 200 tons of ore every twenty-four hours, turning out several cars of high-grade concentrates a week.

IDAHO.

Florence Miner: The Fortune mine, Buffalo Hump, was sold to the Buffalo Hump D. Co. for \$6000 cash.—At the Iron Crown mine, near Florence, the mill is running regularly and making good clean-ups. At the last mill run of thirty hours \$1750 was taken from the plates.—The dredges at Idaho City and Placerville have closed operations for the season; they ran long enough to demonstrate that they are paying properties. Work is still going on at two at Centerville, and it is learned that two more will be built there as early as the weather will permit next spring.—A company has procured an option on the Jumbo mining claim at Buffalo Hump for \$75,000. S. I. Silverman is at the head of the undertaking. He says that the ledge on the Jumbo is from 12 to 20 feet in width at the outcrop and that development thus far has shown a good milling property. In a tunnel that has been driven ore is exposed that shows an average of \$40 per ton in gold.

Silver City Avalanche: The sale of the Empire mine, near Silver City, to Senator Pettigrew of South Dakota and his associates, has been made. About fifteen men are employed this winter, and some good ore is being extracted.—Lewis & Davis, who have a lease on the Burro claim, are pushing development work.—At the Cumberland mine work will soon be resumed.—In the Addie mine they have 14 inches of fair grade ore. Work will continue all winter.—The Poorman mine is still running on the 150-ton test lot of ore.—The Big I mine at De Lamar is shipping high-grade ore.

Idaho City World: Extensive developments have begun on the Blue Jacket mine in the Seven Devils country. A crosscut tunnel is in 250 feet. The ledge will be cut at a depth of

350 feet. The ledge will be drifted on until a depth of 800 feet has been reached.—On the Peacock, the company's main property, the developments show an ore chute 300 feet long and 40 to 60 feet wide. A company has been organized to put in a 500-ton smelter next spring, in which Glass Bros. of Basin, Montana, are the prime movers.

In a clean-up recently at the Lucky Boy mine 100 tons yielded \$15 a ton. The vein is from 5 to 6 feet wide. Three men in the mine have been keeping the mill supplied with ore, and took out seventy-five tons in addition to the 100 tons crushed.—J. K. Fleming, Supt. of the Lucky Boy mine, has secured a bond on the Illinois, adjoining the Lucky Boy. This mine, worked to a depth of only 50 or 60 feet, has yielded between \$200,000 and \$300,000. The mine cannot be developed any deeper by tunnel. It is estimated that an outlay of \$10,000 will be necessary to develop the mine.

MONTANA.

The last dredge boat to shut down on Grasshopper creek was the A. F. Graeter, which completed its run for '98 last week. This has been a profitable season for the big gold saving machines.

At the New Year mine at Lewistown the new mill will soon be in operation. The capacity will be forty tons per day. The company has developed a coal mine, which furnishes fuel, in proximity to the mill. The force employed is thirty-five men.—McDowell & Blewett of Butte recently secured a \$20,000 lease on the St. John mine at Copperopolis in Meagher county. They have men developing the property and are pleased with the showing made. Assays show 40 per cent copper. The first carload of the ore was received in Butte last week.—The Emery mine at Butte is making weekly ore shipments.—L. O. Enoch made a clean-up of \$1200 from a three weeks' run on Eureka ore.

Phillipsburg Mail: The mining property owned by Smith & Kent near Phillipsburg has recently been bought by C. D. McLure and P. A. Fusz for \$20,000, with a cash payment down. Development has begun. A shaft has been sunk 110 feet and the showing in the levels on the lead is good. The ore at that depth is high grade, samples assaying 7000 ounces in silver, and a shipment of thirteen tons recently netted over \$3000. A hoisting plant will be erected and large pumps installed.

Clancy Miner: The Pilot mine near Clancy will resume operations. The property is equipped with a concentrator, and a steam hoist capable of developing the mine to considerable depth.—T. W. Ross is developing a property near Clancy in which he has a ledge said to be from 8 to 10 feet in width, and from which a sample shipment to the smelter gave \$150 a ton.

NEVADA.

Pipe for the Evans pumping plant, to unwater the Comstock 500 feet, is beginning to arrive at Virginia City, and the Risdon Iron Works, which has the contract for the work, is getting ready the pump for shipment. It is expected that the actual work will begin next month.

The Occidental mill at Virginia began dropping fifteen of its stamps on ore from the mine last week. The other five will soon be started. The twenty stamps have a crushing capacity of sixty tons daily. The ore is above the average grade.—The mills in Six-mile canyon, closed on account of the recent frost, are again in operation.—The Indian Queen mine in Esmeralda county is said to be producing good ore.

Ely News: C. S. Davis, Mgr. of the Ely M. & M. Co., says it is the intention to thoroughly develop the mine before erecting a mill. The showing in the shaft is good at 100 feet.—The Prince mining claim at Pioche was sold by the sheriff last week for \$900 to satisfy a judgment.—Mining machinery is being delivered at Bullionville, Lincoln county.—Near White Pine a body of ore has been opened in the Union Jack by the Butterfield M. Co. in a 300-foot tunnel, and the crosscuts of the vein show its width to be 20 feet, carrying gold values.

Eureka Sentinel: A large amount of ore is being shipped from the Eureka Con. mine.—Smith & Jackson, working the Homestake and Rocco mines near Hamilton, will continue to work six men during the winter prospecting the mines. The last shipment for the season was made last week.—At the McEllin mine, a lead producer, a few men are sinking the shaft on contract.—In October extensive preparations were being made for the erection of a water-jacket smelting plant at the Wheelan-Dougherty mines at Copper Basin. The mines were said to have been sold to a California company, and active development work was expected to be in progress before now. A misunderstanding is said to have recently occurred, and M. J. Donovan, Supt. for the California people, is having all the improvements and machinery removed on the E. & P. railroad in Pine valley.

NEW MEXICO.

At Santa Fe on the 21st the United States Court of Private Land Claims restored to the public domain the Estancia land grant, made in 1845, and claimed by Joel Parker Whitney. It contains 500,000 acres.

In Cooney district the Helen M. Co. is building a pipe line which will furnish the Confidence mine with power for hoisting, milling and lighting the mine and 30-stamp mill, generating 500 H. P. The Confidence group is producing seventy tons of \$30 ore per day. The development work consists of a 1000-foot tunnel, about the same amount of drifts, winzes and 1800 feet of shafts.—A tunnel is being run on the Cooney property 900 feet to tap the ore chute at a depth of 650 feet. This has been a producing property since 1880.

The Maude S will be reopened shortly. It was closed in 1897 because the character of the ore changed and the mill was losing the values.—In the Baldy district a tunnel is being run on the Aztec property 100 feet lower

than the old workings. The Aztec 20-stamp mill has been repaired and is being supplied with low-grade ore from the smaller veins on the property.—The Wallace placer field, embracing 10,000 feet of ground on the South Ponil river, Colfax county, was sold last week to Col. Mathews of Hutchinson, Kansas. The dirt will yield from 20 to 70 cents per yard.

At Central the Texas shaft has reached a depth of 500 feet.—At Hanover the Philadelphia is a regular shipper to the Silver City Reduction Works. The ore is copper pyrites.

Near Elizabethtown the Montezuma G. M. & P. Co. employs twenty-four men. The vein has a width of 60 feet.—Work has resumed by the Hematite Tunnel Co.—At Santa Rita the Santa Rita Copper & Iron Co. is making regular shipments of iron ore.

OREGON.

Shipments from Sumpter for November were 429,790 pounds of concentrates and 73,550 pounds of ore, a total in five months of 2,453,464 pounds.—At Granite on the Cougar mine M. Larkin contemplates building a mill of 100 tons capacity.

The Grant's Pass Journal is informed that Senator Jones & Co.'s mill on Mt. Reuben will start up this month.—The Star Gulch Hydraulic M. Co. has everything in readiness to start when rain sets in.

Ashtand Record: It is locally reported that the Black Jack gravel mine, near Hornbrook, will be put in operation again.—Knapp & Pollard of San Francisco will run the Dugan & Knapp placer mine, near Ashtand.—The Swayne mine, on Big Applegate, is working twenty men.—F. G. McWilliams had nine tons of ore crushed from his quartz mine near Jacksonville the other day. It did not come up to 50 per cent of the assay. He will make another test.

UTAH.

The Midnight Bowers mine, Tintic, has let a contract for putting the shaft down 200 feet.—The Northern Light of Lion Hill last week, after an interval of over a year, shipped ore that yielded 247 ounces silver, \$4.80 in gold and 6.9 per cent lead per ton.—De Lamar's Mercur Mines Co. made a consignment of auro-cyanides last week from the Golden Gate mill, valued at \$75,000.—The Old Susan mine, in Tintic district, which was a producer twenty-five years ago, but has been in litigation, has resumed work.—Work was resumed last week on the Dagmar-Eureka group, near Eureka.—From Eureka the Sunbeam shipped three cars of ore and the Joe Bowers one.—The Dalton M. Co. at Marysville bought a group adjoining its mine for \$5000.—The Iron Duke mine at Silver City was sold last week to the Monterey M. Co. Upon the Duke is a shaft 370 feet deep. Ore has been found that showed 170 ounces silver, 2.75 ounces gold, 30 per cent copper and 35 per cent lead.—Tests made upon the ores of the Mammoth mine at Bingham gave an average value of \$9 gold per ton. Of this class of ore there are 2000 tons on the dump. In the 200-foot level are 2 feet of ore said to yield \$24 per ton.—From Tintic were shipped last week 84 cars of ore, 13 of concentrates, and 34 bars of bullion.—The Ajax mine at Mammoth shipped ten cars of ore this week. Included in this shipment are the first five cars from the new gold chute that has been opened between the 200 and 400-foot levels, and of which there are over 5 feet. According to assays, this ore shows \$20 in gold, 5 per cent copper and six ounces silver.

Near Vernal the new Bromide smelter is running full capacity.—G. Holmes and associates of Salt Lake City have secured a group of copper-bearing claims near Paradise for \$40,000, payable in six months.—In Clifton mining district the Midas mine, under the supervision of Mr. Grant, is piling up ore to be put through the mill to be built soon on Midas ground.—From the Spotted Fawn mine Murdock & Co. are marketing a fine quality of silver-lead ore.

Park Record: Eighteen bars of silver bullion from the Marsac refinery were shipped last week from Park City. This bullion was the product of Ontario tailings.—The shipments of ore for the past week were 1,490,140 pounds.

The Bingham Bulletin approximates the ore shipments for September, October and November from Bingham at 12,377 tons.—A shipment of high-grade copper ore was made last week from one of the Old Telegraph leases at Bingham.—A 1000-ton lot of Dalton & Lark dump ore was bought by one of the smelters.—The ore from the new strike in the Frisco assays 49.6 per cent lead, twenty-nine ounces silver and \$1.10 gold.—Butte people are figuring with the St. Joe Co. to advance the deep tunnel of the St. Joe group 3600 feet.

Mercur Mercury: The owners of the Old Fred at Mercur hope by spring to be ready for a mill. A contract has been let to sink a winze from the 400-foot tunnel to the third vein, which has been extensively prospected in another part of the ground.—W. A. Clark, of Butte, Mon., has bought the control of the Ophir Hill mine, and it is locally reported that he will begin soon to enlarge the mill and put the mine in a condition to furnish larger tonnage. There is said to be much ore that can be treated by the cyanide process and a cyanide plant may be added. The property is capitalized for \$25,000 in shares of \$25 each.—At the Daisy the mill is supplied with ore. A shaft has been sunk on the vein which was found while clearing the ground for enlarging the mill, and \$7 a ton ore was found.

Mercur Mercury: The Geyser-Marion mill and mill 200 tons of ore per day, commencing Jan. 1.—A large vein of low-grade silver ore has been opened up in the Hercules, running from ten to twenty ounces silver and \$2 to \$6 in gold. It is too low grade for shipping and it is probable that the company will build a cyanide mill.—The pipe line to the Chloride Point is completed and the mill is 100 tons of ore per day and shipments will be larger than formerly. It is probable that

leaching tanks will be added to the plant.—The Northern Light's first shipment of ore since July, 1897, was made last week and a second carload of 600 sacks went out last Saturday. Assays of the first shipment showed values of \$4.80 in gold, 247.1 ounces silver and 6.9 per cent lead to the ton.

WASHINGTON.

(Special Correspondence).—The Monte Cristo district, fifty miles east of Everett, is developing gradually, the greatest drawback at present being that about five miles of the railroad which reaches the district is washed out, with no likelihood of its being repaired this year. The Monte Cristo ores are an arsenical iron, rich in copper.

The Gold Basin district is reached by wagon road from Wallace, on the Great Northern. It is claimed a fair tonnage of ore has been mined, which is ready for shipment. The Forty-five and the Sultan are the best developed of Gold Basin properties.

It is reported that the Penn Mining Co., operating in that section, recently cut a vein of ore 10 feet in width that pays well.

From Index, forty miles east of Everett, an electric line to Galena, twelve miles distant, is being planned. Most of the ores at Galena are high in copper. In this district the Sunset Mining Co. is developing a property with energy. It is asserted that they have uncovered a copper ledge 25 feet wide for 1700 feet, and that the ore runs 34½ copper. The ores exhibited at Everett are fine specimens of rich copper-iron. The building of a small smelter on the ground is contemplated. This company was organized and is managed by John E. McManus of Everett.

While the region of the Cascades in Washington is difficult to prospect, owing to the heavy undergrowth, it is being investigated a little more thoroughly each year, and development on both sides of the range has resulted favorably.

The Everett smelting plant has added a refinery capable of treating 1000 tons a month of base bullion. The smelter operates four roasters and two furnaces. The management reports getting a small tonnage of ore from the Cascades, which is increasing. Some of this comes from the Mathow district.

WASCOOT.

Everett, Wash., Dec. 10th, '98.
A depth of 300 feet has been reached on the Black Tail mine at Republic, and the ore is said to run \$25 per ton in gold.—At Bossburg 12 feet of ore, yielding \$11 per ton in gold, has been disclosed on the Ben Franklin.—The Great Northern mine has reached 150 feet and has shipping ore going \$20 per ton.—The Black Butte mine near Cottage Grove is said to be turning out quicksilver at the rate of \$30,000 per month. The output will average a ton a day for the year round. The smelter was erected during the summer and began operations October 10th.

Spokane Review: At Chelan, on the Colville reservation, M. D. Griffin & Son have bonded three claims to M. L. Turner of Seattle, representing New York capitalists, for \$500,000. The first payment is \$50,000, and the purchasers begin at once and push development. In six months a payment of \$50,000 will be due, and the balance, \$245,000, at the expiration of a year.

WYOMING.

Grand Encampment Herald: The Rambler mine at Battle Lake in the 170-foot shaft ran a 100-foot drift which cut three new veins. The last vein reached is 5 feet wide and is copper-bearing ore.—T. G. Clemmons & Co. have leased the Melita mine near Grand Encampment and are taking out shipping ore. It carries gold, copper and silver.—F. M. Benson has sold an interest in the Little Marion, Commodore and Magnolia claims to Michigan people and the new owners have contracted for sinking to begin at once on the Little Marion.

FOREIGN.

BRITISH COLUMBIA.

The ore shipments from the mines about Rossland from Jan. 1 to Dec. 10, '98, were 121,431 tons. Shipments from Dec. 3 to Dec. 10, inclusive, were 2460 tons.

Rossland Miner: The announcement comes officially from Montreal that the C. P. Railway will at once begin the construction of a big smelter somewhere in the Boundary country. Its capacity will be from 500 to 1000 tons daily, and it will be devoted exclusively to treating the low-grade copper ores of the Boundary country.

MEXICO.

Two Republics: From the Mazapil, Durango, gold mines, lately acquired by a Belgian corporation, last week twenty-five tons of ore were shipped to Belgium for a test treatment. The company, which owns large copper properties, is said to contemplate the erection of reduction works.

Operations have begun on extensive development of the Seven Star mining property, near Chuichupa, Chihuahua. The mine has seven well-defined veins and the ore assays high in silver. The company will erect a smelter soon.—The Roy mine of Pilares district is shipping ore via Casas Grandes and the Sierra Madre railway to El Paso. The distance from Pilares to railroad at Casas Grandes is 111 miles. The ore is carried to Casas Grandes ninety-six miles by wagon and fifteen miles by pack animals.—There are three mines at Pilares employing from 150 to 200 men, and each is shipping high-grade ore. These are the Roy, the Cinco de Mayo and a group worked by J. Santa Cruz.

ONTARIO.

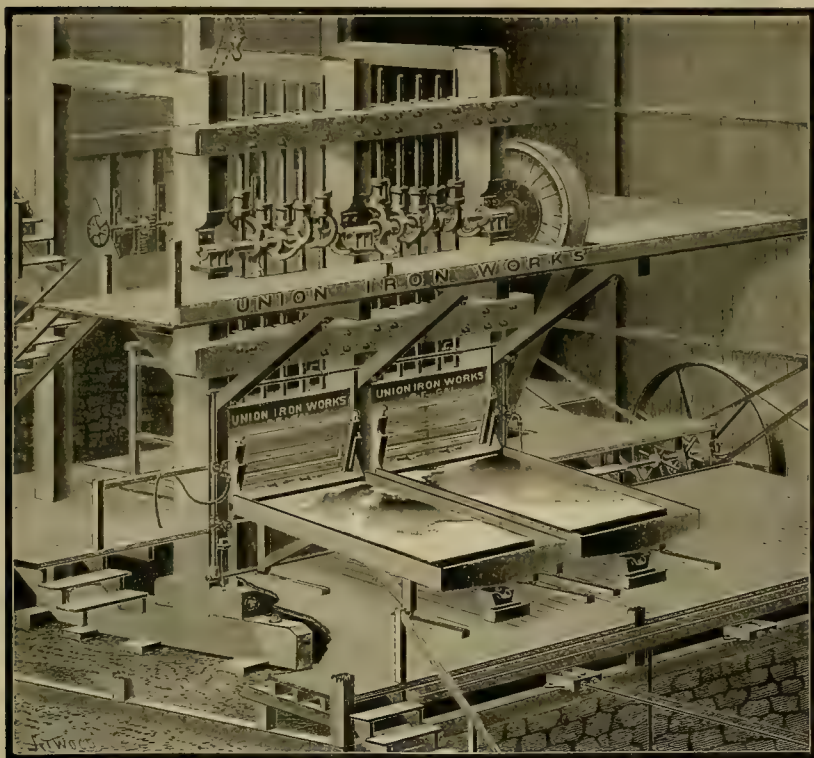
At Sturgeon Falls the Hidden Treasure mine has been leased for \$55,000, and on the Golden Crown mine \$8000 is to be spent in development this winter under an option.—The Independence has let a contract for sinking another 100 feet, which will make the shaft 175 feet deep. The 5-stamp mill in its last run of twenty-six days yielded \$2000 in gold.

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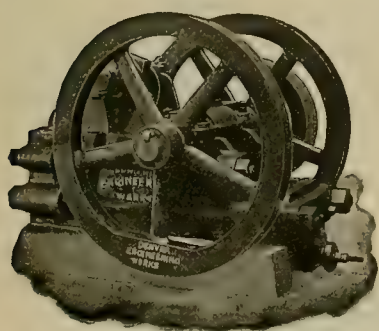
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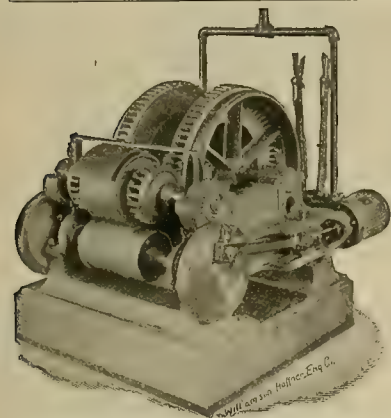
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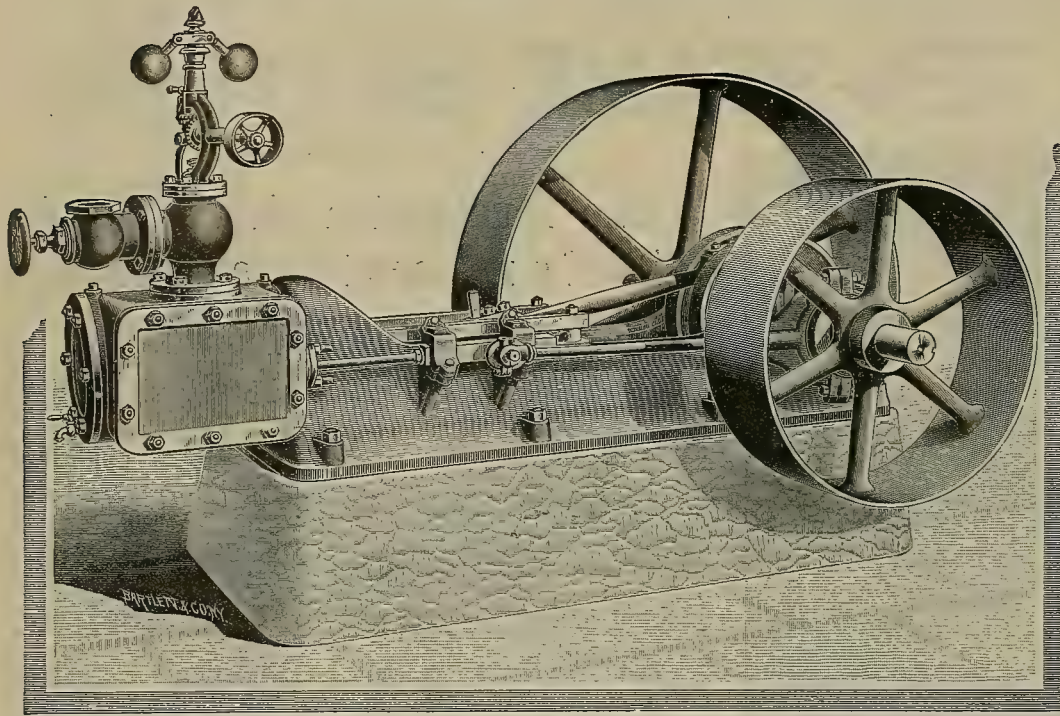
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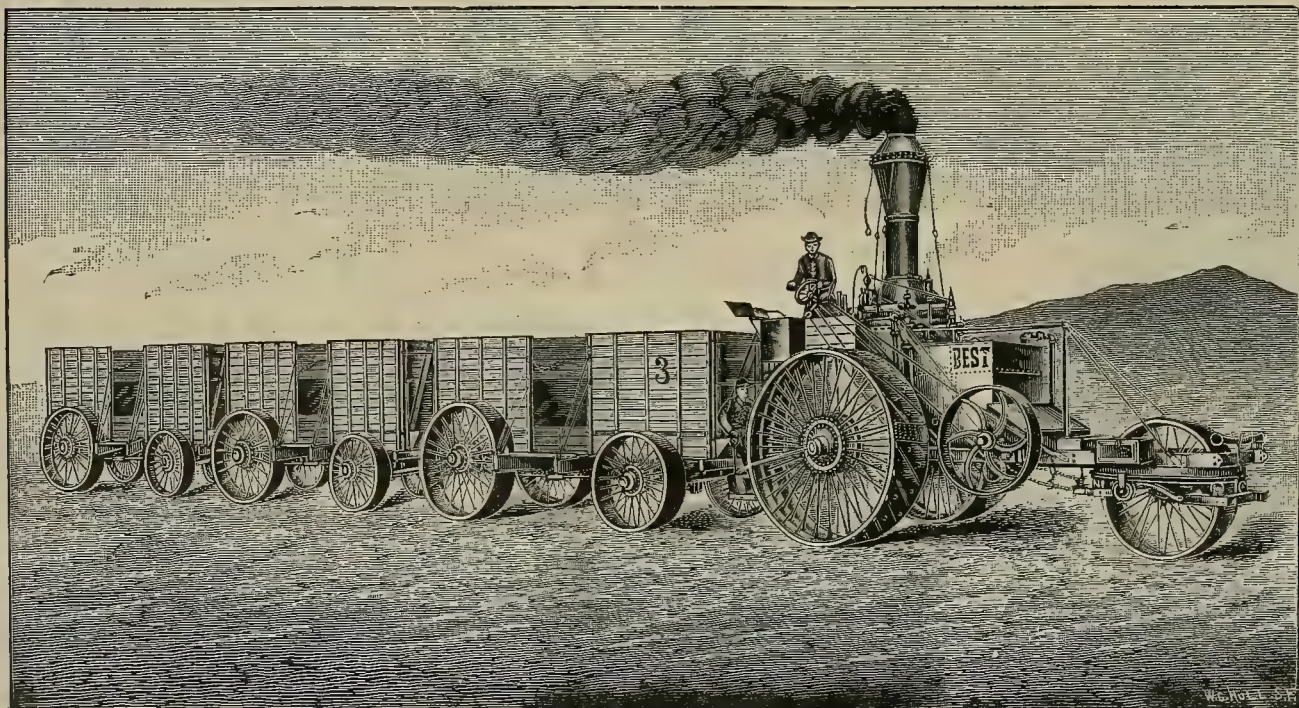
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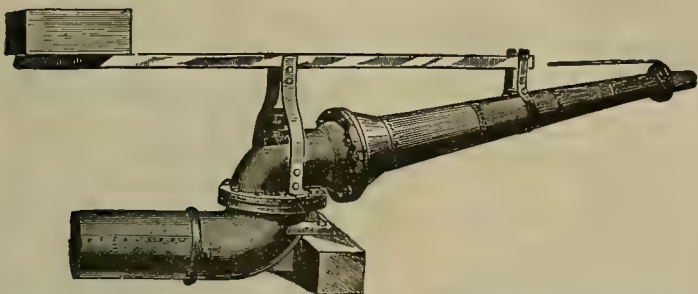
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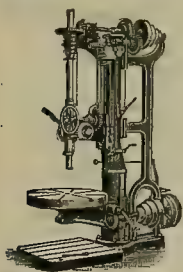
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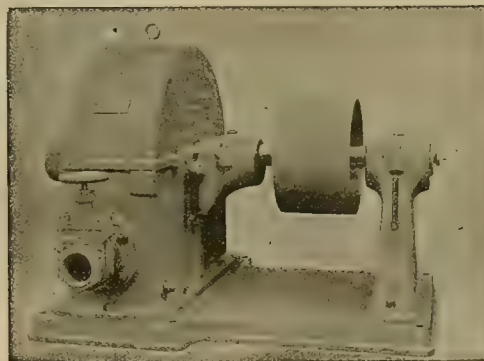
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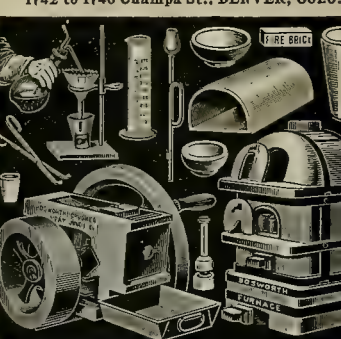
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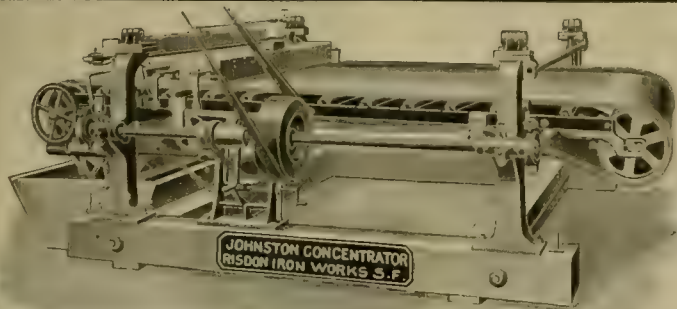


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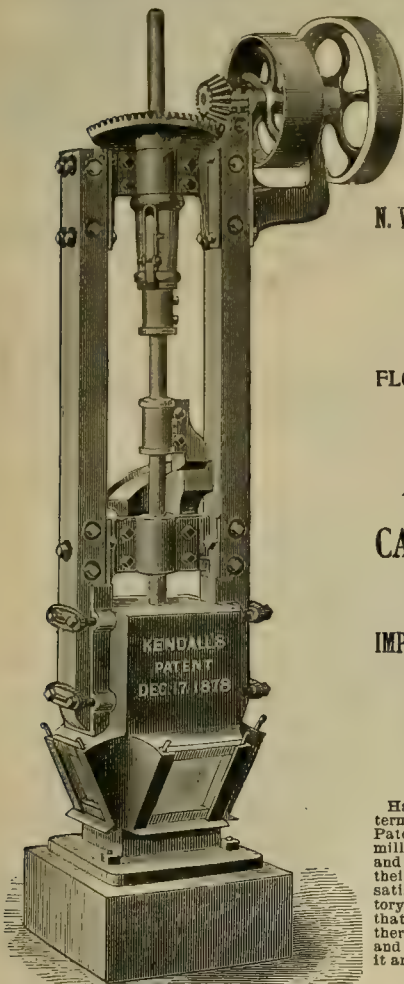
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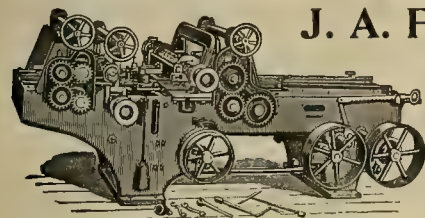
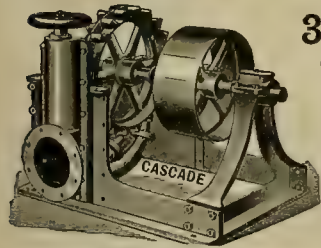
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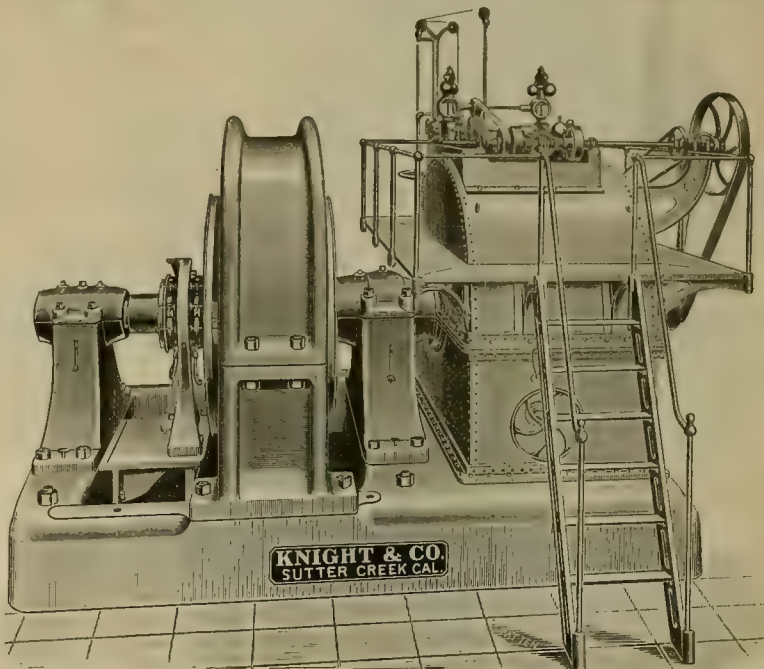
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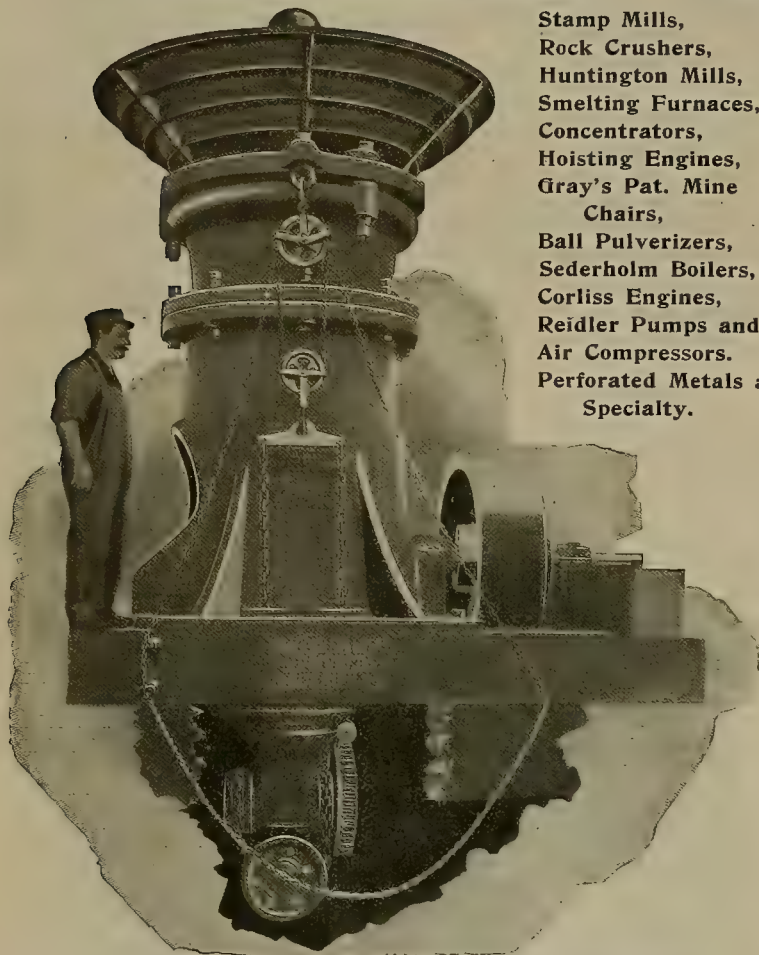
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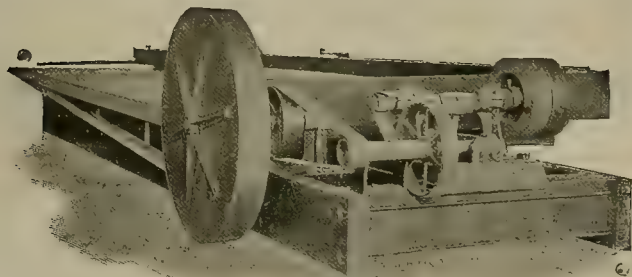
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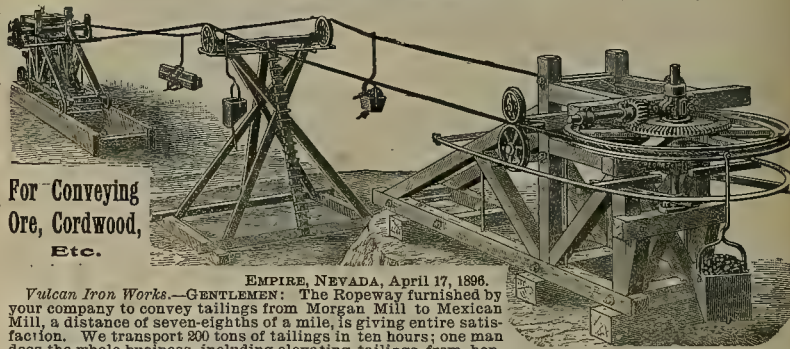
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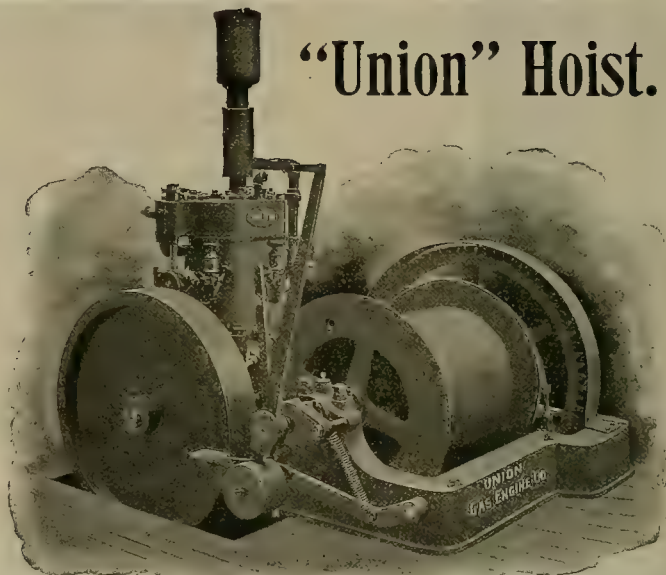


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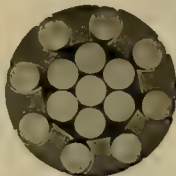
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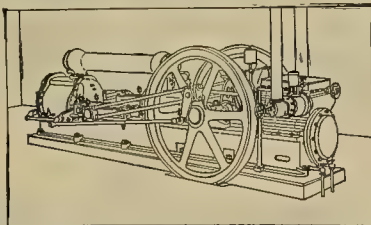
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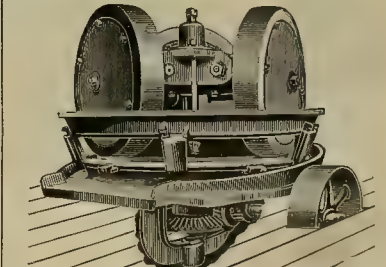
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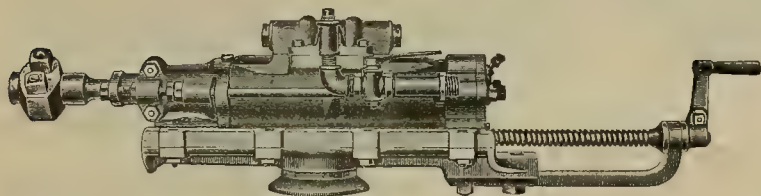


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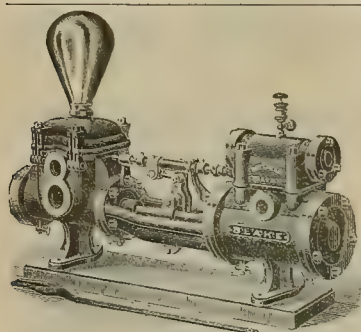
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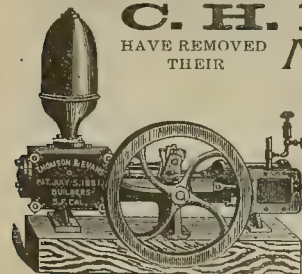
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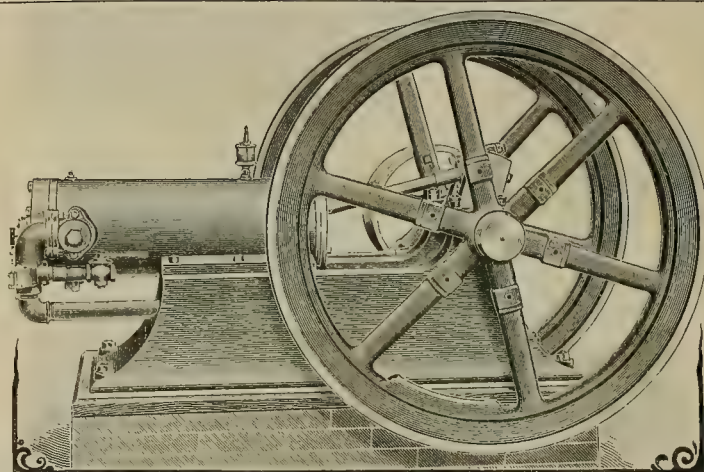
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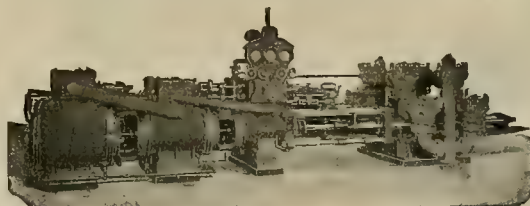
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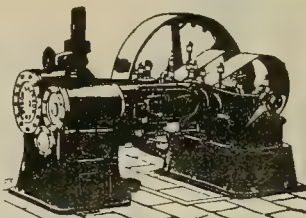


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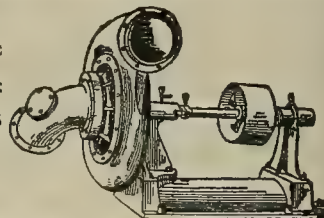
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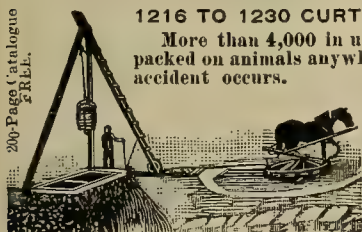
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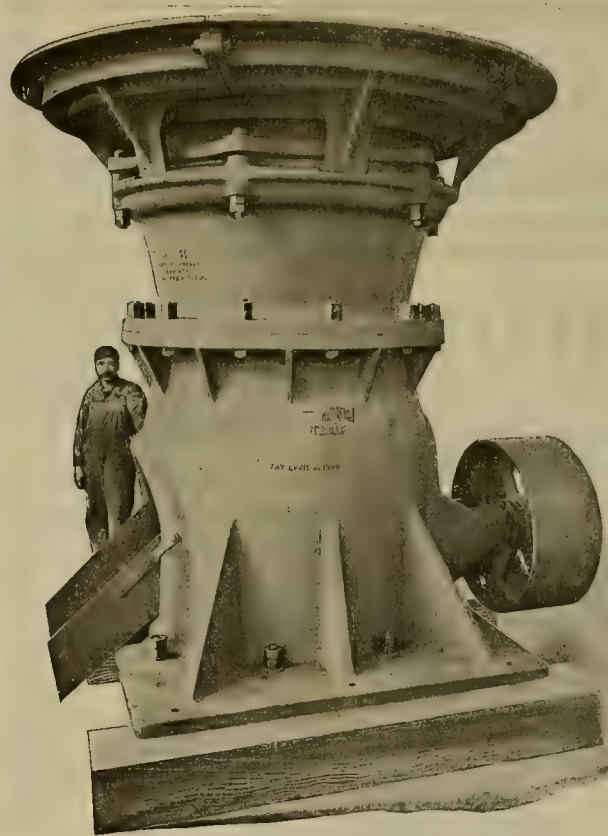
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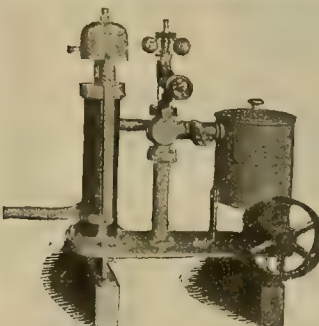
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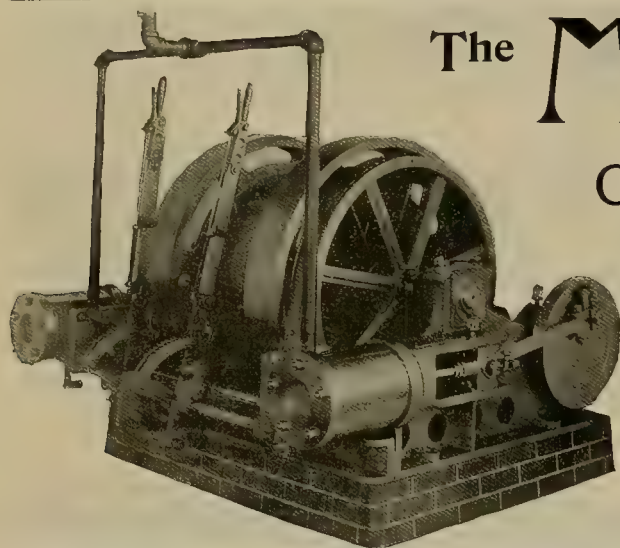
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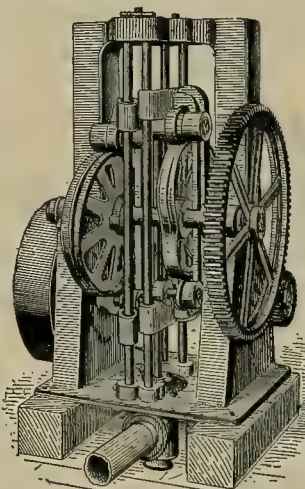
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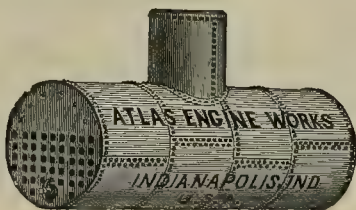
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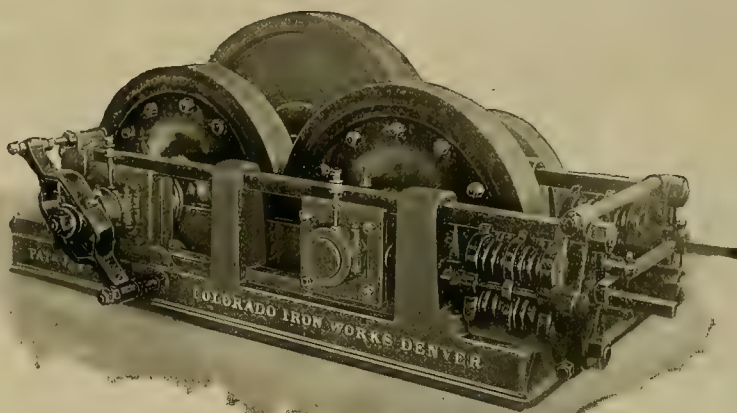
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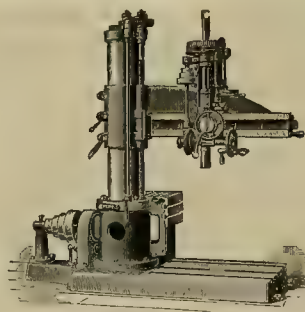
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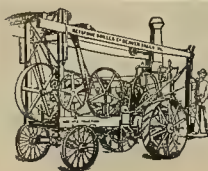
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Assessment Notices.

MARINA MARISCANO GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Sunny Hill, Shasta County, California.
Notice is hereby given that at a meeting of the Board of Directors, held on the 15th day of November, 1898, an assessment (No. 15) of 2 cents per share was levied upon the issued capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 217 Sacramento street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 15th day of December, 1898, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 15th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
CHARLES BOVONE, Secretary.
Office—217 Sacramento street, San Francisco, California.

INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business, San Francisco, California; location of works, Inyo, Inyo County, California.
Notice is hereby given that at a meeting of the Board of Directors, held on the 5th day of December, 1898, an assessment (No. 21) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, room 31, 10th floor, Mills building, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 25th day of January, 1899, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 23rd day of March, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
CHARLES E. ANDERSON, Secretary.
Office—Mills building, room 31, 10th floor, San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.
Notice is hereby given that at a meeting of the Board of Directors, held on the 5th day of December, 1898, an assessment (No. 22) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 30th day of January, 1899, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
CALVERT MEADE, Secretary.
Office—106 Leidesdorff street, San Francisco, California.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.
Notice is hereby given that at a meeting of the Board of Directors, held on the 5th day of December, 1898, an assessment (No. 5) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 773 Mission street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 20th day of January, 1899, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 15th day of February, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors,
GEO. W. FLEISSNER, Secretary.
Office—773 Mission street, San Francisco, California.

DELINQUENT SALE NOTICE.

ARRASTRAVILLE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.
Notice—There are delinquent upon the following described stock, on account of assessment (No. 2) levied on the 15th day of November, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. | Cert. | Shares. | Am't. |
|---------------|-----|-------|---------|---------|
| William Day | 602 | 100 | 100 | \$10 00 |
| George Strant | 623 | 1,000 | 100 00 | |
| George Strant | 646 | 300 | 50 00 | |
| E. P. Hill | 637 | 150 | 15 00 | |

And in accordance with law, and an order from the Board of Directors, made on the 15th day of November, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, 213 Jackson street, San Francisco, California, on TUESDAY, the 15th day of January, 1899, at the hour of 3 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
J. MIDDLETON, Secretary.
Office—213 Jackson St., San Francisco, California.

ANNUAL MEETING.

The Regular Annual Meeting of the Stockholders of the CONSOLIDATED ST. GOTHARD GOLD MINING COMPANY will be held at the office of the company, 113 Crocker building, San Francisco, California, on THURSDAY, the 12th day of January, 1899, at the hour of 2 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close Monday, January 9th, at 4 o'clock P. M.
J. P. HOLLING, Secretary.
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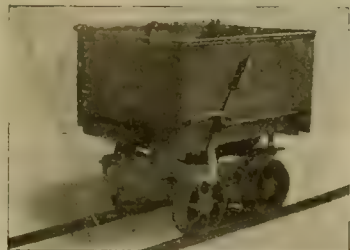
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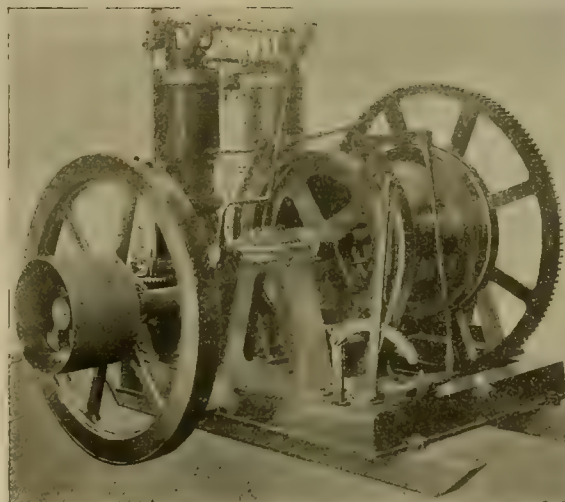
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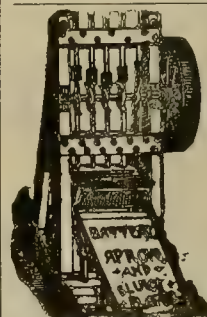
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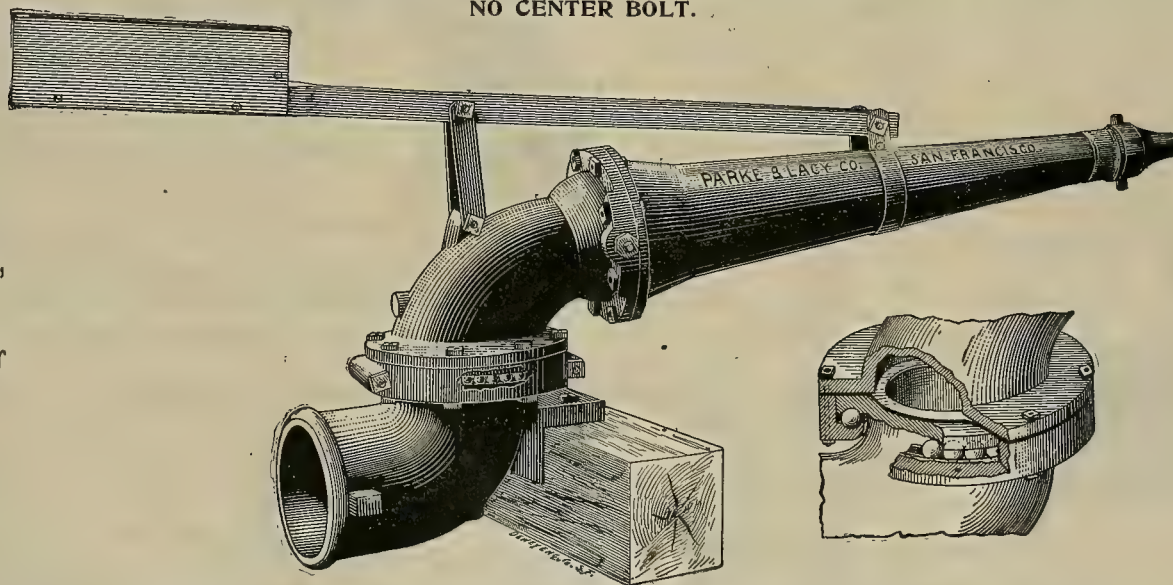
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No. 2008.—VOLUME LXXVII.
Number 27.

SAN FRANCISCO, SATURDAY, DECEMBER 31, 1898.

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Single Copies, Ten Cents.

The Tropenas Steel Process.

In '99 the Union Iron Works of San Francisco will begin the manufacture of steel on the Pacific coast in connection with their extensive works at the Potrero. It would be further gratifying to be able to say that

the iron would be a Pacific coast product. In several parts of California, Oregon and Washington are large deposits of suitable iron ore. Not a month passes without the receipt of a letter from some one somewhere in those three States citing the existence of the very kind of ore fitted for the manufacture of steel. To recount the reasons for such non-development would be unnecessary to those who can understand

them, and useless to those who can not. Probably the most potent are the elements of fuel and transportation. Steel can to-day be bought in the United States for less than \$15 per ton. This is on the authority of Andrew Carnegie. Alabama is to-day making pig iron at a cost on the cars of less than \$6 per ton; this is on the authority of that State's geologist. When the simple fact is cited that among the other elements of cost in previous coast experience, figures one of \$8 per ton for fuel, it will be seen why the great iron deposits of this coast are not profitably worked. However, since the closing down of the Pacific Rolling Mills, the Union Iron Works (which was that concern's largest customer) must have steel from some source, and is now putting in a 10-ton converter and building the necessary appliances.

While the above is cited as showing why coast iron ores are not more largely developed it must not be understood that the prices quoted are for other than the cheapest qualities, as there is steel and steel. "Steel" in the form of rails can be bought at the mill for \$18 per ton, and "steel castings" can be had

there for \$70 and \$80 per ton, but such quality would not be effective for other requirements.

During his recent visit to Europe, Irving M. Scott

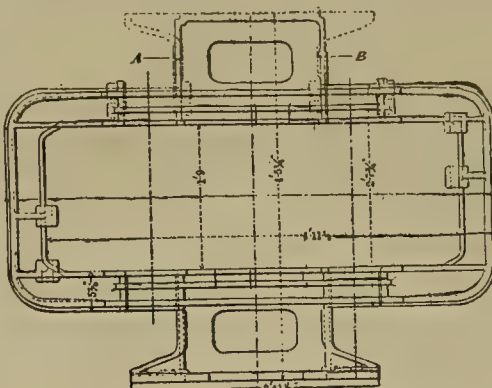


FIG. 2.

secured the right to use the Tropenas steel process, which was commended to his attention. This, it is believed, will mark a new era in steel making in the United States. So far as known, there is but one other "Tropenas process" plant in the United States, and that (in Connecticut) is not in operation.

It has been generally successful in Europe, and, with the resources of the Union Iron Works, it is safe to assume success. The characteristics of the Tropenas process are described as follows: 1. Low-pressure blast, always above the surface of the metal and through the lower, or "fining" tuyeres. 2. The disposition of the tuyeres in the horizontal plane, so that the jets of air arriving above the bath cannot impart to the latter any gyratory motion. 3. Great depth of the metallic bath, so as to avoid churning and stirring during the operation. 4. Arrangement above the "fining" tuyeres, and independent of the latter, of a supplementary row of "combustion" tuyeres, so as to burn the combustible gases escaping from the metallic bath and thus increase the final heat of the steel. As to the waste of the operation, it has been found that from the cupola the waste may be as much as 6½ per cent and from the converter itself as much as 12½ per cent, a total of about 17 per cent. The pig iron used is of the Bessemer quality, inasmuch as no phosphorus is removed during the "blow." The process has not yet been applied to Thomas iron (basic Bessemer).

Herewith appear three illustrations of this process and the metal made by the use of it. Fig. 1 shows a vertical view of the converter with the two systems of tuyeres. Fig. 2 shows a part of a gun casting for the Woolwich Arsenal, and Fig. 3 a steel casting, made by Edgar Allen & Co.,

Sheffield, England, bent and tied cold. From the *American Manufacturer* it is learned that about 30,000 tons of steel castings are now made by this process per annum, and the use of it is extending. Physical and chemical tests of the metal have shown it to be well adapted for all the ordinary purposes for which such material is used. Experience with it abroad has demonstrated its value as an adjunct to the foundry, if indeed it be not superior for many important classes of casting work.

Power Distribution by Vertical Rope Drive.

The illustration shows the distribution of 75 H. P. to the several floors of the manufacturing establishment of the Mergenthaler Linotype Co., Brooklyn, N. Y., the power being carried across the court to a jack shaft and then up and down to the various floors. One continuous rope is used, and a sufficient number of wraps made at each floor to transmit the power required there. The drive to the various floors are all vertical, and as the slack in the rope is automatically taken up, all the difficulty that there would be of keeping belts tight for this kind of drive will be readily appreciated by those who have had experience with them. This drive was installed by the Link-Belt Machinery Co. of Chicago, who are



75 H. P. VERTICAL ROPE DRIVE, MERGENTHALER LINOTYPE CO., BROOKLYN, N. Y.; POWER DISTRIBUTED ON SIX FLOORS.

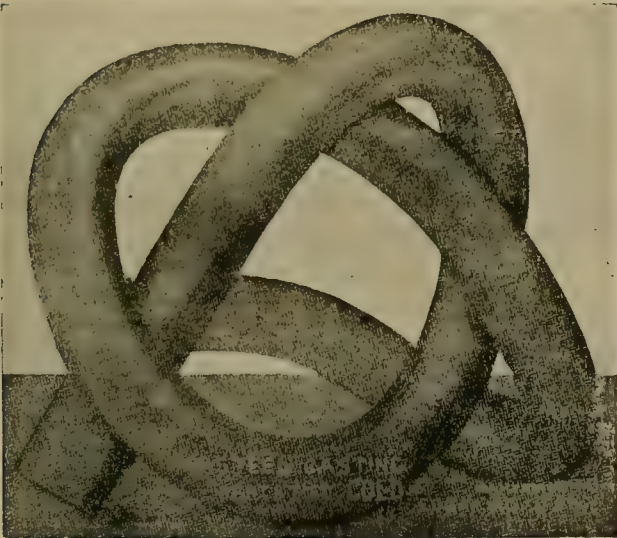


FIG. 3.

the pioneers in the manufacture of this class of machinery, and who have designed and installed many of the largest rope drives in the United States.

MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....Publisher

San Francisco, December 31, 1898.

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TWO INTERESTING FACTS.

In all the States of the Far West and the Pacific Slope, consisting of California, Oregon, Washington, Idaho, Montana, Wyoming, Colorado, New Mexico, Arizona and Utah, the largest circulation credited to any publication devoted to engineering and mining is accorded to the MINING AND SCIENTIFIC PRESS, a weekly, published at San Francisco, Cal.—*American Newspaper Directory*.

Among the engineering and mining papers in California, none has credit for so large a regular issue as is accorded to the MINING AND SCIENTIFIC PRESS, published weekly at San Francisco. In fact, it fully equals five times the combined issue accorded to all the others.—*American Newspaper Directory*.

SOMETHING new in iron castings is reported from Scottdale, Md., where a concern this month turned out a "breeches pipe," used where the main of a pipe line divides, the branches separating at about an angle of 45°. The casting was 48x36 in., weighed 6594 lbs., and is believed to be the first of its kind.

As with electricity and compressed air, '98 has been a great year for the gas engine. The range of industries in which it finds practical place constantly widens in this and other countries. In Germany, which is a land of small industries, it has reached particularly wide distribution. In thirty-six German cities are now in operation 2323 gas engines used in 151 different industries.

THE Kennedy mine, Amador Co., is cited as an example of successful deep quartz gold mining in California. Many years ago it was sunk and worked in low-grade ore to a depth of 600 feet and then shut down because such ore in those days didn't pay to work. Subsequently it was reopened and sunk to a depth of 2400 feet, paying between \$2,000,000 and \$3,000,000 in dividends. In '99 it is to be sunk to a depth of 3100 feet, with assurance of still further success as a dividend payer.

ABOUT \$150,000 could or should be California's proper public contribution from the State Legislature for appropriate representation at the Paris Exposition; more might be necessary, but less would not be commensurate with the magnitude of the interests involved. That amount or any amount so spent should be looked upon as any first-class business establishment would view an advertising appropriation—as necessary and legitimate investment with view solely to its likelihood of producing satisfactory business returns.

HOW COMPLETELY men are creatures of environment and circumstance is well shown by the greatly decreased gold output of California for '98 because of the drought. With unusual activity, increased appliances, improved economical methods in every department of mining, opening of new properties and reworking of abandoned mines in every part of the State, the enforced idleness because of lack of rain has dried up many of the ordinary sources of the State's gold yield to the extent that the showing

for the year in gold yield will be a meager one. The one consolation is that the gold is here, the \$1,300,000,000 that California's surface has furnished being but an index of what is to be mined at greater depth, and that with a cycle of ordinarily wet winters sufficient water will be obtainable for all requirements.

THE fact that in gold mining there is no competition, no struggling for recognition, no striving for a customer, is cited by a correspondent as the reason for such frequent laxity in mine management, the absence of ordinary criticism and comparison "rendering unnecessary such customary business requirements." This novel view may be answered by citation of the patent fact that in all business pursuits results alone determine failure or success, and the absence of the necessity of securing a customer is in the case of mining more than made up by the necessity for constant skill, economy and intelligent action on the part of the mine manager; then, too, the element of chance enters largely into all underground mining, and adverse but unavoidable circumstances may upset the best plans. In every other line of business the standard is fixed: investors, owners and managers are thrown together and there is a constant interchange of information. In mining there is still left a little leaven of the ancient superstition that isolation and secrecy are "the proper thing." This, coupled with some self-sufficiency tends to detract from the fullest measure of success. "Everybody is wiser than anybody," and, as with managers in all other lines of business, so it should be more the rule among men at the head of mining enterprises to exchange information, and thus tend to reduce to the lowest minimum the element of chance that plays so important a part in the ever present problem of how to make the mine pay.

"I AM called a 'lucky' man, just because I leave nothing to luck," recently said a wealthy man to the writer. He argued that there was no such thing as "luck;" that every man was the architect of his own fortune; that the shrewd, calculating man saw clearly how things would go; what could and could not be sold; what would appreciate and what depreciate in value; that he judged men, their ability, weakness and capacity, and that it was folly to suppose that any chance or "luck" entered into the great game of commercial success, and that everything went by hard and fast undeviating rules as inexorable as the laws of nature. Probably he was right, yet, as we read last week of the death of C. A. Chapin of Niles, Mich., it occurred to us that that man's later years afforded an adverse answer to the wealthy San Francisco miner and a good illustration of what "luck" is. Many years ago C. A. Chapin had a little business in a little town in northern Michigan. He was no manager, failed, but honestly turned everything over to his creditors, most of whom lived in Detroit. When they met to effect final settlement one said, "Chapin is an honest man; I hate to turn an old man like him and his wife out on the world with nothing." Among the assets was a quarter section of rocky "no account" timber land near the town where Chapin had had his little store. This the creditors turned over to the old man to clear and try to get a living from. In clearing up the land iron ore was discovered; a Milwaukee, Wis., company agreed to develop the property without cost to Chapin, and pay him 50 cents per ton royalty on the iron ore produced therefrom. For several years that old barren 160 acres "timber land" yielded 80,000 tons annually, on which Chapin got annually \$40,000; then he reduced the royalty to 25 cents per ton, and the output grew to 400,000 tons annually. In the last years of his life his income from the mine that never cost him a stroke of work was \$100,000 annually. If this was not "luck," it was a happenstance that is usually given that name.

'98 HAS been a great year in the mining industry. It has an unequalled record, and the most of the operations have been honest and legitimate, working the mine and not the street. Decreased cost of mining machinery and supplies; improved methods of mining; cheaper and more general reduction processes; easier transportation; increased interest; steadiness of demand at fixed prices; absence of competition; a universal market for the product; the generally profitable character of the business—

these are a few of the causes that have made '98 the banner year in gold mining. The ruinous rivalry and profit-destroying competition that forces every other industry into a fierce battle for existence is not manifest in the gold-mining business; that, alone, helps all others and competes with none; it creates a market without crippling its own members, and gives a hundred other industries employment, while itself adding to the lasting wealth of the nation. It is the era of low-grade gold ore; of quantity rather than quality, where the owner or mine buyer looks as eagerly for large deposits of five-dollar ore as in the old days he sought for twenty-dollar ore. In the last few years machinery has rapidly reduced the ultimate cost of producing an ounce of gold, while the product has steadily maintained the same price—a fact unequaled elsewhere in the commercial world. "Scientific" mining is no longer sneered at. "Science" is only organized knowledge, and every success in mining is due to the application of such organized knowledge. Energy and capital, inclination and opportunity, have alike failed in mining unaccompanied by the practical knowledge and experience, the "sabe" that alone makes success assured.

CHARACTERISTIC of '98 in electrical progress is successful transmission of long distance high voltage. A Utah company for mining purposes transmits 40,000 volts thirty-five miles; a southern California company is about ready to transmit high voltage electric power eighty miles. Five or six years ago the transmission of 10,000 volts thirty miles was considered the possible limit. This has an intimate connection with progress in gold mining, as available power is one of the most important factors in that problem. New Zealand engineers figure on a possibility of transmitting 20,000 H. P. 180 miles. Cecil Rhodes, in South Africa, has a proposition to transmit electric power from Victoria Falls on the Zambesi to all the gold mines in Rhodesia, from 350 to 500 miles distant. It is understood that in the latter case 10,000 H. P. at \$375 per H. P. per annum would be a subject of contract. Still, the transmission of high voltage over such comparatively great distances is not a question that can be glibly discussed. There are not wanting electricians who now hold that in this the limiting commercial ratio is fast being approached. As the pressure rises the difficulty of successful transmission increases in inverse ratio. Of course, the question of distance, voltage, weight of copper and strength of insulation with the skill and intelligence of the human element may eventually be determined to admit of 50,000, 60,000, 70,000 volts transmitted 200 or 500 miles, but such tremendous probabilities involve equally tremendous risks and dangers. The question is one of interest to every gold miner, more especially in this west half of America, where every stream flowing from the mountains to the sea is a source of power, and where it is cheaper to carry power on a wire to where it is needed than to transport fuel. Thus it becomes a question of as much importance to the miner, the mill man and the metallurgist as any other economy in the profitable treatment of ore. The whole thing comes down to a question of cost. The Niagara Falls Co., which as the pioneer long distance concern took the lead in these things, has a schedule, which goes into effect to-morrow, which makes the cost to the consumer of 80 H. P. \$22.35 per H. P. per year, which, so far as known, is the cheapest power in the world, all things considered. When it comes to pass that a mining or manufacturing company can have 80 H. P. delivered to it continuously ten hours per day for \$150 per month, it will be a mighty evolution from the time that seems but yesterday.

DESPITE business depression, panics and war, and every other commercial disturbing factor, the installation of electrical power transmission machinery has progressed with marvelous rapidity. One of the largest companies installed in mining and power machinery alone 13,719 horse-power in 1892; 18,762 in 1893; 42,379 in 1894; 46,727 in 1895; 75,000 in 1896; 83,000 in 1897 and about 100,000 in 1898. This record, it should be remembered, is that of a single company and purely power transmitting apparatus, the numerous other applications of electricity not being included.

Concentrates.

IRIDIUM is worth about \$5 per ounce troy.

THERE are 1363 pages in the '98 issues of this paper.

SALINE lands cannot be entered under the desert land laws.

THE next meeting of the California Debris Commission will be on Jan. 9, '99.

THE H. P. hour is the unit of work or energy; it equals 1,800,000 foot pounds.

COLD weather has closed down every concentrator in the Cœur d'Alenes, Idaho.

TEN-FT. HEAD OF WATER gives an approximate pressure of 4½ pounds per square inch.

IN the new mining camp of Republic, Wash., it is estimated that there are 500 men employed.

STREAM TIN has long been known to exist in various parts of Montana, more especially at Clancy.

DRIVING a tunnel 5000 feet in length has begun on the Midland mining property at Brigham, Utah.

A 16-CANDLE POWER incandescent electric light requires about half an ampere current at 110 volts.

FIFTY-TWO issues is the usual number furnished our patrons for each year. This is No. 53, in '98, for good measure.

THOUSANDS of pounds of delayed mail for Dawson City, N. W. T., are reported lying at various northern points.

MULTIPLYING the head of water in feet by .0024147 gives as a product the H. P. obtainable from one miner's inch water.

THE net returns of the Homestake M. Co. at Deadwood, South Dakota for the year ending June 1, 1898, were \$3,505,170 20.

BEGINNING with '99, the California powder manufacturing companies resume the payment of dividends after a lapse of several years.

A GOOD SOLUTION for bichromate batteries is: water, 1500 parts; potassium bichromate, 100 parts; mercury bisulphate, 100 parts; 66° sulphuric acid, 50 parts.

T. A. McNEAL, Santa Fe foreman at San Bernardino, Cal., is locally credited with ability to perfectly weld copper, and temper it "so that a file cannot touch it."

AS to using mining machinery it is usually well to let some one else do the experimenting, and to get what has been proved to be effective in similar instances.

THE price of meals at Dawson has dropped to \$1, and there is no fear of starvation this winter. A large number of people have recently left the Klondike metropolis.

MICHIGAN charges \$12.50 to incorporate a new mining company, and the State Treasurer figures on \$15,000 fees in '99 from the incorporation of copper companies therein.

IF a patentee eventually finds himself justly entitled upon his invention to more than is secured by the patent already granted the safe and proper remedy is by a re-issue.

THE object of the patent law is to secure to inventors a monopoly of what they have actually invented or discovered, in view of which the statute will be liberally interpreted.

A NEW YORK dispatch reports the sale of fourteen claims in the vicinity of Jerome, Arizona, and known as the United Verde Extension, by N. W. Hull to Farrell, Greulich & Co.

"MORE gold at less cost than last year" is what Dawson and the Klondike report, being practically the same statement regarding the gold yield coming from all parts of the world.

LANDS containing petroleum or other mineral oils, and chiefly valuable therefor, may be entered and patent obtained therefor under the U. S. mining laws pertaining to placer claims.

A PIPE 3 feet long holds approximately as many pounds of water as the square of its diameter in inches; thus a 6-inch pipe holds approximately thirty-six pounds water in each yard length.

THE new Buffalo Hump mines are forty-five miles southeast of Grangeville, Idaho, via Florence. An unusually large quartz ledge carrying some rich gold ore, non-free-milling, is reported.

MINERAL lands in the forest reserves are subject to location and entry under the general mining laws, in the usual manner. The Yosemite, Cal., national park is not a "forest reserve."

FOREMAN KILGALLON of the Colusa-Parrott, Montana, was an expert witness in a mining case at Butte last week. Asked "What is a lead?" he answered, "A ledge of ore between two walls."

THE new California law allows sixty days after date of discovery for the purpose of marking the location of a mining claim, but no method of marking, other than that required by the U. S. Statutes is prescribed.

A MACHINE and its product cannot be joined in one application when they constitute different inventions; but, when being inseparable in their nature, they constitute one and the same invention, they may be so joined.

FOLLOWING the example of the Comstock companies, the Standard Con. of Bodie, Cal., will reduce its present capital stock of \$20,000,000—200,000 shares, par value \$100 each—to \$2,000,000: 200,000 shares, par value \$10 each.

THE time is going by when a man with a "prospect" can hope to get a big price for his undeveloped property; the gamble is being eliminated and it is getting down to legitimate business the same as any other commercial transaction.

WHAT an old blacksmith says is an excellent recipe for welding steel and iron is as follows: Carbonate of ammonia, ½ lb.; borax, 2 lb.; muriate of ammonia, ½ lb.; black oxide of manganese, ¼ lb. Beat up in a mortar and mix thoroughly.

RECALESCENCE is a phenomenon occurring during the cooling of a mass of steel, when it suddenly emits heat and grows more luminous for an instant. It is a phase of latent heat, and apparently marks the transition from a non-magnetizable to a magnetizable condition.

A PLACER patent carries all lodes not known to exist at the date of application therefor; should, however, a lode have been discovered within the placer location limits before such application it may be located, and the placer location to that extent would have to yield to it.

FIGURING the horse power needed to raise water to a given height, multiply the number of gallons per minute by 8.35; multiply that product by the number of feet the water is to be raised; divide that product by 33,000; the quotient will be the theoretical H. P., to which should be added about 30%.

ASSESSMENT notices, annual meeting notices, etc., may

legally be published in this paper or any other journal "of general circulation." Where obscurity or secrecy is desired, some medium not seen by the general mining community might suffice, though, if called in question, such quasi "publication" might not prove legal.

CONSUL MACRUM from Pretoria, South Africa, sends a report of the gold output of the South African republic, in which he says the October report shows that the number of mills and the total of stamps is rapidly increasing. It is expected that the gold output of the Transvaal next year will exceed that of the combined mines of this country, including Alaska.

THE California State law requires that on any lode claim located after May 26, '97, \$50 in work or improvements must be done sixty days after posting the notice. On any lode claim located after January 1, '98, the \$100 in annual assessment work necessary to hold it may be done any time during '99. A delinquent co-owner has ninety days from the last publication to pay up.

TO SET the weight on a safety valve lever, multiply the area of valve by the pressure carried and by the distance from the fulcrum; multiply weight of valve and stem by their distance from the fulcrum; multiply the weight of lever by one-half its length; subtract the two latter from the former, and divide the remainder by the weight of ball. The quotient is the distance from fulcrum to ball or weight on lever.

BADLY RUSTED IRON ARTICLES may be easily cleaned after twenty-four hours' immersion in a saturated solution chloride of tin. To keep machinery from rusting, take one ounce camphor, dissolve it in one pound melted lard; after removing the scum mix with it as much fine black lead as will give it an iron color; clean the machinery well; smear with the mixture. After twenty-four hours rub off, and clean with soft cloth.

THERE are no "blanket deposits" in Gilpin Co., Colorado. The veins cut obliquely across the foliation of the country rock. Occasionally ore is found occupying the line of lamination of the enclosing gneiss or schist, but no instance is known where ore occurring in that way has shown any great degree of permanence, nor are very flat veins found to be productive in that section, the vein of the Specie Payment mine being one of the rare exceptions.

THE Puget Sound Reduction Co. of Everett, Wash., has a suit pending in the Federal courts, on appeal from a decision of the board of appraisers, concerning the method of assaying. The smelter uses the fire test to determine the value of ores; the Government, in assaying samples to determine the percentage of dutiable lead, uses the wet test. There is a difference in the two methods of almost 3 per cent. The Reduction Co.'s method is practically its smelting process on a small scale.

THE term "inverted siphon" is applied to water pipe which follows the natural trend of great depressions in its course. There are many instances in California and elsewhere. The one most recently described herein is in Trinity county. One has just been completed by the Twin Placer Co., Idaho. An "inverted siphon a mile long" of wrought iron, 18 inches diameter, is a feasible proposition. With 400-foot head there would be approximately a pressure of 800 feet, or 400 pounds per square inch.

THE zircon, like the garnet, is of almost world-wide occurrence, and is found in granite, syenite, crystalline limestones, gneiss, chlorite and mica schists, and other rocks; also in basalt and pitchstone. Its composition is—silica, 33 per cent; zirconia, 67 per cent; its hardness is 7.5. It is found colorless, gray, pale yellow, green, red and reddish brown. When cut as gems, the nomenclature is according to the color. The transparent and red varieties are known as hyacinth, the colorless and smoke-tinted as jargon, and the gray or brown as zirconite.

PROBABLY the largest nugget or mass of silver ever mined was a piece weighing 1340 pounds, which was taken from the Smuggler mine, Aspen, Colo., in 1894. The nugget in question formed part of a consignment of 205,031 pounds of ore, which, with silver at 58 cents or thereabout, netted, free and clear of all expenses, close to \$3000. At Silver City, Idaho, is a mine which is said to have produced the richest load of ore ever sold in Denver. It brought, according to report, over \$80,000. Another from the same mine is said to have sold for \$60,000.

UNDER the constitution of the State of Colorado, mines were not taxed till March 14, 1896. The following year a law made all mines and mining property taxable. Any mineral-producing claim to the annual value of \$1000 is assessed on the basis of one-fifth the gross proceeds of the preceding year. Productive unpatented claims are also assessed. It is a partial Colorado custom to assess unproductive, unpatented claims at \$500 each. In California such claims are by custom assessed at \$100 each. Productive claims, patented or unpatented, are assessed at any figure the owner will stand.

AN automatic condensing engine takes from two and a quarter to three and a half pounds coal per H. P. per hour. A steam-jacketed compound condensing engine may, with extra good management, do with two pounds per H. P. per hour. Rightly managed, an average of thirty pounds water per indicated H. P. an hour will serve. A condenser helps greatly. The amount of injection water so required will run from twenty to twenty-five times the quantity supplied to the boilers. Estimating fourteen pounds coal per square foot of grate per hour, about eight pounds water is the rate of evaporation per pound of coal.

A PLACER LOCATION covering 160 acres is considered as one claim by the Land Department. When claims are contiguous each location is considered by the Land Department as a separate claim in patent proceedings, and \$500 worth of work on each claim is necessary; all may be patented under one application if adjoining each other. Eight individual locations are assumed to be united in each 160-acre lot. In thirty-two twenty-acre locations \$500 worth of work must be done upon each one to entitle the applicant for patent. It requires a separate application for each lot or location if these thirty-two are separate or cannot be joined.

THE best sample of mica from any coast mica mine received at this office this year came last Thursday from Dr. T. W. Helm, Bakersfield, Cal. The piece is 3x3 in., and of fair quality. Dr. Helm states difficulty in securing the services of one knowing how to properly get it out, and asks the value of sheets 3x4, 4x6, and 6x6 in. The value of mica increases rapidly with the size of the sheets procurable. Sheets 3x3 in. are worth \$1 per pound; 6x6 in., \$10 per pound. A. O. Shoemaker, the Palermo Mica Co., E. V. Munsell and J. D. Hague

—all of New York City—are dealers in mica of commercial value, and Dr. Helm would do well to communicate with those people.

IN the issue of the 17th inst., appeared the closing installment of a long technical paper on "the refining of base lead bullion containing silver, and high in gold," in which the author, discussing the method of parting down bullion, stated his belief that the process of parting which combined the qualities of quickness, cheapness and greatest efficiency with small plant expense was the Gutzkow process. It is of some interest to note that this process was invented thirty years ago by F. Gutzkow, then and now a resident of San Francisco, Cal., and that its survival and use in so many smelting establishments is good evidence through three decades of its practical value.

THE total output of gold in Japan in 1894 was 23,696 ounces; in 1895, 21,000 ounces. The quantity of silver mined in 1894 was 1,956,838 ounces; in 1895, 1,768,250 ounces. Silver mining in Japan is now at its height, while gold mining is somewhat declining. In the principal gold and silver mines machinery of American style is in use, while in copper and lead mines machinery of German pattern is employed. Only in the Ashio copper mine are electric motors used, steam being used in the important mines. There are in Japan six copper mines, yielding above 1,333,343 pounds per year. Copper is second in importance in the mineral industries of Japan, coal being first. There are in Japan six mines, yielding upwards of 1,330,000 pounds of copper each year.

THE effects of roasting sulphides are threefold: first, an alteration of obnoxious compounds into indifferent ones; second, the removal of sulphur, by which the ore grains become porous, and with it the fine gold and silver particles become accessible to solvents; and thirdly, a certain amount of fritting of the fine ore grains, which allows more rapid leaching afterward. If we do not roast "dead," the effects of course will be different. The last-named point will be the same; but instead of insoluble oxides we have a mixture of sulphates and oxides, as well as undecomposed sulphides, and therefore also a less porous product. If we could transform all sulphides into sulphates at the same time, little could be said against adopting such a method preparatory to cyanidation.

THE United States law does not require a locator of a mining claim to sink a 10-foot discovery shaft. It only requires him to disclose a vein or lode of ore in place. If a man sinks a shaft to any depth required by the local or State or Territorial laws, and then marks his claim and records it according to law, even though he has found no ore in place in his discovery shaft, and afterwards discovers ore in place in another part of the location, such discovery of ore is held to cure the defect of not finding ore in place in the discovery shaft, and the claim becomes good and dates to the time of original location. This does not apply to cases where any second locator has obtained conflicting territory by location between the dates of the first location and the discovery of ore in place.

AS to what constitutes a perfect location, Sec. 2, Act of May 10th, '72, Revised Statutes, says: "No location of a mining claim shall be made until the discovery of a vein or lode within the limits of the claim located." The time allowed in Colorado for perfecting title is sixty days to complete discovery shaft and thirty days more to survey and record location certificate. Mills' Annotated Statutes, Sec. 3154: "Any open cut, crosscut or tunnel which shall cut a lode at a depth of 10 feet below the surface shall hold such lode the same as if a discovery shaft were sunk thereon." Colorado statutes require 10 feet depth at least. Morrison, page 36: "If a crevice does not show in 10 feet the shaft must go deeper; if it appears sooner the 10 feet must still be completed." The assessment work is that done in the discovery shaft, and the annual labor is the \$100 worth of work performed annually thereafter.

GOLD does change in value, but less than any other commodity or material. Gold and silver are not like other commodities in responding to the law of supply and demand, for there is very little loss of gold and silver. The work they have done one year they can do a second and a third year, and almost indefinitely. So an increased demand for gold finds always practically as much gold on hand as there was before the demand began, plus any increase of stock from the mines. So, too, a decreased demand has practically no effect on the stock of gold, which cannot be destroyed or sold at "bargain rates." There is some change in the value of gold. It decreased after the discovery of America, when the Spaniards captured Mexico and Peru; it decreased again after the discovery of gold in California and Australia. But, compared with a day's work of an unskilled laborer, the value of gold has changed less than that of any other commodity.

THE capacity of a pump is measured by the greatest amount of water it can deliver per day; thus, a pump of 3,000,000 gallons capacity is understood to be one that can raise 3,000,000 gallons of water in 24 hours. This gives, however, little idea of the work done by the pump unless the height of lift or the pressure that it maintains is also stated. A pump of 3,000,000 gallons capacity lifting water through a height of 100 feet becomes merely one of 1,500,000 gallons capacity if the height of lift is 200 feet. The power of a pump is the number of H. P. it can deliver; one H. P. is the performance of 550 foot-pounds of work in one second. Thus, if 1,200,000 gallons of water is to be raised through a height of 230 feet in 24 hours, the weight to be lifted in one second is 116½ pounds and the power required is 48.6 H. P. The effective power of the pump must, however, be considerably higher than this, as work is lost in overcoming the frictional resistances due to the flow in the pipe as well as the pump cylinders.

THE idea of annual assessment levied on an unpatented mining claim is to keep the claim from lapsing. It won't amount to anything "to just keep the title up." If the locator doesn't think the claim worth working or patenting, he need spend no money on it at all; and if others are of the same opinion, and don't "jump" or relocate it, he can save all assessment work, take his chances as to relocation and not do anything. When he gets ready to work the claim he will have as good a "title" to it (if it be not relocated) as though he had put \$100 or \$1000 worth of improvements on it each year. He might do required annual work for ten years, and if he missed one year he would have no better "title" than if he had never done a stroke on it. However, if a claim is worth holding it is worth patenting and developing, particularly the former, and the better way is to get a U. S. title to a mining claim as speedily as possible. If the owner should want to sell, a government title is a great aid.

Mistakes in Mining.

By EDMUND B. KIRBY.

* * * * *

At the head of the list might be put the mistake of not letting go soon enough. It is a wise man who knows when he is beaten. It is never justifiable to risk money unless the chances are decidedly in favor of success. As soon as they cease to be so it is time to shut down the mine and confess failure. Dogged persistence and determination are grand virtues in some fields, but ruinous vices in this. If the investor intends to continue mining he should transfer his risk to some other mine where success is again probable. Out of a number of such ventures he may expect to win some. If \$100,000 has been spent fruitlessly and it is a question of putting in \$10,000 more, the real issue should be whether the \$10,000 can best be risked on this mine or on some other venture. What is already lost should not affect the decision. Good judgment as to when to quit is therefore highly desirable for the investor's interest. Unfortunately for him, however, it is quite the contrary with all others concerned. It is expecting too much from human nature to assume that men will put an end to their own jobs.

The most important duty of mine management is, of course, the proper direction of development work. Pay ore bodies must be discovered in the first place, and even in pay mines new bodies must be found to replace old ones as they are worked out. The fate of the mine depends on the success of this work, and it generally calls for the highest quality of skilled judgment. It therefore presents unlimited opportunities for errors, which are, however, rarely noticed by owners. Such errors count up rapidly, because it costs \$6 to \$15 per foot to move horizontally and \$20 to \$50 to move vertically underground.

They would be less apt to occur if more attention was given to the structure of ore shoots. These are generally understood to be those limited belts or portions of veins and other ore deposits which are specially productive and are thus distinguished from the rest. A shoot may be a continuous body of ore or an irregular string of bodies separated more or less by barren ground. In most gold and silver ore deposits the pay ore shoots are merely the main channels of flow through which the mineral bearing solutions found their easiest passage as they rose from the depths below to escape at the surface. Shoots are generally fairly continuous down to a depth where the pressure or other conditions at the time did not favor ore deposition. They then play out; either the grade or the quality of ore falling below the pay point. The structure of shoots is too complex a matter for discussion here. In general it may be said that their peculiarities are always what might be expected from their origin. For instance, they are apt to stand nearly up and down along the rise or dip of the ore deposit, and are found quite a distance apart.

Notwithstanding these simple and well-known facts, it is common to see large sums spent in hunting ore along the edges of some worked-out ore shoot. In other cases the barren vein areas between shoots is explored by the same close and expensive network of shafts, winzes and levels that would be used within the areas of the shoots themselves.

Since shoots stand up and down in a vein, there is more chance of striking one by horizontal than by vertical workings. Incidentally the former are also much cheaper. Notwithstanding this, the chief hopes in development work are apt to center on the shafts and winzes, because these gain depth. The old and never-dying delusion that mines improve with depth is partly responsible for this. As a matter of fact mines improve when any working gets into an ore shoot.

But every little while some shaft headed for the earth's center chances to run into a shoot on its downward slope. The same shoot might have been found with little delay or expense by a short level from the shaft while it was shallow. In fact, it may have come to the surface and a little skillful prospecting would have exposed it there at the beginning of operations. Nevertheless such strikes are always heralded as proof of the depth theory.

When mining in fissure veins, a large part of the development work is often wasted by being "run off the vein."

As every mining man knows, the filled and cemented fissure which constitutes a vein of this class is not often a simple, clean-cut break. Like any other fracture in a solid mass, it has branches, crossings, side bows and parallel crevices in every conceivable form. These may be distributed through a width of 20 to 100 feet, and are more or less connected by interlacing crevices.

It is not easy, and is sometimes impossible at first sight, to distinguish the principal ore-bearing fracture or "main vein" from the others. At every split there is a chance of following the wrong clew, and the sum total of such errors in a single mine is sometimes appalling.

The difficulties are increased by the fact that an ore shoot frequently jumps from one crevice to another, and mine levels, therefore, pass by it. In addition to the difficulties of identifying the main crevice of one vein are those which come from the

existence of other veins close by. Every time the vein must be reached anew by a lower shaft, crosscut or tunnel there is danger of mistake. There are no tags on veins, and a large expenditure of good money on the wrong one is a familiar sight.

Next to skilled judgment, the best safeguard while following or intersecting veins is the judicious use of crosscut work. Whenever doubt exists, this should be extended far enough to include other crevices and give decisive information. Generally speaking, one crosscut in the line of an ore chute is worth a dozen elsewhere. Well-designed mine maps, with plenty of sections and kept up with the work, are always necessary for good work underground. This is particularly the case in irregular or complicated ore deposits. Nevertheless it is not uncommon to find large mines operating without maps or with a mere apology for one.

The danger to an enterprise of crosscut tunnel work has become proverbial in the mining world. Nevertheless these are still seen everywhere and do not seem to be any less popular than in past years. Those really needed to drain some heavy water flow and driven by some mine for its own development, are often wisely planned. Others, and especially custom tunnels, have generally been financial failures.

Among the many reasons for this are the heavy cost, the long delay, the short life of mines, and the difficulty of persuading or forcing the owners of other mines to pay an adequate return for benefits received. An underground system of connections is a very expensive way of reaching ore bodies irregularly scattered over a large territory.

It is easier to travel over the surface. As a rule mine owners find it cheaper and quicker to do this, and to discover and work these ore bodies through their own shafts. The prevailing idea that hoisting costs more than to tram ore through a tunnel is often wrong and will not stand the test of exact figures.

When it comes to the minor details of work, there is much room for economy by improving the usual system of ventilation. This system is to continue the working in question, say a level, until the mixture of hot breath, candle gas and dynamite fumes gets clear beyond human endurance and the men kick.

Then a hand-blower and 5-inch air pipe are provided and they are invited to amuse themselves at this apparatus whenever they don't like the breast. After this resource has been worked to the limit and progress becomes so slow as to worry the superintendent, an air connection is ordered. This is driven through solid ground to the nearest parallel working and everybody is then ready to start the process over again.

The cost of these solid rock air connections in a mine is generally enough to pay many times over for a good ventilation plant. It seems hardly necessary to mention the lost time, the inefficiency of labor, the slow progress and the immoral effect upon any self-respecting man who has to stand such conditions.

But all this waste is concealed in the payroll and is invisible to many people. If properly planned, simple and not very expensive apparatus will provide pure air in every heading. When this is attempted the system generally adopted is that of forcing air. This is wrong in principle, and in almost every case the exhaust system should be employed. Steam, compressed air or electricity can be used as power. In the absence of power a hot air column can be made to meet any ordinary requirements.

Mills built before an ore supply was secured stand all over the West. So much has been said upon this subject that it seems unnecessary to mention it here.

But an extensive experience has convinced the writer that such mistakes do not belong to a past era. Unfortunately, they appear to be as frequent as ever. A certain proportion is due to ulterior objects, with the purpose of enriching some individuals at the expense of others. Being successful in this, they can perhaps hardly be classed as mistakes. Others are due to mistaken information on the cost of mining and the real average value of discovered ore.

The cost of mining is purely a question of book-keeping. It is figured in just as many ways as there are individuals. Hence, as stated by mining men, it may vary from a few cents to thousands of dollars per ton. These differences of opinion arise from the different ways of treating the general expense and development accounts.

If a mine spends \$20,000 one year and extracts two tons of ore, what did this cost per ton, \$10,000 or \$2? How about the next year, when 4,000 tons are produced for \$20,000? It is the sacred prerogative of every mine owner and superintendent to figure this to suit himself and issue statements accordingly.

To many people it seems a very simple matter to ascertain the true average value of discovered ore in a mine. Full information on this fundamental fact of the business is plainly as important as the accounts in a commercial house. It is therefore naturally supposed that every man who owns a mine or is in charge of mining work must know accurately what he has.

There are, of course, plenty of well managed mines where this assumption is correct.

In most cases however, it is not. One reason is

that there is no royal road to the correct sampling and measurement of ore bodies. If done improperly the results are liable to dangerous error. The work is very laborious and expensive and requires an unusual degree of skill and judgment. Moreover, accurate figures of this kind ruin too many "good mines."

There is plenty of room for improvement in the details of mining work. Aside from the leasing system, which has its own field, the best economy is to be secured only by using the contract system. This system is spreading slowly but too slowly. Even in districts where its value is acknowledged for driving headings there is apt to be a prejudice against its use for stoping. The long practical experience of various districts in the world proves that most of the stereotyped objections to this are not valid. There are few cases where it is not possible to devise some way of paying for stoping also, by the amount of work done. This, however, requires more skill in arranging details, closer attention from superintendent and foreman and good management of the men. Without these conditions contract stoping in difficult ore deposits is apt to fail.

It would benefit the industry if more attention were directed to the best methods of sorting ore. It is evidently important to get rid of worthless material at the mine so far as possible. Moreover, rich ore ought not to go with the low grade to ordinary milling processes. Care in these details will frequently make all the difference between loss and profit.

With the high-priced labor of the West, however, the cost and quality of sorting done is far from satisfactory. The primitive Mexican methods, with hammer and stone, are still in general use.

Expensive labor ought to have the assistance of some machinery, and at least of convenient apparatus for its work.

A properly designed sorting plant, either alone or as part of a mill is not expensive. Simple crushing, screening and washing machinery with stationary or traveling picking tables, will permit a quality and quantity of work impossible by present methods. If a mine cannot afford a complete plant, it can at least put in something to assist the hand work.

Compressed Air.

A discussion took place recently at the International Mining Congress at Brussels as to the limits of safety to which work can be carried on under compressed air. The Austrian doctors declared that men under twenty and over fifty years of age should not be allowed to work where the air pressure was high, and in all cases medical certificates should be forthcoming as to the soundness of the heart, lungs, and the vascular system. An ear affection, a cold or gastric attack should be sufficient for prohibition. The limit of pressure should be seventy-five pounds, which would enable the work to be carried on under water at 170 feet from the surface, but in such cases special precautions would be necessary in returning from the high pressure to the normal condition. The minimum would be 100 minutes, but the men may continue to work for any period. It is one of the peculiarities of working under high air pressure that healthy men might almost live in the pressure chamber, but the change from high to lower pressure should take one minute for every one and one half pounds of pressure. Men accustomed to the work might take only ten minutes for a pressure of twenty-two pounds, fifteen minutes for thirty-seven pounds, or thirty minutes for a seventy-five-pound pressure. It is suggested that the men in passing through the changes of pressure should suck sugar; not that sugar possesses any particular virtue, but it insures the swallowing of the saliva and prevents the tympanum from being injured. As to the ventilation of the working chamber, the air should be renewed at the rate of 700 cubic feet per head per hour.

REFERRING to the article "Concentration After Lixivation," on page 659, since that part of the issue of this date was printed Mr. Alderson writes: "At Rochester, Montana, E. Mueller concentrates his material after leaching it with cyanide because of lead in the ore with which the gold is chemically combined. The lead concentrates are shipped to smelter for treatment. Many people seem to think ore cannot be cyanided which contains any lead. The above certainly affords proof to the contrary."

At New York City last Wednesday the American Chemical Society was shown by C. E. Triplar, liquid air with a temperature below 200 below zero. A diamond was consumed therein, giving forth "fierce light." Experiments with liquid oxygen and a magnet showed that the substance was highly susceptible to magnetic influence.

In the issue of the 10th inst. was illustrated and described the excavator used by the San Francisco Bridge Co. in constructing an irrigation canal in Colusa Co., Cal. It has been subsequently learned that the elevator dredge so used was designed and built by the Bucyrus Co., South Milwaukee, Wis., in 1890.

The Duplication of Drawings.*

Half a century ago, the engineer and architect were entirely dependent upon tracing paper and draftsmen's skill for the production of duplicate copies of working drawings. The necessary tracing and retracing of every plan, until the required number of copies was obtained, made the expense very great, and it is no wonder that the introduction of a process by which drawings could be duplicated at one-tenth the expense of tracing was enthusiastically received.

It was in 1843 that Sir John Herschel, while experimenting in photography, investigated the effect of light on various iron compounds, and afterwards perfected a method of photo-printing which he called the cyanotype.

The cyanotype was nothing more than a primitive form of the blueprint process. The lack of facilities for obtaining pure chemicals made the preparation of the paper somewhat difficult in those days, but the resulting material was precisely the same as the commercial blueprint paper of to-day.

The application of the cyanotype to the reproduction of working drawings revolutionized drafting-room practice. The danger of error due to oversight in tracing was reduced to a minimum, and the great labor of carefully checking a large number of duplicate tracings was obviated entirely. A carefully plotted drawing, and an accurately traced copy, were all that was required of the draftsman, while an unlimited number of duplicates could be turned out by the bluper, each copy being precisely like the original tracing, so far as the relations of lines and dimensions were concerned.

But it is contrary to human nature to be content with but a single improvement. It is a strange but well demonstrated fact that man will plod along, contented with the most primitive ways and methods, for at indefinite period; but just as soon as some one shows him an improvement on his methods, he eagerly accepts the improvement, and demands, at the same time, something still better.

It was the same with blueprinting. Architects and engineers were delighted with the process, for they found that it not only saved them much labor, but trebled the output of their drafting rooms. Soon, however, they demanded something more. The blueprint was a negative copy of the drawing; that is, the lines were white on a colored ground, while in the original tracing the lines were black on a white ground. This, however, was not entirely satisfactory, and when, finally, several processes were invented, each of which gave a reproduction of the original, in black lines on a white ground, the impatient practitioner complained of the trouble and expense involved.

Everything has been done to perfect these photo-printing processes, and at the present day there is little room for improvement. The one disadvantage of all of them lies in the fact that sunshine is necessary for the printing, and unless the day is bright, little or no printing can be done. For this reason several attempts have been made to devise a mechanical method of reproducing drawings, which shall be independent of weather conditions, and at the same time simple and inexpensive in operation. So far, these attempts have been only partially successful, though, for some purposes, fairly good results may be obtained.

The simplest of all the photo-printing processes is the cyanotype, or blueprint, the paper for which may be prepared as follows: In a dark-colored or opaque bottle dissolve two ounces of citrate of iron and ammonia in eight ounces of water, and in a similar bottle dissolve one and one-quarter ounces of ferri-cyanide of potash in eight ounces of water. Immediately before use, mix equal portions of these solutions, and, by means of a soft sponge, a wad of cotton, or a camel's-hair brush, spread the mixed solutions evenly over the entire surface of a heavily sized white paper. This must be done in a room lighted with gas or other artificial light whose color tends toward yellow, and the paper should be dried quickly in a dark room or closet. The tracing is laid on a sheet of heavy glass (or preferably in a printing frame) with the drawing next the glass; the prepared paper is then laid over the tracing with its prepared side against the tracing cloth. A piece of heavy blotting paper, or felt, is then laid on the back of the paper, to distribute the pressure and keep the tracing and printing paper in close contact; a board is then placed over the felt, and the whole is submitted, glass side up, to the rays of direct sunlight. In from three to ten minutes the print is removed and washed in clean water, when the entire surface becomes a deep blue color, except at the points protected by the lines of the tracing, where the paper will remain white.

After washing, the print is hung up and allowed to dry, when it is ready for use as a working drawing. Any desired alterations in the print may be made with an ordinary writing pen and a solution of

caustic soda. This solution, applied to the blue portions of the print, will immediately bleach it white, while any existing lines may be obliterated by means of a little Prussian blue water color, or even an ordinary blue pencil.

The printing frame for use in the making of sun prints consists of a rectangular frame, or box, as shown in Fig. 1, on one side of which is fixed a pane

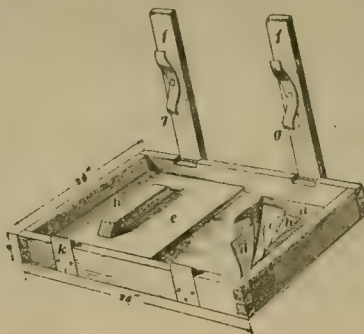


FIG. 1.

of clear plate glass *a*. The tracing is then laid in the frame against the glass, as shown at *b*, and the printing paper next, as shown at *c*. A felt pad *d* is then spread over the back of the paper, and the wooden backing *e* is put in, to hold the paper and tracing against the glass. The arms *f* are then turned down, and the springs *g*, pressing against the cleat *h*, keep everything tight in place, while the catches *k* hold the arms down. The frame is then turned over, and so placed that the sun may shine through the glass and tracing on to the printing paper.

The backing is usually made in two or more pieces, as shown, in order that the frame may be partially opened and the progress of the printing examined, while one of the arms is still clamped down and secures the end of the tracing and paper from slipping. If the print is then found to be insufficiently printed, the back may be replaced and the exposure continued.

When the printing frames are large, and not easily

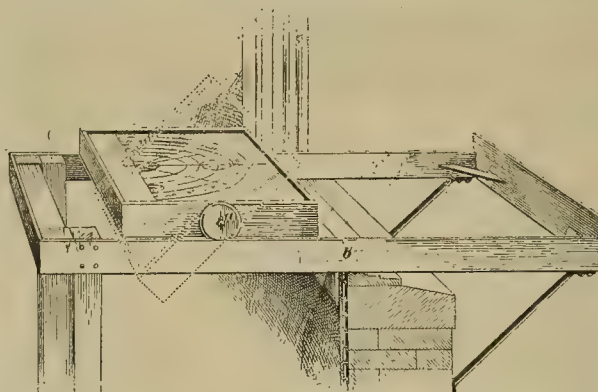


FIG. 2.

handled, it is customary to build a track out through a window, as shown in Fig. 2. The frame is then provided on each side with a flangewheel *a* for running on the track *b*. When the frame is taken in to remove the print, or to put in a new tracing, it is simply turned over on the wheels, as shown by the dotted lines. The back is removed, the tracing and paper adjusted, and the back replaced. The frame is then turned glass side up, pushed on the track, and left in the sun till the printing is completed.

Next in simplicity to the ordinary blueprint process is the blueline process, whereby the reproduction shows in clear blue lines on a perfectly white ground.

The paper is coated with the following solution:

| | |
|---------------------------|---------------|
| Gum arabic..... | 385 grains. |
| Perochloride of iron..... | 123 grains. |
| Tartaric acid..... | 62 grains. |
| Sodium chloride..... | 46 grains. |
| Water..... | 3 1/4 ounces. |

When dry, the paper is exposed under a tracing, as in the previously described process, and, when sufficiently printed, is immersed in a saturated solution of ferrocyanide of potassium until the lines are fully developed. It is then rinsed in a dilute solution of hydrochloric acid, to remove any yellow stains due to the ferrocyanide, and is finally washed in water.

Alterations in the finished print may be made with an ordinary pen and a rather thickly ground solution of Prussian blue water color. Existing lines may be removed with the soda solution previously described.

The processes for printing black lines on a white ground are numerous, but somewhat complicated. One of the earliest forms consisted of a process of double printing, and, though more complex and expensive than later methods, it gives results that leave nothing to be desired.

A sheet of thin but close-grained paper is im-

mersed for half a minute in a solution of common table salt and then dried; it is then brushed over with a solution of ten grains of nitrate of silver in one ounce of water, and again dried. The paper is then exposed under the tracing and printed until the lines just commence to change color, while the ground becomes a deep bronze color. The print is then soaked for ten minutes in a solution of one ounce of hyposulphite of soda in ten ounces of water, and afterwards well washed in water and dried. When dry, the print is rubbed over with sweet oil, to render it transparent, and is then put in the printing frame in the place formerly occupied by the tracing. A new print is now made under the oiled copy, and this second print is soaked in the soda solution and washed in water, the same as the first one. The result is a clear white ground, on which the lines of the drawing are duplicated in a deep bronze black, equal in every respect to an inked drawing. Any number of prints can be made through the oiled copy, but the process is so troublesome, and takes so much time, that it never found much favor except for special work and small sizes of drawings.

A paper for direct printing of black lines on a white ground may be prepared as follows: In nine ounces of water dissolve

| | |
|------------------------------------|----------|
| Gelatine..... | 3 drams. |
| Perochloride of iron solution..... | 6 drams. |
| Tartaric acid..... | 3 drams. |
| Ferric sulphate of iron..... | 3 drams. |

Apply two coats of this solution to the surface of a heavy sized paper, allowing each coat to dry thoroughly. Print as usual, under a tracing having somewhat heavy and well defined lines, and develop the print in a solution consisting of six drams of gallic acid dissolved in thirty-two ounces of water and six and one-half ounces of alcohol. The lines will appear strong and of a deep purple-black color, and the ground will assume a cream tint, afterwards changing to a pale gray. The print should then be washed in several changes of water and hung up to dry. Additional lines on this form of print can be made with ordinary drawing ink; existing lines can be removed only by careful rubbing with an ink eraser.

The quality of any print produced by the agency of sunlight is dependent very largely upon the tracing from which it is made. The lines of the original should be strong and of an even density, and the ink used should be absolutely opaque.

The best results are obtained when the ink with which the tracing is made is mixed with a small quantity of thickly ground chrome-yellow water color. If the color refuses to mix freely with the ink medium, a drop of ox-gall will clear it and cause it to flow more freely—though too much gall will give it a tendency to blot.

Regardless of the numerous disadvantages, nearly all mechanical drawings of the present day are reproduced by some one or other of the sun-printing processes. There is, however, an increasing tendency among users—architects particularly—to adopt the more recent method of printing by means of mechanical transfer. This consists of making duplicate copies of an inked drawing or tracing by placing it in contact with some prepared surface that will absorb a portion of the inked lines, and afterward transfer them to other sheets.

The disadvantage lies in the fact that the ink necessary for the purpose must be colored with an aniline dye, thus becoming very difficult to handle and dirty to use. It has a corresponding advantage, however, inasmuch as different parts of a drawing can be made with different colored inks, and the copy will show these color relations.

The materials necessary for the transfer process may be prepared as follows: Soak four ounces of white glue in five ounces of water and three ounces of strong aqua ammonia. When the glue is soft, warm the solution, by setting the vessel containing it in a pan or pail containing boiling water. When the glue is dissolved, add three ounces of granulated sugar and eight ounces of gelatine; then let it come to the boiling point until the whole becomes liquid. While still hot, paint the solution on sheets of heavy white blotting paper until the latter is thoroughly saturated; then lay them away to dry, for two or three days.

When ready for use, slightly moisten the surface of a sheet with a sponge dipped in cold water, and lay the drawing or tracing (which has been executed with the prepared inks already described) over the pad so that every part of the inked lines comes in contact with the sheet. Rub the drawing on the back into close contact with the prepared blotter, and after two or three minutes carefully remove it. Sheets of plain white paper laid over the pad and gently rubbed into contact will receive a complete impression nearly as clear as the original; from six to ten copies may be thus obtained from a single impression. After use, the pad should be laid aside for twenty-four hours, after which the ink will be found to have sunk into the blotter and a new drawing may be transferred. The pads should be kept in

*L. Osborne in Home Study Magazine.

a horizontal position on a shelf or in a drawer, away from heat and dust.

The inks required for these pads may be mixed as follows:

| BLACK INK. | |
|----------------------|------------|
| Aniline black..... | 1 ounce. |
| Water..... | 14 ounces. |
| Glycerine..... | 4 ounces. |
| BLUE INK. | |
| Aniline blue..... | 1 ounce. |
| Hot water..... | 7 ounces. |
| Add, when cool, | |
| Spirits of wine..... | 1 ounce. |
| Glycerine..... | 1/4 ounce. |
| Ether..... | 10 minims. |
| Carbolic acid..... | 1 minim. |

Red, violet, or green ink may be prepared by substituting the desired color of aniline for the one mentioned above.

Automatic Air Compressors Adapted for Electric Motors.

Written for the MINING AND SCIENTIFIC PRESS.

For the economical and proper operation of an air compressor something more is demanded than that it shall compress its air economically when running

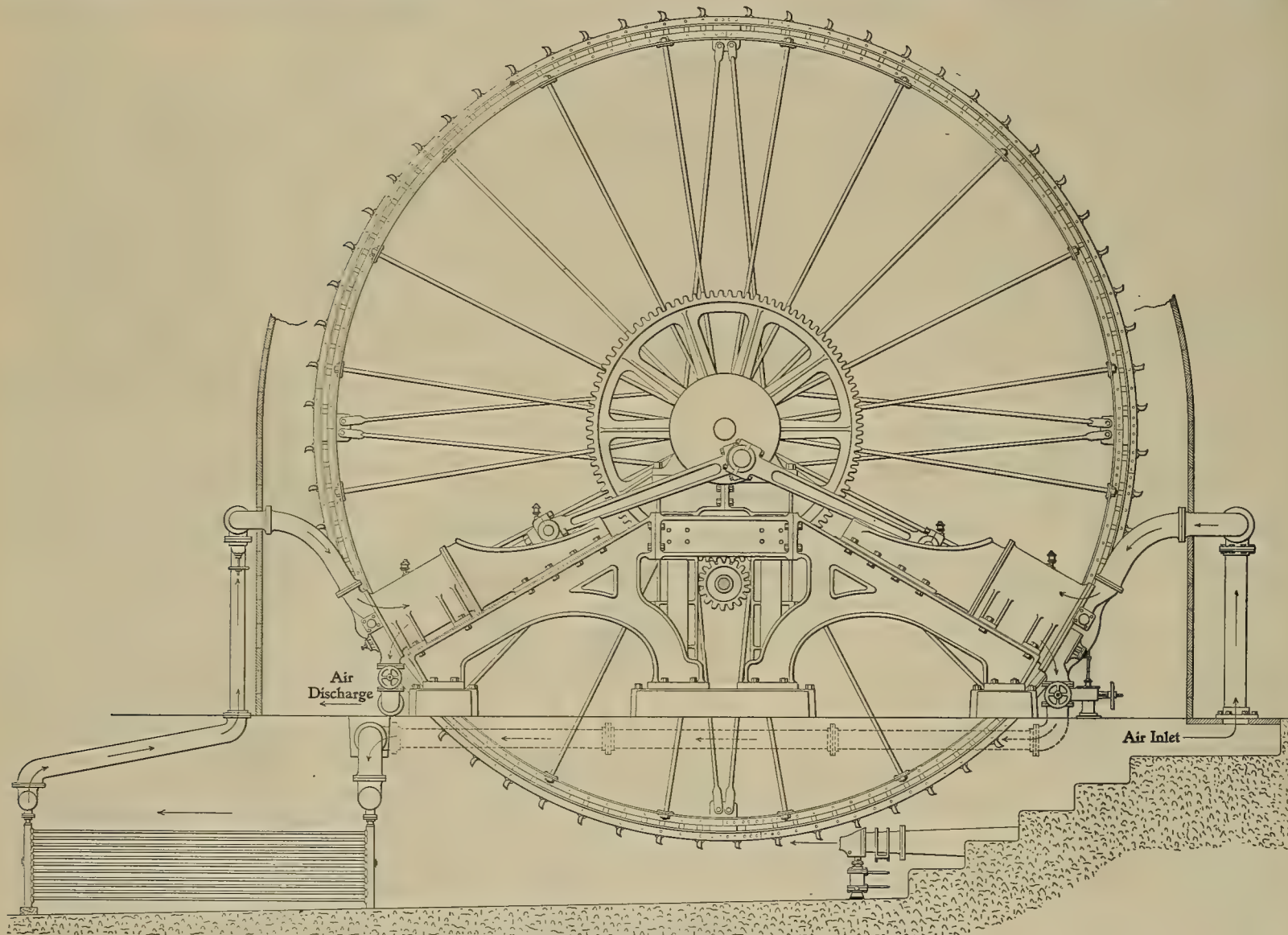
case, when the receivers have been filled to the required pressure the constant speed compressor will discharge the excess of air through a safety valve into the atmosphere, and the work in compressing this air so discharged is, of course, lost, there being a proportionate wear on the compressor to do this lost work.

There are means employed by compressor manufacturers to switch out the full load when the pressure in the air receiver has reached a certain point, but this constant switching in and out of the full load, especially in large machines, has a bad effect upon the line current, and frequently upsets the governing mechanism at the electric generating station, giving the whole system a see-saw motion and also interfering with the steadiness of the lights; in fact, where lights and power are delivered from the same line, it would be a cause of serious complaint to drive a compressor from it that was continually switching in and out from nothing to full load.

The ideal compressor, to properly overcome these objections and difficulties, is one which will automatically cut itself out by increments, as the demand for air increases, and when the demand for air

is placed upon its main shaft and is 30 feet in diameter, operating under a single jet with a pressure of 775 feet. The electric motor, which may be connected or disconnected to the main driving shaft of the compressor by cut steel gears of large size, is a Stanley synchronous motor, of 440 H. P. The small water wheel shown on the left of this motor is a starting motor for the generator, or may be used afterwards to drive the motor as a generator, to furnish power for pumping in the mine, should it be required.

The compressor itself consists of two low-pressure, single-acting cylinders, 30 inches in diameter by 30-inch stroke, which receives the air from the water wheel pit and compresses it to about 25 pounds to the square inch. This air is forced through pipes of large diameter, through the inter-cooler, which it will be noticed is situated in the water wheel tail race, where the spray from the water wheel will assist materially in cooling the air. The heat in the first stage of the compression is taken out of the air and it then passes to the high-pressure cylinders, which are 18 1/2 inches in diameter and 30-inch stroke. In these the air is further compressed to 90 pounds



THE RIX VARIABLE VOLUME AIR COMPRESSOR, NORTH STAR MINE, NEVADA COUNTY, CAL.

at a given speed. With the advent of the numerous electrical transmissions which have been installed in the State of California there are conditions and requirements imposed in the use of power which make it imperative to construct a compressor which shall work properly under the new conditions.

At first sight it would seem that it is only necessary to either belt or gear a compressor to the electric motor and that the installation is then complete, but it happens that in the use of alternating currents, which are exclusively used for high potential transmissions, the motors run practically synchronously with the generators; in other words, the motors are constant speed motors, and these motors will not start at full load, and synchronous motors cannot be started for work unless in synchronism.

It will readily be seen that where a motor is driving at a constant speed the compressor is naturally delivering its full quantity of air. If it were possible to exactly calculate the amount of air required for use, there would be no objection to constructing a compressor to deliver this quantity at this constant speed. But the most work done by compressed air in the State of California is intermittent work, which varies from about 15 per cent of the capacity of the compressor to full capacity. This being the

ceases; it will have cut out the entire machine and will as automatically decline to deliver air when the occasion demands and gradually restore the delivery of the full volume, if such be required. All this must be done in the most gradual manner, covering such a period of time that it will not interfere with the harmony of the electrical installation. This cut-out device must also be so constructed that it can be installed and conveniently operated for the starting of the compressor. It will be readily seen that this must be accomplished by constructing such a valve mechanism that it will deliver from the cylinder the whole of its contents or any portion that may be desired. In other words, the cylinder and the valve motion must be capable of delivering a variable volume when running at a constant speed and constant stroke.

The new compressor which is now being installed at the North Star mine at Grass Valley, Cal., was built to meet the conditions as set forth above. This compressor, as shown in the accompany cuts, is arranged so that it may be driven either by water power or electrical power. The water wheel, which is the largest tangential water wheel in the world*,

*An illustrated description of this wheel appeared in the issue of October 15th, '98.

to the square inch and forced into the mains leading to the mine.

This compressor will make about sixty-five revolutions, which slow piston speed insures economy of compression.

The entire construction of this compressor—both the frames and shafting, gears and everything pertaining thereto—is massive in construction, the total installation weighing about 100 tons. This compressor, as stated before, running at a constant speed, will automatically deliver a volume of air at the final pressure from 15 per cent of its volumetric capacity to its full volume. This means, of course, that as the power demands increase it will automatically give forth additional air. Inasmuch as the motor governs itself, this general combination will make an economical plant.

The small cut, showing a double-acting valve motion, is the vertical elevation of the cylinder of the compressor, of a similar kind to the North Star, which is now being installed at the Jumper mine, Tuolumne county, Cal. This compressor will be a duplex compressor, having 15-inch diameter cylinders by 30-inch stroke, each cylinder double acting. This will be driven by a 150 H. P. Westinghouse induction motor, making a constant speed of 640 revo-

lutions per minute. The power will be transmitted from the motor to the compressor through a mortise maple tooth gear, of very large diameter and extreme width of face, the driving pinion being a cut cast iron pinion on the motor shaft. The mortise gear will insure a certain elasticity of motion that will withstand the shock of the compressor and will be comparatively noiseless. This compressor will, like that of the North Star, be capable of automatically cutting itself out as the demand for air decreases, until it reaches about 12 per cent of the volumetric capacity of the cylinder.

The governors on both of these compressors are under the control of the pressure in the air receiver. The variation of this pressure above the required limit, which in both these cases is 90 pounds, will change the position of the trip cams that control the opening and shutting of the inlet valves.

The inlet valves in both of these machines are of the Corliss type, giving 10 per cent the area of the cylinder for the induction opening, which is almost double that which can be introduced into an air compressor with poppet valves. This variable motion

Concentration After Lixiviation.

Written for the MINING AND SCIENTIFIC PRESS by
MATT W. ALDERSON.

The usual practice when ores contain sulphides or values in concentrated form not easily dissolved by cyanide is to remove such particles before leaching. One would naturally expect them to be more valuable before any part of the precious metals was removed than afterwards. Conditions, however, may alter cases, and conditions are not the same at Cripple Creek, where concentration follows cyaniding, as in South Africa, where it precedes it.

The ores of Cripple Creek and vicinity contain tellurium, and, to use the words of a prominent chlorinator (C. C. Burger): "As is well known, it is not possible to satisfactorily concentrate tellurium ores; when such material is crushed, through a twenty to forty mesh screen, the values will float off any vanner or concentrating machine ever devised."

When ores containing tellurium are roasted, con-

comes in easily and naturally. At the Brodie mill concentration is effected by the use of four Wilfley tables.

At the mill of the Colorado Ore Reduction Co., at Elkton, the leached pulp passes through a tailings launder 2 feet in width and about 20 feet in length, having Hungarian riffles in the bottom. From thence the tailings continue over blanket concentrators. Results have been very satisfactory and the management claim better work is being done than by any other system in use in the district.

The mill of the Metallic Extraction Co., at Cyanide, is on level ground. The tailings, as they are discharged from the leaching vats

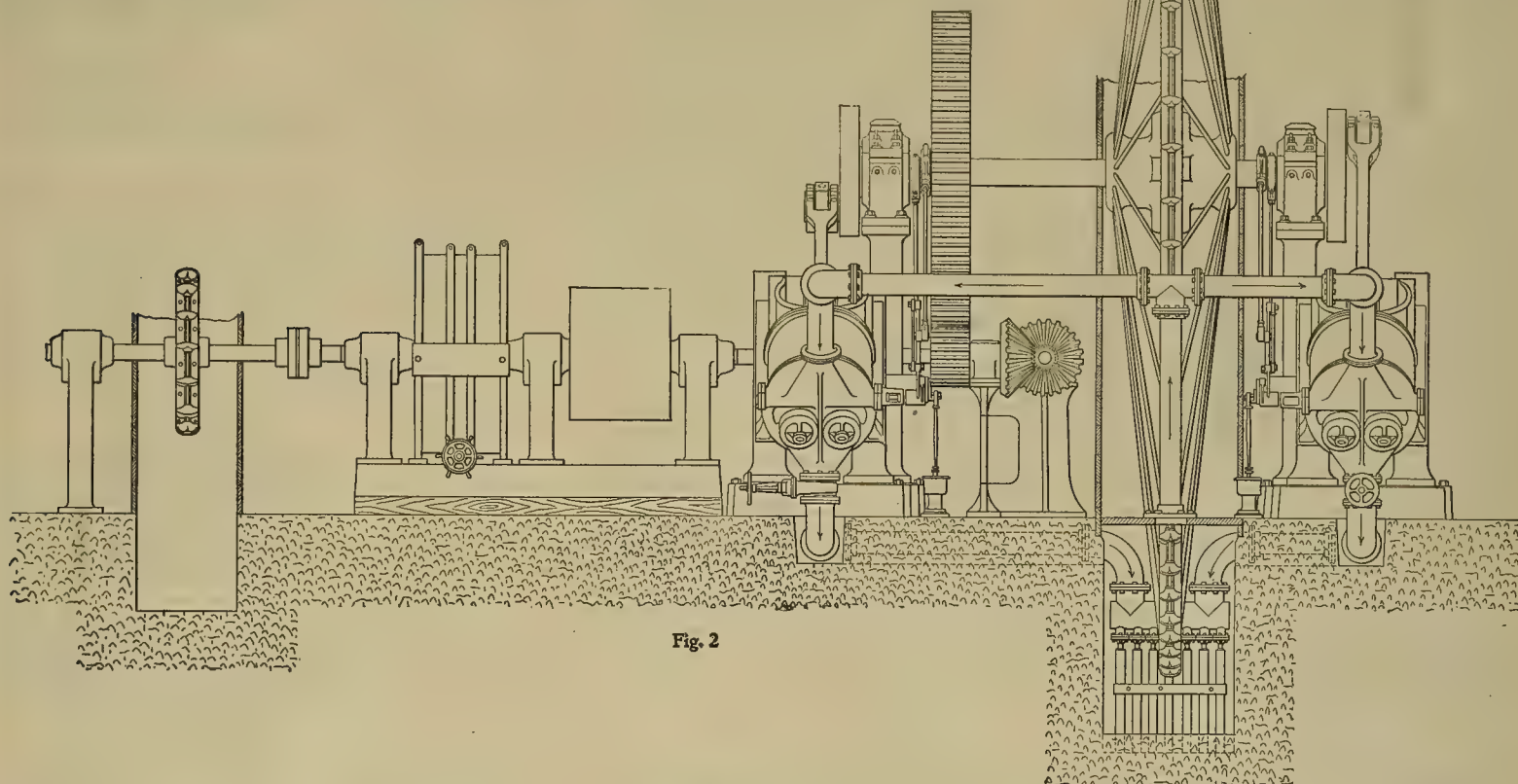


Fig. 2

SECTIONAL VIEW AIR COMPRESSOR, NORTH STAR MINE, NEVADA COUNTY, CAL.

applied to air compressors is the subject of a recent patent by Edward A. Rix of San Francisco, Cal.

THE Nicaragua Canal Commission has completed its preliminary report, estimating 75,000,000 cubic

conditions are changed, the process of roasting—where sulphur, antimony, tellurium, etc., are driven off—being in one sense that of concentration. If the ore was in a wet state at the completion of the roasting, concentration might take place then to excellent

are elevated by a centrifugal pump and flow away from the mill through an elevated launder, in the bottom of which are Hungarian riffles. The ore at this mill is crushed to thirty mesh, and, as better results were secured than at cyanide mills in the district where the ore was crushed to but sixteen to twenty mesh, concentration was not attempted until recently. Results were so satisfactory, however, that all material passing the mill will be concentrated hereafter, and it is in contemplation to concentrate the accumulated tailings.

All the above mills are cyanide mills, treating the refractory ores of the mines of Cripple Creek and vicinity. The value of concentrates obtained is about the same at each mill, varying according to ore treated, to some extent, and ranging in value from two to seven ounces of gold to the ton.

Readers of contributions to mining journals must have been impressed with the statements so frequently made therein that a considerably better extraction can be secured by chlorination than by cyanidation, but one does not often have the opportunity of seeing plants using these two processes at work on the same ores, as in Colorado. The cyanide mills, in treating \$20 ore, make an extraction of about 90 per cent. This leaves, prior to concentration, about \$2 in the tailings. One seldom sees claims of less than 96 per cent by chlorination. This, if applied to the Cripple Creek mills, would be leaving 80 cents in the tailings, prior to concentration. What is the result? Some one discovered that there were good values in the chlorination tailings, and those values are being saved. And even after saving what can be saved by concentration, there is many a ton of tailings which will still assay as high as 80 cents. The process has not yet been invented whereby one may save all the values of any ore.

At the El Paso Reduction Co.'s mill at Florence, Colorado, are seven concentrators; at the Gillette

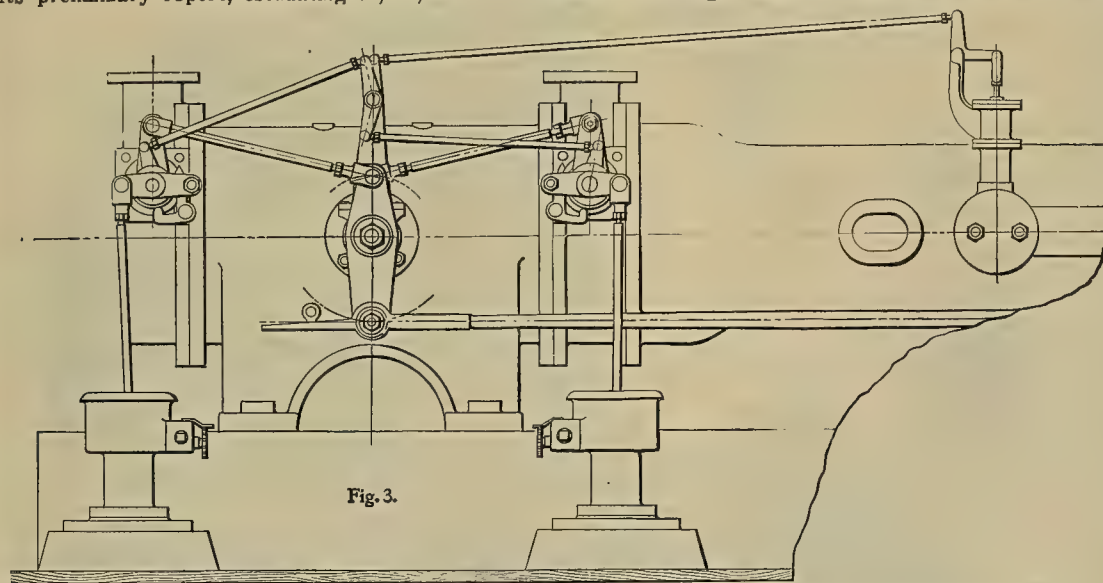


Fig. 3.

VERTICAL ELEVATION CYLINDER AIR COMPRESSOR, JUMPER MINE, TUOLUMNE COUNTY, CAL.

yards of all grades of cutting to Lake Nicaragua. The cost of the Ochoa dam, upon which rests the entire feasibility of the route, was not satisfactorily computed, as the undertaking is of so colossal a nature as to be beyond figuring. The dam will be over 1500 feet in length, its foundation 75 feet below the bed of salt in the river bottom and its rise over 130 feet; \$135,000,000 will be a conservative estimate of the entire cost of the canal.

advantage and the concentrates would be of better value; but to use the quantity of fluid necessary to pass the ore over concentrators would be reversing what would be easy and natural; for the ore would have to be impounded as tailings and the surplus water removed before cyanidation or chlorination could take place. As a consequence, the ore is leached first, and then, as extra fluid is necessary to carry the residues out of the mill, concentration

Reduction Co.'s mill at Gillette eleven, and at the Colorado-Philadelphia Reduction Co.'s mill at Colorado City twenty-one—all saving concentrates from the tailings of mills treating ores by chlorination. The concentrates obtained, as in the case of concentrates following leaching by cyanide, range in value from \$40 to \$140 to the ton.

One familiar with Cripple Creek ores and their treatment must acknowledge that admirable work is being done there by both cyanide and chlorination mills. Their success is an instance of intelligent adaptation of processes to the material in hand, and is due, not to theorizing as to what should be or should not be, but to meeting a situation as it is found to exist. And in at least one respect that situation is a very peculiar one. The ores treated, especially those which are locally known as the blue or unoxidized ores, have no free gold in them, and the sulphides are very fine and disseminated throughout the ore. Complete failure would necessarily follow attempts to amalgamate or concentrate such material. It would seem to be an ideal one for liquid processes, and yet must needs be roasted before it will surrender its values. The peculiarity is that particles of free gold of appreciable size, and which can be saved by chlorination, are found in the tailings. If you interrogate the mill men as to the object of concentration, their reply will be practically that of R. B. Turner (MINING AND SCIENTIFIC PRESS, May 21, 1898): "The idea of concentration is to recover the coarse gold which has not had time to be affected by the cyanide, and also any sulphides carrying values." The presence of coarse gold in the concentrates is universally recognized, and that it was not in the material when crushed will, I presume, be conceded by anyone at all acquainted with the ores in question. Theoretically, it would not be possible for coarse gold to be found in the tailings, but it is there, and recognition of the fact is money in many a man's pocket. In one sense of the word, it is enough to know that it is there and can be saved. The practical mill man may be satisfied with that knowledge, but the investigator will be interested in delving deeper. How did it get there? Where does it come from? I have my own ideas on the subject, based on a large number of laboratory experiments with a different class of ore, and may give expression to them in another article. In the meantime I will, and (I think) cyanidists generally will, be interested in any explanation of the phenomenon offered.

An Injunction Granted.

In the United States Circuit Court of the district of New Jersey, Aug. 30th, '98, Judge Kirkpatrick granted an injunction against the Whitaker Cement Co. as users of the Griffin mill, which is declared to be an infringement upon the Huntington mill, patented by F. A. Huntington, May 8th, '83. Judge Kirkpatrick discusses the subject in detail. He says:

Apparatus, appliances for crushing and pulverizing ores were known to the art at the time Huntington obtained his patent, as was also the mighty power of centrifugal force. Machines had been constructed to utilize this force for such purpose, but in every case the balls or rollers or crushers had rested upon the floor of the pan, so that when rotated at high speed the constant rubbing between the rollers and the pan and between the crushers and the driving arm induced excessive wear and tear and resulted in the rapid and continual destruction of the parts. Various means had been used in the attempt to overcome these serious objections. In the Pickering & St. John patent No. 71,055 the weights had been made round, and in the Lucop patent No. 173,411 the round weights were made to rotate upon their own axes, while in the Howland patent No. 263,497 the floor of the pan rotated, and in consequence there was present not only abrasive friction of the rolls upon the floor, but also against each other and the vertical part of the die. In all of these inventions there was present the circular annular die, against which the rolls or crushers were pressed or rotated. An examination of the prior state of the art discloses the fact that of the parts forming the Huntington combination the circular pan with its interior vertical die was old, the rollers rotating upon their own axes were old, as were also the shafts (or their equivalents) for propelling the rollers around the pan, but in none of the previous devices had there been a suspension of the rollers so as to allow them to move radially to and from the center, and rotate against the die by centrifugal force. This Huntington conceives and declares to be the important feature of his invention. By this appliance the rollers when rapidly rotated "were thrown outwardly by centrifugal force so as to crush anything between them and the die surrounding the inside of the pan," and by this means was overcome the abrasive friction of the rolls against the bottom of the pan and the driving arms, besides the maximum reduction of the excessive wear and tear that had been previously borne by these parts. It is impossible to read the record in this case and not be convinced that the suspension of the rollers so as to allow them to swing to and rotate against the rim of the inside die was the gist of the Huntington invention. It was not material how the rollers should be suspended—"the vertical carrying shafts may be

suspended in many ways," the inventor says—nor what other movements the rollers had; the important feature was that whatever peculiar manner of suspension was used it should be such as would allow them to move to and from the center, and be free to rotate against the die by centrifugal force. This was the application of a new principle to the art, to accomplish a result long sought, but until then never satisfactorily attained. Huntington did not devise a new way to do an old thing, but he made it possible to utilize a force long known but practically of as little value for the purpose to which he applied it as if it did not exist. I am of the opinion that Claim 1 of the patent is valid and not anticipated by any of the prior devices which have been cited to the court as having been used in the prior art.

In the specification describing his invention the patentee uses the following language: "My invention consists of a pan having an interior circular die around its periphery, and in combination with this of a series of rollers which roll against the die being suspended by vertical shafts turning in sleeves which have horizontal journals above, so that the rollers may swing radially. The suspending mechanism is suspended upon a cross or frame which is driven by a central shaft, and the rollers are thus thrown outward against the die by centrifugal action." Reference is also made to the drawings for a more complete explanation of the invention. These show an embodiment of the inventor's specifications, and on them a plurality of rollers and shafts appears. It is contended on the part of the defendants that by the use of the plural of "rollers" and "shafts" in the claim, and by the expression "series of rollers" in the specification, that Huntington has so limited his invention that the machine used by the defendants, which is constructed with a single roll suspended by a single shaft, does not come within its scope. In this view I cannot concur. I have little doubt that Huntington was impressed with the idea that the embodiment of his patent as shown in the drawing possessed advantages superior to any other, and that for certain reasons two rollers were more desirable than a larger series or a less number, but I am unable to conclude that he intended to limit the application of the principle he evolved to any particular number of rollers. He says: "In the present case I have shown two rollers suspended from opposite arms of the frame," but he does not thereby limit himself to two rollers. It may be properly inferred from his language that either a greater or less number would equally serve the purpose. "It will be manifest that the vertical shafts carrying the rollers may be suspended in various ways so as to allow the rollers to move to and from the center, which is the important feature of my invention." That is to say, my invention consists, not in the number of rollers or shafts, but in so suspending them, whether few or many, that they can be free to rotate against the periphery of the circular die, and, by centrifugal force, to crush against the die the ore or other hard substance intended to be pulverized.

free to swing to and from the center of the pan and rotate against the die was the novelty and the essence of the invention, and it was in this respect, as the defendants' expert declares, that the Huntington machine differed from the earlier mills of its class. This it was that gave the machine its undoubted excellence. In view of the prior state of the art, I find that the actual invention of the patentee was that by a combination of the means set out in Claim 1 of the patent a machine was constructed which for the first time embodied this important principle of construction. Neither the "rollers" nor the "shafts" constituted the novelty of the invention, and in this respect they differed from the "Springs S S" set out in the McLain patent, which was considered in the case of McLain vs. Ortmyer, 141 U. S., 491. In the present case no function is assigned to the plurality of rollers. The use of the plural included the singular, if the singular could do the work marked out by the plural.

While the rollers and shafts are mentioned in the plural, they are referred to in the claim by a "single" letter, so that as to them the claim is "fairly susceptible of two constructions. That one will be adopted which will preserve to the patentee his actual invention."

The duty of the court is to so construe claims that, without doing violence to the language used, to give the patentee what he has actually invented. In other words, "to make the claim commensurate with the invention."

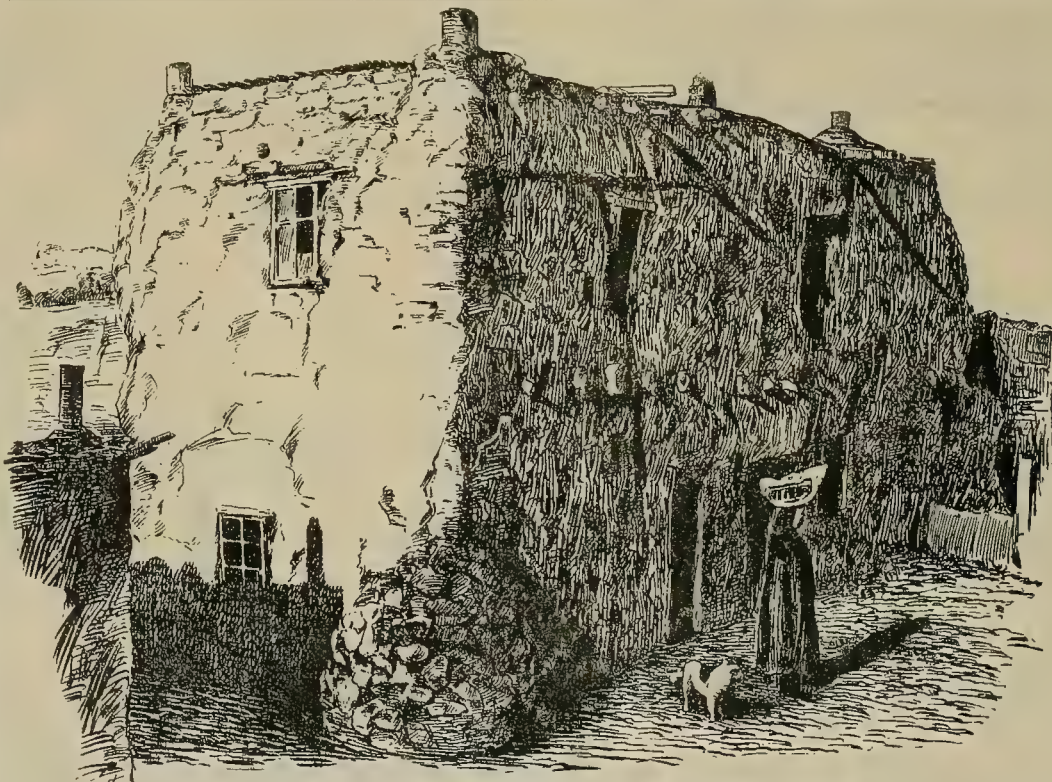
After a careful consideration of Claim 1 and the specifications of the patent No. 277,134, I fail to find any intention on the part of the patentee to impose upon himself any limitation as to the number of rollers or shafts to be used in his machine. It is the first embodiment of the important principle of suspension by the combination of devices described in the claim, and any subsequent combination of the same devices embodying the same principle to accomplish the same result must be regarded as an infringement.

It will be useless to discuss the minor differences in the form and structure of the machine of the complainants and defendants. I have considered all of them to which my attention has been directed by the brief and argument of counsel. I am satisfied that the defendants' machine incorporates in its structure and operation the substance of the invention as set out in Claim 1 of the patent in suit, and is therefore an infringement thereon.

The complainants are entitled to protection against those who, availing themselves of the discovery, seek to justify themselves by pointing to mere form in the mechanical devices used. The complainants are entitled to a decree as prayed for in their bill.

Supposed to Be 300 Years Old.

The accompanying illustration represents the oldest house in Santa Fe, New Mexico, and presumably the oldest structure in the United States. Its exact



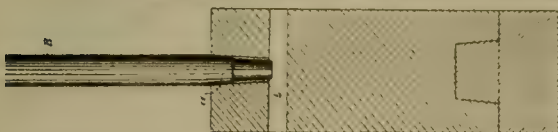
PROBABLY THE OLDEST STRUCTURE IN THE UNITED STATES.

The combination of the patent was not pan and rollers and shafts alone, but added thereto the means of suspending said shafts from above, so that the said rollers might rotate against the die by centrifugal force. The suspension of the rollers so as to be

age is not positively known, but the general belief is that it is at least 300 years old. The building is situated in the immediate vicinity of San Miguel church, which is locally credited with being three centuries old.

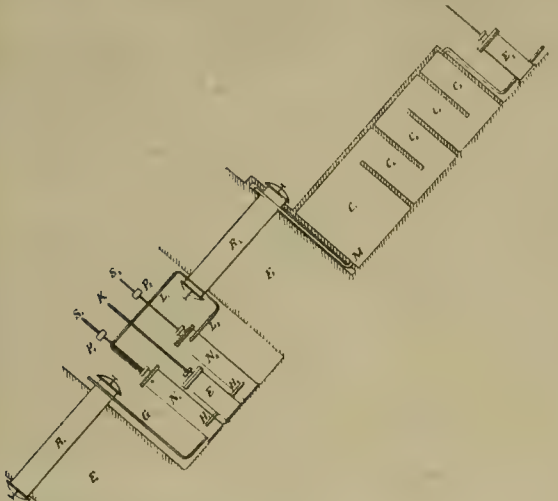
Recent Mining and Metallurgical Patents.

616,311. CRUSHING-MILL STAMP-STEM. CHARLES GRACEY, Kingman, Ariz. Filed Apr. 1, 1898. Serial No. 676,042. (No model.)



Claim.—An improved stamp head and stem consisting of the stamp-head having a transverse drift-opening and an opening in the center of its upper end and covering downwardly, and a stem having a short tapered portion to closely fit the upper portion only of the central opening and having a portion below said tapered-portion of less diameter than the latter to maintain this prolonged portion out of contact with the remaining portion of the walls of the tapered opening in the stamp-head, the lower end of the said reduced portion extending into the drift-opening whereby it may be engaged to detach the stem from the head.

616,391. PROCESS OF OBTAINING SULFUR FROM SULFATES. VLADIMIR DE BARANOFF and EUGENE HILDT, Paris, France. Filed June 22, 1896. Serial No. 596,524. (No specimens.)



Claim.—1. The herein described process of extracting sulfur simultaneously with sulfids and sulfurous acid from metallic sulfates by treating a metallic sulfate with sulfureted hydrogen under heat and thereby decomposing the sulfate into sulfur, sulfurous acid and sulfids, substantially as described.

2. The herein described process of extracting sulfur, simultaneously with sulfids and sulfurous acid from metallic sulfates by reducing a metallic sulfate by means of carbon under heat, causing the carbonic acid generated to act in presence of water upon a metallic sulfid to generate sulfureted hydrogen and then treating a metallic sulfate with the sulfureted hydrogen under heat and thereby decomposing the sulfate into sulfur, sulfurous acid and sulfids, substantially as described.

Industrial Notes.

—The S. P. Co. is reported ready to begin building a line of railroad from San Diego, Cal., to Yuma.

—The United States has decided to place the entire Philippine archipelago under American jurisdiction.

—A new track is to be built for the Sierra, Cal., railway, and the line extended to Sonora and Summersville.

—The White Pass and Yukon Express Co. is the latest incorporation in connection with the first railroad in Alaska.

—The coal output of the State of Washington this year is 1,715,515 tons, an increase of nearly half a million over 1897.

—For the fish industry of Puget sound Japan is a new customer. Fourteen hundred tons of salt fish were shipped from the North Pacific coast to Japan last year.

—Preliminary contracts have been made between the Kiushiu and Sanyo, Japan, railway companies and the Yokohama agents of Peacock & Co. of London, for loans amounting to \$7,500,000.

—Beginning to-morrow all Eastern mail will arrive at Pacific coast points thirteen hours sooner than before. Under the new system San Francisco and New York City are distant 100 hours by mail.

—Before the end of January the Hawaiian Islands will become a strong base of naval strength, and, in conjunction with the effective forces at Manila and San Francisco, will effectually command the entire Pacific ocean.

—The Globe, Arizona, Times notes that the mining companies have nearly exhausted the timber in the Pinal mountains, and that in a short time a railroad will have to be built north to the pine forests, or timber must be shipped from California.

—President Jefferey of the Denver & Rio Grande R. R. Co., says: "In the seven years that I have lived in Colorado, I have never seen such evidences of general prosperity as we now have. This applies to all kinds of business, trade, agriculture, and, best of all,

the mining interests, which form the basis of Colorado's prosperity. The mining camps at Cripple Creek, Leadville, Aspen, Creede and other points are making a larger output of ore than they have in many years.

—Senator Hoar of Massachusetts says the Nicaragua canal should be built at once for the protection of the Pacific coast and for the commercial relations between our Western and Eastern ocean borders, and that it should be built by the Government.

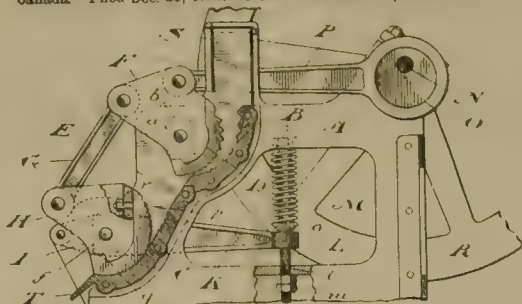
—The establishment of a steel foundry in Chihuahua, in the northern part of Mexico, by Henry Creel and his associates marks a new era in Mexico's industrial progress, as up to the present time over 12,000,000 of people have depended for their supply of iron and steel almost exclusively on foreign countries.

—The San Francisco Mechanics' Institute plans to hold a Colonial Fair at the Mechanics' pavilion, beginning September, 1899, to continue three months, to be confined to the exhibition of the resources of the Philippines, Cuba and Central America, and Congress will be asked for money to cover the appointment of a special commission to visit the regions mentioned and make collections of exhibits.

—The Los Angeles, Cal., Oil Producers' Trustees report that in November receipts were 10,685 barrels; sold during the month, 17,260 barrels; balance in storage December 1, 71,865 barrels; gross amount received for the 17,260 barrels sold, \$14,876.61, an average of 86.19 cents per barrel at the wells. What is reported to be the finest grade of light oil yet pumped in southern California is said to have been discovered in the wells of the Columbia Co. near Fullerton in Orange county.

—One restaurant during the past winter at Dawson, N. W. T., had the following bill of fare tacked on the wall: Bowl of soup \$1, mush and milk \$1.25, canned corn \$1.25, stewed fruits \$1.25, canned tomatoes \$3, slice of pie 75 cents, coffee or tea \$1, with pie or sandwich \$1.25, beans, coffee and bread \$3, plain steak \$2.50, porterhouse steak \$5, hot cakes and maple syrup \$1, poached eggs on toast \$2. A leading restaurant, having a seating capacity of thirty-two, employed three cooks, one of whom received \$100 a week and the others \$1

616,427. ROCK-CRUSHER. BAGSTER R. SEABROOK, Victoria, Canada. Filed Dec. 29, 1897. Serial No. 664,315. (No model.)

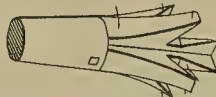


Claim.—1. In a rock crusher and pulverizer, a curved bed supported in a suitable frame, in combination with an oscillator; bearing-blocks vertically adjustable in suitable guideways in the frame of the machine and having the shaft of the oscillator journaled therein; a toothed upper curved bed communicating with the lower bed and having a toothed oscillator adjustably journaled therein; an arm extending from each oscillator; a link connecting the said arms, one or more eccentric-rods journaled to the arm of the oscillator, and eccentrics operating said rods; and a shaft for transmitting power to said eccentrics, substantially as described.

2. In a rock crusher and pulverizer, a curved bed supported in a suitable frame, in combination with an oscillator normally in contact with the lower portion of the bed, bearing-blocks vertically movable in suitable guideways in the frame of the machine and having the shaft of the oscillator journaled therein; and means tending to retain the oscillator in contact with the bed; a toothed upper curved bed communicating with the lower bed; a toothed oscillator journaled in proximity thereto; an arm extending from each oscillator; a link connecting the said arms and means for rocking one of the oscillators, substantially as and for the purpose specified.

3. In a rock crusher and pulverizer, a curved bed supported in a suitable frame, in combination with an oscillator normally in contact with the lower portion of the bed; bearing-blocks vertically movable in suitable guideways in the frame of the machine and having the shaft of the oscillator journaled therein; means tending to retain the oscillator in contact with the bed; a toothed upper curved bed communicating with the lower bed; a toothed oscillator journaled in proximity thereto; an arm extending from each oscillator; a link connecting the said arms and means for rocking one of the oscillators, substantially as and for the purpose specified.

616,273. MINER'S DRILL. JOEL F. STRAUSSER and HARRY T. KLINGER, Tower City, Pa. Filed May 12, 1898. Serial No. 680,528. (No model.)



Claim.—As an improved article, a miner's drill consisting of the body portion, the downwardly-extending central portion formed with four vertical wedge-shaped or beveled cutters at right angles to each other, and the inner ends meeting at a common point, and the outwardly-inclined tapering or wedge-shaped side cutters, located above and in the same vertical plane with said central cutters, but having their cutting edges at a right angle thereto, substantially as described.

an hour. Four waiters are paid \$50 a week each, and the women \$100 a month. The leading gambling house and dance hall employs three bartenders, two waiters, a bookkeeper and porter. The barkeepers receive \$15 a day, the bookkeeper \$17.50, waiters \$15 and porter \$10.

—If the Canadian Commissioners have succeeded in securing free admission of Canadian coal to American ports, it will hurt the State of Washington in benefiting other parts of the coast. The coal industry in that State amounts to \$12,000,000 per annum. The Pacific Coast Co.'s mines produce 40,000 tons a month. Under free production Washington cannot compete with British Columbia mines. Few Washington miners make less than \$3 a day; Chinese make 65 cents. British Columbia mines are on salt water and can load 80 per cent cheaper than Washington can.

—Early in '99 it is expected that between San Bernardino and Los Angeles, Cal., the Southern California Power Co. will begin the distribution of electricity to every part of the country between those two cities. The plant is about completed at a cost of \$800,000. Preliminary work began in November, 1898. Since May, 1897, men have been at work in the Santa Ana canyon digging ditches and tunnels and building flumes which carry the water from the intake to the power-house. At the junction of Bear creek with the Santa Ana river to the head of the pressure a conduit has been constructed three miles. Of this distance 11,555 feet consists of eighteen tunnels, 2682 feet of flumes, 167 feet of open canal, 680 feet of head flume, 132 feet of sand boxes and sixty-two feet of reservoir and forebays. The first tunnel is through solid granite; the others are all cemented. From the mouth of tunnel No. 18 the water is dropped almost perpendicularly for 728 feet to the power-house through 30-inch pipe. The water is thrown into the buckets of the turbine wheel from a nozzle 4 1/2 inches in diameter, the power in the stream being 300 pounds to the square inch. With the machinery used this is enough power to generate 1250 H. P. The four dynamos will be driven 300 revolutions per minute. The dynamos rest upon their own foundation and receive water from their own nozzles,

and they are so arranged that there are really two complete systems. The electric current is to be conducted to Los Angeles, over eighty miles. It is intended to deliver there 4000 H. P. with a loss of only 10 per cent.

Personal.

M. J. BURNS is Supt. Eureka mine, Republic, Wash.

W. D. McDUGALL has returned to California from South Africa.

F. B. HILL, Supt. Oriental mine, Alleghany, Cal., is in San Francisco.

W. H. STORMS, Supt. Agnes mine, Sonora, Cal., is in San Francisco.

C. C. COTTON has been appointed Supt. Edison mine, Red river, New Mexico.

W. LEANUE has been appointed Gen. Mgr. Blue Grouse M. Co., Moscow, Idaho.

JAS. CRONAN of Hackberry, Arizona, is in San Francisco to buy some concentrators.

R. FLINTERMAN succeeds A. Mackay as Supt. Kildona mine, Pluma, South Dakota.

M. W. MATHER, Supt. Plumbago mine, Alleghany, Cal., has returned from San Francisco.

JNO. W. MACKAY sent \$500 on Christmas to the poor of Virginia City and Gold Hill, Nevada.

L. T. WRIGHT, Gen. Mgr. Mountain Copper Co., Keswick, Cal., has returned from San Francisco.

G. W. STARR, succeeds to the position of Gen. Mgr. of the Omaha Con. mines at Grass Valley, Cal.

JNO. O. BOUSE, chief engineer Twin Placer, Idaho, M. Co., is in San Francisco, to get machinery and competent hydraulic miners.

F. ZEITLER, Pres. St. Gothard Con. mine, North Columbia, Cal., and Supt. Champion mine, Nevada City, Cal., is in San Francisco.

CHAS. BUTTERS, Berkeley, Cal., is visiting La Colorado and Minas Prietas, Sonora, Mexico, and exporting the ore tailings of those localities.

G. HUESER of Cologne, Germany, a Government mine inspector, is examining copper properties in Shasta county, Cal., for Dusseldorf and Cologne capitalists.

D. KIETH, managing owner Silver King and Gen. Mgr. Valeo mines at Park City, Utah, has reached home from Sonora, Mexico, where he has been examining mining properties with a view to purchase.

C. J. FULTON, who retires from the management of the Gold Nugget M. Co. at Clancy, Montana, to take charge of an Eastern company's interests in developing Montana and Colorado mining properties, will be succeeded by W. A. Miller, Jr., of New Jersey.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey, Strong & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING DECEMBER 30, 1898.

616,284.—FRUIT CLEANER, ETC.—Baker, Chalker & Ferguson, Los Angeles, Cal.

616,408.—BICYCLE GEAR—E. Courtwright, Tacoma, Wash.

616,006.—ELEVATOR GEARING—E. M. Fraser, S. F.

616,311.—STAMP STEM—C. Gracey, Kingman, A. T.

616,312.—LABEL HOLDER—J. R. Grinsfelder, Spokane, Wash.

616,335.—SHOE LACE CLASP—M. E. Hendrick, Amity, Or.

616,331.—VISE—A. Howard, S. F.

616,332.—SHEARS—A. Howard, S. F.

616,333.—MECHANICAL MOVEMENT—A. Howard, S. F.

616,410.—NUT LOCK—A. Howard, S. F.

616,335.—WHEEL—W. H. F. Jones, Highland, Cal.

616,420.—CAKE TURNER—J. Korbel, Los Angeles, Cal.

616,110.—CAN AND TRAP—H. F. M. Lahann, Traver, Cal.

616,126.—BOTTLE—N. A. Lybeck, S. F.

616,135.—SPRING GEAR—J. M. O'Brien, S. F.

616,351.—CAR COUPLING—J. W. Price, Belfast, Wash.

616,250.—SURGICAL INSTRUMENT—L. H. Rogers, Los Angeles, Cal.

616,370.—MOWER—C. C. Swain, Stockton, Cal.

616,160.—SPOKE SOCKET—A. Weiheimer, Fresno, Cal.

20,825.—DESIGN HOOF PAD—E. D. Flint, Oakland, Cal.

20,821.—DESIGN TWINE CUTTER—J. Joffraud, S. F.

NOTE.—Plain and Certified Copies of U. S. and Foreign patents obtained by Dewey, Strong & Co., by mail or telegraphic order. American and Foreign patents secured, and general patent business transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey, Strong & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

CRUSHING MILL STAMP STEM.—Charles Gracey, Kingman, Ariz. No. 616,311. Dated Dec. 20, 1898. This invention is designed to prevent the breakage of stamp stems at their junction with the heads into which they are fixed. The stem is usually tapered at the lower end and fits into a correspondingly shaped socket in the stamp head. The constant dropping of the stamps produces twisting and bending strains which eventually crystallize and weaken the stems so that it breaks off at the junction with the head. In this invention the taper of the stamp stem is made to fit the upper part of the chamber in the head for a distance not greater than the diameter of the stamp stem, and the lower part is made something smaller so that it does not quite fit the bottom of the opening. This allows a slight movement either one way or the other when any sudden wrench or side pressure is brought upon the upper part of the stamp head, and this yielding prevents the shock and strain upon the stem which would eventually break it.

Mining Summary.

ALASKA.

Ex-Gov. Swineford of Alaska and Chicago men have a bond on the Merrimac and Monitor claims, Sumdum district. The two ledges run parallel with each other. A tunnel was run in on the line between the two claims and a body of quartz 15 feet wide was encountered. The first 10 feet assayed an average of \$8.60 to the ton, the last 5 feet \$15.35, and the whole 15 feet \$11.35. The company will erect a 10-stamp mill on the property.

ARIZONA.

J. Hanna has eighteen men at work on his Gopher mine near Prescott and is taking out shipping ore.—B. Collins has several carloads of copper ore on the Blackfoot mine awaiting transportation to Kingman.—The Columbia smelter will renew operations soon after Jan 1st. Considerable ore in the Harshaw and Washington districts awaits smelting.—Strahan & Son near Jerome struck a ledge 3½ feet wide that assays well in copper and gold.—A new shaft is being sunk on the Vulture mine near Prescott.—Crowe & Montrose are making a success in working the Bedrock mine under lease. The mine is in Peeples valley; the ore is worked in the Yarnell mill. Several bars of gold bullion were recently obtained from a cleanup.—Near Wickenburg the Butte & Boston Co. is working extensively on the Hamlyn properties and at the King Solomon group they are sinking several 100-foot shafts. Denver people are working the McIntosh properties with success and it is locally stated that some mills will be put in there soon.

The Red Cloud mine, near Yuma, has been leased by H. P. Griswold. This mine is developed by several shafts. Ore is being taken from the third level, where the vein averages 8 feet and carries about 50 per cent lead and ninety ounces of silver.

A streak 18 inches in width of fair grade ore has been struck on the Wedge mine, in Lost Gulch, Gila county.—On the divide between Mineral and Pinto creeks, Burns & Co. are taking copper ore from one of their claims. That averaging 45 per cent is shipped to the smelter.—The Great Republic group of five copper claims, in Pinto district, are developed by a 230-foot tunnel on one, an 80-foot tunnel on the other, and the properties are showing well.

Miller & Wentworth, on Gun creek, are taking out ores that average 12 per cent copper, \$5 in gold and \$6 in silver to the ton.—A smelting plant has been installed by the Spetzuma M. Co., operating near Geronimo. Three 50 H. P. boilers are among the equipments.—A narrow gauge railroad, seventy-one miles in length, connects the copper mines of the Arizona Copper Co., at Clifton, with Lordsburg, New Mexico. The Longfellow, Metcalf, Coronado and Queen mines are connected with the railroad by 20-inch tracks. It is stated that the cost of reducing the ores of these mines has been minimized until ore carrying 3 per cent copper may be profitably worked.

The electrical process experimented with at the Vekol silver mine, in Maricopa county, has been abandoned and new machinery erected.—Los Angeles people have bonded the Patterson group of mines, in Mohave county, and work on them will begin soon.—In the Katie mine, at Mineral Park, at a depth of 160 feet, ore is extracted that runs 700 ounces in silver.—The Yellow Ned mine, in El Dorado canyon, has an ore body 3½ feet in width. Ore sold to the sampling works carried 9 ounces gold and 146 ounces silver a ton.

In Pima county rock running 200 ounces in silver and \$20 a ton in gold, is being taken out of the Blue Jay mine.—A ledge recently discovered in the Baboquivari mountains by W. J. Clark, is large and assays 16 per cent copper and \$4 in gold.—The mines of Oliver Camp are producing high-grade silver ore.—The shaft of the Victoria mine has been sunk 145 feet, and the ore being taken out is good-grade gold and silver.—The Mineral Hill or Asurite mines, near Tucson, shipped in past years, under lease, some 5,000,000 pounds of copper, gold and silver-bearing ores, averaging 15 per cent copper and reasonably rich in the other metals. The ore body is said to be 200 feet wide. The property is being worked under the supervision of T. C. Hughes.—In Graham county the Detroit Copper Co., at Morenci, is making extensive improvements. Work has begun on a 400-ton concentrator.—Thirty men are now employed on the Ray copper mine, Pinal county, which is being developed under bond. A diamond drill will be put in once.

Globe Times: At Globe the United Globe Copper Co. is running a 200-ton furnace, doing custom work for the Black Warrior mine, the management of which hauls ore by wagon from Webster Gulch, twelve miles. There are 250 men employed at the United Globe. Among the prospective improvements is electricity, by which the slag cars will be propelled. The United Globe is enabled to ship two ways at a reduced rate below that of ten months ago. The pay of miners is \$3 a day.—At the Old Dominion Copper Co.'s smelter for sixteen months no work was done, while for two months past there has been turned out enough bullion to load a train of thirty cars. The furnaces dispose of 150 tons of ore daily. A depth of 800 feet has been reached and the mine workings are extensive. About 300 men are employed.—The gold mines at Mesquite are being successfully operated.—The Helvetia in the Santa Rita's shipped 125 sacks of high-grade copper ore to Silver City.—The Temple Bar Placer Co. of Kingman owns 1000 acres of gravel which is from 50 to 300 feet deep. The company has a large pumping plant in operation. A month's run yielded \$60,000.—A 40-stamp mill is running at White Hills and producing considerable silver bullion.—Reports received from the Grand

Reef mine show an increase of good ore. The ledge has been penetrated to a depth of 467 feet and a tunnel is being driven to strike the 400-foot level. Both drifting and sinking continue.

Yuma Sun: In Picacho district, at Venus, H. W. Blaisdell is operating the old Janes property; about seventy-five men are employed and satisfactory results are secured. The mine is a low-grade property, the average of ore yielding from \$4 to \$5 per ton under the cyanide treatment, but ore of higher grade is found running \$15 per ton.—S. W. Dorsey is doing the assessment work on his group of claims, giving employment to a number of men.—The Tarantula group is being developed.—Brown & Werninger have twelve men at work on the Paymaster group of silver and lead claims, and ore is being shipped.—H. P. Griswold, who is operating the Red Cloud mine, has seventy-five tons of high-grade silver-lead ore on the dump.—A. O. Brodie is placing a 20-stamp mill, a hoist of 2000 feet capacity and a pump on his Crown Point mine in Yavapai county. The pumping plant will be placed on the Hassayampa, two miles from the mine.—A. Heller is developing a property at Prescott, with good results. The ledge is 5 feet wide.

Yuma Sun: Under the operations of the newly formed Potholes M. & M. Co., the old Potholes mine near Picacho is proving a money-maker. The battery of four 2-stamp triple-discharge mills is at work on the low-grade ore which is abundant in the mine, about forty tons going through the mill every twenty-four hours. The ores will average about \$4 per ton and is worked at a good profit. Two cleanups have been made both of which proved satisfactory. The shaft has reached 250 feet.

Phoenix Republican: H. J. Sisty at Yarnell is running ten stamps of the 20-stamp mill on ore from the Bedrock mine at Peeples' valley. The Bedrock is not a new mine, although its development has just begun. It was worked years ago. The product is hauled six miles to the mill and gives a profit. Several gold bars were shipped last week. One of the small bars contained forty-eight ounces.—At Vulture the New Vulture is sinking a new shaft.

CALIFORNIA.

Amador.

At the Baldi mine, Sutter Creek, the foundation is ready for the new air compressor. Supt. Porter will put on a full crew Jan. 1st and work will be pushed.

At the Jackson Butte mine, near Jackson, a bedrock tunnel is being driven 230 feet, 190 of which has been completed.—Work at the new shaft of the Kennedy mine is progressing, and it is expected that the engines and hoist will be ready for operating Jan. 15th.

Butte.

The Oroville Register says that two dredgers are to be built during the winter, near Oroville—one on the P. K. Welch place and the other on the Mortenson land.—The Sanders gravel mine, near Chico, which has been idle for some time, was recently sold to McCongar & Co., who will at once begin work.

The Register says there are few persons who know the large sums of gold taken from the mines of Butte. The miners themselves are always adverse to stating any facts concerning their mines and the reasons are obvious that we need hardly refer to them. One is the danger of robbery if it is known that their mines are paying well. Some instances of the past showing the sums in gold extracted may not be amiss. During the month of November, 1897, one mine took out a trifling \$69,000. During the month of December of that year the same mine took out \$47,530.

Calaveras.

A force has been put at work at the Hexter mine, near Mokelumne Hill, retimbering the tunnel and doing other preparatory work.

The Calaveras Chronicle says rich gravel has recently been struck in the Lamson claim, near Railroad Flat.

San Andreas Citizen: At Vallecito the Sanguinetti mine has started up again. Pumping machinery has been installed and sinking resumed.—The Lundberg hydraulic mine has resumed operations. O. Sloan is running a 400-foot tunnel to tap the gravel deposit. The work is rushed night and day.—At Angels Camp the rain last week enabled the Utica, Stickle and Lightner mills to resume operations.—At the Thorpe mine operations will be resumed as soon as the new machinery is in place.—Supt. Blackhart of the Harr's mine will have a new hoist installed at the Harris mine and sink a shaft 400 feet.—In the Gardner mine, near Telegraph City, the shaft is 110 feet deep and the vein is from 3 to 5 feet in width, which is good grade.

San Andreas Prospect: The Oriole M. Co. will begin work on one of its properties, the Big Bonanza, near Angels Camp, and a hoist of sufficient power will be erected to sink 1000 feet. Bids for a 45-H. P. boiler and a 35-H. P. engine will be accepted; the timbers for a 45-foot galloways-frame have been ordered. In the meantime sinking the shaft, which has reached a depth of 250 feet, will continue.

El Dorado.

Placerville Nugget: At the Oro Fino mine, near Shingle Springs, operations have been resumed in consequence of the recent rains, and fifty men are at work. The 30-stamp mill is running night and day, and the fires were started last week at the chlorination works.—At the Vandalla, in the same district, ore is being hoisted from three levels; about forty tons per day are being crushed and afterwards treated by the cyanide process. Eighteen men are employed.—Hall & Baughman, owners of the old Fort Yuma mine, near Shingle Springs, have resumed development work.—The Boulder M. Co., on Weber creek, have enlarged their ditch and are running their 20-stamp mill night and day on high-grade ore. It is said that the company contemplate adding ten more stamps

to their mill soon.—Unwatering the Grand Victory mine near Placerville is being pushed. The 30-stamp mill will soon be in operation.

Georgetown Gazette: Davis & Farmer made a strike of good value last week in the Argonaut mine near Georgetown. The mine is owned by J. Smith of Greenwood.—As a result of the rain the Big Sandy, Rising Sun and Gopher-Boulder mines at Kelsey started up last week.—Slate is being shipped from the Strable quarry near Kelsey, on which work was recently resumed.—The El Dorado Con. M. Co., at Josephine, are making borings on their gravel property.—J. P. Cranmer is rushing work on the Golden Hope mine at Pilot Hill.

Placerville Democrat: At the Marguerite mine, in the Diamond district, sinking continues; the shaft is down 100 feet.—At Slate Mountain the ledge of the Independence mine, in which a strike was made recently, is 20 inches wide, and said to be of high grade. The owners, Schiff & Limpensel of Placerville, contemplate the erection of a mill on the property soon.

Kern.

The Ruby and Alpha claims near Johannesburg are shipping good milling ore.

The framework of the Yellow Aster Co.'s new mill building is completed. The company's well and pumps are in good working order. The capacity of the wells has been definitely determined to be not less than 100,000 gallons in twenty-four hours, more than enough to keep the thirty stamps in operation. The success of the Yellow Aster Co. in increasing by sinking and tunneling, their water supply from a few thousand gallons to 100,000 gallons per day, has encouraged others who own "water land" in the same range of hills to prospect for water and it is probable that new wells will be sunk.—The new mill on the Hard Cash started up this week.—The Johannesburg L. & W. Co. is pumping from 25,000 to 30,000 gallons of water a day.

Randsburg Miner: The Wedge mine near Randsburg shipped seventy tons of ore to the Johannesburg mill for two weeks and as much more will follow before Jan. 1st. This is mostly low grade ore running \$25 a ton.—On the O. K. the shaft is down 75 feet and is in good ore.—The Black Hawk, owned by Wilson & Co., has twelve shafts sunk, ranging in depth from 10 to 100 feet. Some rich ore has been milled from this mine but it is generally regarded as a low-grade property, running from \$20 a ton down. The last eighty tons milled \$15 a ton. The mill being built will be in operation Feb. 1st.

Los Angeles.

The Victoria mine in the Seritas district is in good ore and also in a prosperous condition.

Mono.

The Bridgeport Chronicle says that the late storms have deposited a large quantity of snow on the mountains and that the placer miners next summer will have a larger output of gold from Mono county than they have had for many years.

Bridgeport Union: There are two mining properties in the new district in Little Antelope valley. J. E. Carter took up placer claims in the old Silver King district in Alpine county, but a portion of the placer ground is in Mono. An Eastern company has become interested in one through J. E. Carter of Antelope valley. Next spring there will be much work done in running tunnels.

Nevada.

At Washington J. McCarty has bonded his group of quartz properties to capitalists from the East. The company is represented by G. W. Hall, Supt. of the Eagle Bird mine at Maybert. The properties have considerable development work done. The ledge is large but low grade. It is locally reported that Supt. Hall contemplates building a 50-stamp mill without delay.

Grass Valley Union: The control of the Omaha, Lone Jack and Homeward Bound mines, near Grass Valley, has been bought by W. B. Bourn, Pres. Original Empire M. & M. Co. These mines cover nearly 4000 feet of vein and a surface area of about sixty acres. The pumping and hoisting machinery is capable of working the Omaha mine to a depth of 2000 feet. The mines have paid \$150,000 in dividends. The Omaha is down to the 1500 level, and the Lone Jack has been sunk to the 1700. Drifts have been run over five miles in length. The Homeward Bound is connected with the two former mines. There are said to be three pay shoots, the vein varying in thickness from 6 inches to 3 feet, yielding on an average \$25 to the ton. It is locally reported the mines will be worked on a large scale.

Placer.

During November the Pioneer mill crushed 556 tons ore; average value, \$11.89. The payroll for the month was \$3256; net earnings, \$2132.

Colfax Sentinel: Development work is in progress on quartz claims in Humbag canyon. The claims are owned by T. S. Hawkins of Hollister. The ledge is about 22 feet in width. A shipment of 2680 pounds of ore to Selby's returned \$61.70 in gold.—At the Hidden Treasure mine, as soon as the winter rains move the tailings, the mine will be run with an increased force. Supt. Power says that, even with a reduced force, they are able to take out 400 cars of gravel daily.—At the Bradshaw Bar gravel mine the owners have completed a five-mile ditch. Flumes are in place and work will begin as soon as sufficient water can be secured.—The new electric plant at Pioneer is in place. A trial made shows everything in working order, awaiting the rains.—At the Buckeye gravel mine, near Forest Hill, sixteen men are employed. J. A. Seward is Supt. The mine is owned by J. A. Johnston and Mrs. J. V. Collins.

Plumas.

C. Schneider is meeting with success in the development of his mine in Meadow Valley.

Riverside.

Tailings at the Good Hope mine continue being run through the cyanide process; but owing to the mineral existing, the yield of gold is not large.—Over \$1000 a month in gold is taken from the tailings at the Santa Rosa mine by the cyanide process.—The Riverside Gold Co. at Perris last week found a valuable pocket on the 200 level. The mill is running day and night. The mine employs twenty men.

Sacramento.

Work will begin soon on the dredging plant for mining Mississippi Bar, in the American river, near Folsom.

San Bernardino.

The shaft on the Rose mine, near Victor, is down 250 feet. A cyanide plant will soon be erected.

San Diego.

The Hubbard mine, near Ramona, has resumed work.—The new hoist for the Helvetia mine at Julian was put in place last week and the mine is in operation.—E. W. Sebben is developing his four claims—the Denver, Portland, Anaconda and Rico Aspen.—The assay on samples of vein float ore from claim No. 2 of the recently discovered Pearce sulphur mines, near Coyote Wells, shows a gold value of \$6 per ton, iron 28.45 per cent and sulphur 30.89 per cent.—At the Ranchita mines the 5-stamp mill is running night and day on \$30 ore. C. J. Coutts says he must have a 20-stamp mill to handle the Ranchita's large ore body that has been opened up.

San Diego Union: Although only a part of the stamps in the mill at Hedges were in operation during November, the Golden Cross mines produced \$38,000 in bullion, about half of which is net profit. The machinery will be in better shape this month, and the output is expected to be large. Between Hedges and Yuma, including the former camp, the monthly output of bullion amounts to about \$110,000.

Shasta.

Redding Free Press: Supt. Langdell of the Eureka Tellurium mine near Middle Creek, on which operations were recently resumed, has five men at work.—At Keswick the smelters closed down Dec. 20th and will remain closed until Jan. 5th, for the annual cleanup and the taking of stock. The matte furnace has started and it will take several months to run the deposit through. During the holiday shut down the crew on green ore will be kept at work.—Near Harrison Gulch a good strike was made on the Morgan & Booth claim.—At Copper City a strike was made in the Bully Hill mine of a ledge 26 feet in width of high-grade ore. Five four-horse teams are hauling ore from the mine to Redding to be shipped to the Selby smelter.

Shasta Courier: At Harrison Gulch about 150 men are employed. The new roaster is in course of completion. Capt. Roberts is also sinking a deep shaft on the White Oak properties at Lower Springs, near Shasta. He has also bought the Penrose claims in the same vicinity.—Klett & Blair are running a tunnel on their claim near Whiskeytown and have good indications.—J. C. Frick contemplates the extension of the tunnel in the Oro Fino claim near Shasta.—A. Hunting and partner are reported to have struck a body of high-grade ore in the property they recently bought near Shasta.—About forty men are employed at the Mt. Shasta and the mine is shipping ore to Keswick. It is locally reported that a mill will be erected there soon. O. O. Howard Jr. is Gen. Mgr.—The Spanish mine has seven men extracting ore. The stamps will begin to fall as soon as more rain comes.

Sierra.

(Special Correspondence).—Work is progressing on the old Oriental mine, near Alleghany, on which operations were recently resumed. The shaft has been unwatered and retimbered to 80 feet. It is 250 feet deep. Supt. F. B. Hill will thoroughly develop the property, and if it warrants he will erect a complete plant of machinery. Fifteen men are employed and work proceeds day and night. A pump is in operation with a capacity of 30,000 gallons an hour.

Alleghany, Dec. 23d, '98.

The Mountain mine at Sierra City resumed work last week, which had temporarily ceased on account of frost.

Downieville Enterprise: The Plumbago mine near Alleghany, under the management of M. W. Mather, is proving successful. He is having an electric light put in at the mine. A 10-stamp mill is steadily crushing the ore, which is good grade, and twenty-five men are employed. He contemplates operating the machinery by compressed air.

Downieville Messenger: A second air compressor was started up last week at the Gold Bluff mine, near Downieville; also an air receiver was installed in the mine. About thirty men are employed. Work will continue all winter.—The mill at the Triple mine in Slug canyon started up after the recent rain and will continue during the winter unless the frost becomes too severe.

Sliskiyou.

Yreka Journal: Work is progressing in reopening the old Golden Eagle mine at Indian Creek.—The Sheba Co., working the old Fry & Macauley mine at Patterson creek, have their new mill ready for crushing.—On Salmon river all the miners are prepared for operations in quartz and hydraulic claims, as soon as water is supplied.—At Oro Fino, the John Pitts mine is turning out good ore. The last crushing milled \$60 a ton. The lessees are pushing development work.—The Providence mine has been bonded to G. W. Oberholzer, who is running a tunnel.—E. B. Star is working the Gardner & Demming quartz mine with a steam hoist, and taking

out good ore.—J. and W. Chase are taking out ore and W. Eastlick is crushing ore on the Eastlick mine.—The Old Wright & Eastlick hydraulic mines, under the management of J. O. Rusby, have three Evans' elevators in position.—C. Shell has the Gardner & Shell mine in shape for work. He began piling some time ago but the recent cold snap froze up the ditches.—Macaulay, Fry & Oberholzer are doing development work on the Leader mine at Patterson creek.—It is locally reported that J. O. Rusby has bought the Dick Johnson quartz mine, mill and ditch in Oro Fino.

TRIOLITY.

The Mountain Boomer mine near New River, in which capitalists of San Francisco are interested, is an old property which was worked years ago, and supposed to have been worked out. The new company began where the old one quit and they are satisfied so far with their speculation. The old works have been reopened at a depth of 240 feet where a 30-inch ledge has been uncovered which runs \$40 a ton in gold. A second tunnel is being run which will be 650 feet below the old one. To convey supplies to the camp a pack team of sixty mules is employed to take them seventy-five miles from Red Bluff.—The Postlethwaite dredger operated at Poker Bar is working and returns are satisfactory. The dredger is run night and day. It has a capacity of 2400 cubic yards a day of twenty-four hours.

In the Brown Bear mine at Deadwood the compressor plant was started last week. Work will be pushed on the 4000-foot tunnel, which is in 200 feet.

TUOLUMNE.

Sonora Independent: Work on the Possible mine at Columbia is progressing. The vein was struck last week, which is $3\frac{1}{2}$ feet wide and prospects well.—At the Pug-of-War mine at Five Mile Point the tunnel is being pushed. Forty feet from the mouth a shaft is also being sunk.—H. Nelson is opening a hydraulic mine in Spring Gulch.

COLORADO.

BOULDER COUNTY.

The shipment of ores to the Culbertson mill near Boulder continues from points accessible to the line of the Colorado & Northwestern railway, and satisfactory results have been obtained from concentration. Ores as low as \$6 a ton have yielded a profit, owing to the liberal arrangements made on transportation and dressing charges by railroad and mill management.—The big dumps of the Dew Drop and Adit tunnel are being shipped since the construction of switches to those points have made an economical handling of the ore possible.

Denver Mining Record: Pres. W. P. Daniels of the Adit Dew Drop mines at Camp Frances has awarded a contract for the first 50 feet of work on the Sunset-Frances-Ward tunnel. This begins one of the great tunnel enterprises in Colorado. The plans of the company that will push this scheme contemplate a bore 8x8 feet in the clear. It will cut the Adit Dew Drop vein at Camp Frances at a depth of 1750 feet and the Columbus vein at Ward at 2000 feet. A plant will be put up at the mouth of the tunnel at Sunset at once and work will be pushed. The promoters have located twenty-one claims between Sunset and Frances, nearly all of which parallel the big bore.

CHAFFEE COUNTY.

At Whitehorn another 8-foot vein has been uncovered on the Esther. In 18 inches of the vein copper is visible. Tests on the entire vein give an average of 40 to 60 per cent copper and \$17 in gold per ton.—The fourth 12-ton shipment under the new management was made last week from the Independence. Assay tests range from \$15 to \$200 in gold to the ton.

CLEAR CREEK COUNTY.

The Aliende Con. M. Co., near Georgetown, have struck a vein in the 850-foot level of the Colorado Central workings.—The Griffith mine shipped 100 tons of ore last week. The mine gives employment to fifty men.

EAGLE COUNTY.

Shipments of ore from the Battle Mountain district last week were thirteen carloads, a total since Jan. 1st of 404 carloads.

EL PASO COUNTY.

The Keith & Grube lease on the Vindicator at Victor is outputting from thirty to forty tons daily.—The Modoc maintains its output at thirty tons a day, the ore running from \$35 to \$100 a ton.—The Victor mine has found a large body of medium grade ore at the eighth level. The production, which had fallen off to eighty tons in the past month, has again been increased to 100 tons per day.

Victor Record: Near Victor the Creston Leasing Co., operating on the Jack Pot, at a depth of 250 feet, has an ore chute that has been drifted on for 300 feet, 4 feet wide, 18 inches of which will probably average \$250 to \$300 a ton. A shipment of nearly thirty tons of this grade was sent out last week; the shipment should bring close to \$7000. The lease is employing ninety men, and shipments are running forty tons a day. The new shaft will be completed about Jan. 8th, when the force will be increased and the output possibly doubled. The drift is lighted by electricity, and an electric hoist is installed over a winze.—A shipment from the Abe Lincoln mine last week consisted of between sixty and seventy tons of coarse rock and screenings, the value of which is unknown. Former shipments, however, have averaged \$50 a ton.—The ore is from a depth of 350 feet. The pump is raising about eighty gallons of water a minute.—The Lafayette mine, which has been worked under bond for several months, has been sold to the Princess Alice G. M. Co., composed of Eastern ladies, for \$28,000. An electric hoist is being put in to replace steam power. An ore chute was recently opened in

the 575-foot level and a heavy shipment was marketed last week.

GILPIN COUNTY.

Three tons of uranium ore were shipped recently from the Wood mine at Central City. Some of the ore from this property has been sold for over \$1 per pound.—The force of the Flske mine is sixty men and the daily shipment of ore is fifty tons. The shaft is over 1000 feet deep.—The Rocky Mountain concentrator at Black Hawk is running day and night. Last month it treated nearly 1500 tons of ore, which yielded 500 tons of concentrates.

GUNNISON COUNTY.

The Taylor Park Placer Co. near Gunnison the past season have had fifty-five men employed, and have built 1700 feet of bedrock flume. Next season the bedrock will be washed, from which values are expected. The company owns 3000 acres of patented ground.

HINSDALE COUNTY.

The Rob Roy property near Eagle was sold last week to the G. & S. Fleece M. Co. for \$2045. The property has been in litigation for years. Work will soon be resumed upon it.

LAKE COUNTY.

The Wolfstone owners at Leadville are receiving royalties on 4500 tons of ore a month.

PARK COUNTY.

At the Hook Hocking near Fair Play a large force are working, and a car of ore a day is being shipped.—From the Hill Top high grade ore is being taken out. About 400 tons was last month's shipment.—The Ruby, at Weston Pass, shipped over 500 tons of ore in November.

IDAHO.

The car of ore shipped by the Last Chance mine at Saltese recently netted about \$4,000 for the twenty-five tons.—Wemis Bros. shipped a carload of galena from the Empire State mine near Custer recently.—The Idaho Comstock mines at Dixie have nineteen claims in the group, all somewhat developed and with good showings on each, though development has been confined chiefly to the Comstock claim. On this is a double shaft 145 feet deep, with drifts and crosscuts aggregating over 500 feet. A steam hoist capable of sinking 300 feet is in operation. The ore is teamed to the mill, three-quarters of a mile, the location of the mill being determined the most convenient point for handling ore from the different claims with least haul. The mill is operated by water power, conveyed two miles in a box flume set deep enough underground to avoid freezing. The company contemplates to at once add more stamps and operate on a larger scale. W. T. Hiren is Gen. Man.—At Saltese the U. S. and Last Chance have made occasional shipments of ore for several years. They are both now being worked under lease. A new tunnel to cut 200 feet below the old works is being run. The Last Chance shipped one car a month for the last four months. The U. S. will make a shipment early in January. The ore from each of these claims yields about \$2000 a car above freight and smelter charges.—A strike has been made in the Checkmate mine at Willow Creek, opening a body of good ore. It shows an 8-inch streak that is said to run \$300 in gold.—F. R. Reed, who represents large mining interests in Elmore county, and is Mgr. of the Upper Boise Hydraulic M. Co. and the Josephine M. Co., says he will expend \$40,000 or \$50,000 next summer in developing various properties which his companies own in that county. He has lately organized a new company known as the Pennsylvania Placer Co. The properties of this new corporation are in Elmore county, near Mountain Home. A ditch will be constructed nine miles in length. He will put a large force to work as early as the season will permit. It is intended to operate six large giants. For the Pennsylvania Co. he has purchased and located 800 acres of placer ground. He will also build a sawmill on Fall creek to cut lumber flumes.

The Lucky Boy mine at Custer City the past summer saved 67 to 68 per cent of the assay values of its ore, and it is quite likely that the mill would have been kept in operation all winter were not the available space around the plant crowded with tailings. In spring, cyanide works will be added to the plant and operations resumed on a larger scale. Exhaustive tests have shown that the application of the cyanide process to the tailings, of which there is from 8000 to 10,000 tons at the mill, will effect a recovery of 85 per cent of the gold and from 60 to 70 per cent of their silver values. The company will keep thirty-five men all winter in development.

Boise Statesman: The Challenge mine near Boise has over 1300 feet of tunnels and shafts. Recently an ore chute was found in the lower tunnel 500 feet from the mouth. It has been opened up for 100 feet. The vein varies in width from 2 to 6 feet. The paystreak in the chute is 3 to 26 inches wide. The values run from \$50 to \$400 a ton, gold predominating. The owners have built a 2-stamp mill and concentrator to handle the lower grades of ore. A large quantity of ore is ready for shipment. Supt. Knight of the Challenge is working ten men.

MONTANA.

At Basin the shaft at the Hope mine is going down, between the 500 and 600-foot levels, with three 8-hour double shifts. H. L. Frank says that when the 600 is reached plans for a 500-ton concentrator will be asked for.—At the Eva May mine the shaft is being sunk to the 600-foot level. If they find on the 500 and 600 a continuation of the large ore body they have above, the Eva May will be a heavy producer.

The Speculator mine, near Butte, under operation by the Langley estate, is proving a good shipper. About 100 tons of ore per day are shipped to the smelter. One-third of this amount is high-grade copper, gold and silver, and the remainder is the usual average of con-

centrating ore of the Butte district. The shaft is developed to the 100-foot level, where the values rather increase than decline.

Libby News: The concentrator at the Snowshoe mine is unable to be operated on account of water shortage. The developments in the mine are being pushed. The tunnel is in about 1200 feet. A raise has been started at a depth of 1050 feet. There is an accumulation of concentrates at the mill and they are being shipped to Everett.—At the Rocky Fork coal mine of Red Lodge, the daily output is between 1300 and 1500 tons. One tunnel is in 10,000 feet and has not reached the limits of the property or the end of the seam. The main slope is 1275 feet down and another is down 1100 feet.—It is estimated that the output of gold from placers in Montana during 1898 will be about \$700,000, or a small increase over 1897. The increase is due in a great measure to the introduction of dredges at Bannack which inaugurated at new era in placer mining in Montana. With several new dredges in course of construction it is believed the output of placer gold in the State next year will be materially increased.

NEVADA.

The Horseshoe mine is in Eagle Valley mining district, Lincoln county. The ore on the 100-foot level now runs \$50.

F. C. Everett, accompanied by Fish & Jones of the Cuyahoga M. Co. owning mines in Smith Valley, have been inspecting their mines. They have had several tests of ore made at the Douglas laboratory at Dayton and are satisfied with the returns.—Near Como the Orpheus mine has been bought by the Cuyahoga Co. together with Merrimac and Feverish Hornet. The company will develop its property as soon as machinery can be put in. The Everett & Co. 5-stamp mill will be remodeled and concentrators put in to handle the pulp.

The company owning the Copper Canyon mines in Elko county will have a mill in operation next month.—J. F. Holland is reported getting copper ore out of his Mason Valley mine.

The Magnolia mine at De Lamar is working fifteen men; shipments are made the middle of each month of the high-grade ores, the low-grade being piled up for a mill which the company will build in the spring. The ore shipped more than pays prospecting expenses.

Winnemucca Silver State: The largest producing mine in White Pine county being worked is the Homestake. The ore body has been tapped by a shaft at 250 feet. The ore averages 68 per cent lead, 15 ounces silver and nets \$20 a ton after paying transportation to San Francisco and charges at the smelter. Over 1200 tons of ore were shipped between July 1st, '97 and July 1st, '98.—A new mining company known as the Tuscarora G. M. Co. has been incorporated at Salt Lake, and has bonded twelve claims in Elko county.

NEW MEXICO.

Santa Fe New Mexican: The Steeple Rock Development Co. of Grant county has disposed of its tailings to the Pacific Extraction Co. of San Francisco. The tailings will be worked by the cyanide process.—An ore body 30 feet wide, yielding \$12 in gold, has been uncovered in the Bull of the Woods mine, near Bland, by H. Lockhart.—The Crown Point M. Co. has made a strike on the Glencoe, near Bland, which is yielding fifteen ounces of gold.—The Edison M. Co., Red River district, has a force cleaning out the works, after which development on an extended scale will proceed.—Work has been resumed on the Stella property, Red River, and three shifts are being worked.—At Copper Hill in Taos county the Champion mine opened 8 feet of ore averaging \$40 to the ton, with some higher grade.—M. Ruthenburg will build a smelter at the Val Verde works at Paschal. There are several thousand tons of ore on the dump ready for smelting.—The Confidence mine in the Mogollons is producing eighty tons of ore daily.—The Othello and Desdemona mines in Cooks district are employing 125 men and putting out from 400 to 600 tons per month, which is sent to El Paso. The property belongs to the Kansas City Con. S. & R. Co.—The Iron mines near Silver City, operated by W. H. Newcomb, consist of twenty-seven claims. The development is mostly on the surface, the iron lying in shallow deposits, from 5 to 15 feet in depth. Twenty-five men are employed. The present production is seventy tons a day. A contract for shipments to El Paso has been secured for 1899, which will necessitate an increased output. The local smelter is using ten tons per day from these mines.

Santa Fe New Mexican: The Charter Oak mill, Hillsboro district, has been running for two weeks on ores from the Cincinnati and Prosper mines.—In the Cooney mine, in the Mogollons, the tunnel is to be extended to 900 feet.—At the Helen mine of the Confidence group the management is erecting a pipe line and water power to run the mill and light the mine with electricity and to furnish 500 H. P. for hoisting.—In the Cochiti district, the Black Girl property shows a 15-foot vein of good ore; the product will be treated at the Bland custom mill.—A strike has been made on the T. S. K. property in Colla canyon.—In the Red River district work has been resumed on the Stella mine. The property shows a 7-foot vein of \$30 ore.—A steam hoist and thirty men are operating in the Jumbo vein.—Denver investors have secured an option on the Edison mine and will erect a milling plant. The Edison ore averages \$20 per ton.

OREGON.

M. Alexander sold a half interest in his Navy Blue mine at Granite to J. W. Larkin for \$5000.

Ashtland Record: Supt. James has started a shaft at the Shorty and Hope claims from the 150-foot level, and has put three 8-hour shifts at work. They have found high grade ore, which will be sent to the smelter.—The

Shorty-Hope 10-stamp mill and residences are lighted with acetylene gas of twenty-four 25-candle power lights.—Supt. Crane of the Oro Fino mine is reducing five carloads of his ore at Ashtland.

Grants Pass Journal: Ferguson & Ferrier have sold their two-thirds interest in the Riverside group near Grants Pass to Cottage Grove and Portland people. The mine has 100 feet of tunnel on two ledges, showing in one place 4 feet of ore averaging \$40 to the ton, and the other ledge, 40 feet wide, shows an average of \$12 to the ton.—The Music mine in Lane county will make an early start in the spring. Hundreds of tons of high grade ore are on the dump. The 10-stamp mill has been completed.

Jacksonville Times: The ledge discovered by Hannum & Browning near Jacksonville is a foot wide and the ore assays \$90 a ton.—D. DeBar, who is developing a ledge near Jacksonville, had fifty tons of ore crushed with favorable results.—Hull & Beck, who are running a mill at their mine near Grants Pass, after a run of fourteen days cleaned up \$800.

Houck & Cox are developing a cinnabar mine near Gold Hill.—A quantity of ore from the mine prospected by F. G. McWilliams was lately crushed with good results.—Work will be resumed at Beekman & Huffer's mine Jan. 1. A long distance of tunnel has been run; a shaft will be sunk. Two tons of ore crushed last week yielded \$100.

SOUTH DAKOTA.

The number of tons milled by the 400 stamps dropped on Homestake ore at Deadwood for the past year was \$95,000.—The Highland, where 140 stamps are dropping, milled the past year 147,000 tons of ore, and the value of the output was about \$700,000.—The Kildonan at Pluma, where 47,000 tons of ore are treated yearly by the chlorination process, output this year \$845,000.

The chlorination plant at Rapid City has been started on ore from the Gilt Edge mine. Seventy-five tons are sent to Rapid daily. The plant is able to treat 100 tons a day.

UTAH.

At Bingham the Niagara Co. contemplates the treatment of its auriferous ores with the use of cyanide, and a plant will be erected during 1899. It has been shown here that ore of a gross value of less than \$5 in gold per ton could be made to yield a good margin.

The shipments out of Tintic last week were seventy-six cars of ore and thirteen of concentrates.—The McKinley Co., on Lion hill, uncovered 30 inches of ore, in which is a copper-stained streak from which three samples show 67.6 ounces silver, 201 ounces silver and 484 ounces silver per ton. In addition, the gold chute is showing good values.—The Highland Boy, at Bingham, has encountered ore in tunnel No. 7, at 500 feet, with copper predominating.—The old Jordan & Galena, which has been sending ores out of Bingham for more than a quarter of a century, has made a strike. In the meantime 3000 tons of gold ore are being leached monthly at the cyanide plant. These ores are averaging \$6 per ton in gold and six ounces silver, with a saving of 93 per cent of the former and 53 per cent of the latter in the product.

At the Old Jordan and Galena the new rolls have been started. The nine big tanks are now loaded.—The roasting of ores is progressing at the Cigale mill, West Dip. The bins are being loaded and the filling of the leaching tanks will soon begin.—On the Justice group of claims at Silver City the resumption of work has begun. The company expects to begin the extraction of ore within sixty days.—Work has resumed on the Song Birds at Mercur. The shaft has been put to a depth of 150 feet and has been productive of some values.—At the Showall placer, Bingham, machinery is being placed and sinking will shortly be resumed.—The Giant Chief mine has fifty tons of good ore on the dump and will soon make a shipment.—On the Midland at Bingham driving of the tunnel 5000 feet has begun.—The Jos Bowers made a second shipment of silver and lead ore. The first shipment yielded \$30 a ton. Assays of the second shipment of the week show 50 per cent lead and thirty-eight ounces silver, with a small amount of gold.

In the Centennial Eureka at Tintic ore has been exposed in different places containing silver and copper. The workings have attained a depth of 1500 feet. With the electric system of signals introduced, the miner in any part of the property is enabled to communicate with the surface. Electric lights will be placed underground.—At Diamond, the Midnight shaft is going down with three eight-hour shifts.—At the Alliance mine, Park City, the contact has been broken into, and the material is highly mineralized; manganese has also made its appearance. In this development over \$400,000 has been expended. Since the company began operations there have been assessments that in the aggregate reached \$310,000, while the investors paid \$1 a share for the stock. The tunnel has penetrated the zone for a mile, and at a depth of 1000 feet the contact has been reached.

Mercur Mercury: At the Daisy mine, recently, on the 200 and 300 levels, values are running \$25 per ton. A large body of this class of ore has been opened up.—The twelve new tanks at the Golden Gate mill are completed and will soon be operating. As soon as some difficulties with the electric power are surmounted, the mill will begin the treatment of 800 tons per day, and this will be increased soon to 1000 tons.—Another shipment of ore was made by the Northern Light last week, consisting of ore which assayed 126 ounces silver and \$4 gold per ton, and brought \$1500. Another shipment will be made soon of ore which yields 247 ounces silver.

Park Record: Shipments of ore from the Mackintosh sampler at Park City last week were: Silver King, first class, 945,840 pounds;

Ontario, 176,450 pounds; Anchor, concentrates, 375,690 pounds; total, 1,497,980 pounds.

WASHINGTON.

At Sheridan three shifts have been started on the Princess Maud tunnel. On the Nelson the ledge is about 8 feet wide. The Treasury tunnel is in ore, with values running from \$5 to \$8. The tunnel is in 360 feet. In the Victor the ledge is wide and the quartz averages \$6. In the Liberty the 2 feet of ore assays from \$5 to \$16. Considerable development work is being done on the Lucky Boy claim. The values run from \$33 upwards, and lie principally in silver.

Everett News: The Forty-Five mine, in the Silverton district in western Washington, will soon be able to haul in machinery and dispense with the costly pack train now used to haul ore out. Last month the Forty-Five averaged 102 men on their payroll. N. E. Downs of Seattle, a representative of New York capital in the Silver Creek district, has ten men working on the Merchant group. By Jan. 1 the compressor plant and power drill will be placed and work will be pushed on the lower tunnels, 500 feet below the upper workings. They are working in ore carrying gold, silver and copper in varying values. The Trident M. Co. is pushing development work. The Silver Creek G. M. Co. of Everett is developing a property near Galena. The Co-operative Co. is working a group of claims and has thirteen men employed. The Everett Hydraulic G. M. Co. has expended \$36,000 on its Ruby creek claims this season and will spend \$15,000 more next year in development of their mine.

FOREIGN.

BRITISH COLUMBIA.

Ymir has two shipping mines in the Porto Rico and Blackcock. The latter will ship from eight to ten tons of ore per day. The first cleanup of the Porto Rico mill last week was ninety-four ounces of gold in twenty hours run. This did not include the concentrates.

The Mollie Gibson M. Co. have made their final payment of \$40,000 on the Mollie Gibson group in the Slocan. The property was bonded for \$110,000.

Ore from the Wakefield is being hauled to Silverton for shipment. Over 2000 tons will be shipped this winter. The Comstock mines near Silverton recently shipped two carloads of galena to the smelter.

The B. A. C. last week in the Annie mine found two ledges which average \$50 in gold per ton. The ore shipments from Rossland last week show a decrease, due to the development in the Le Roi and to the inability to get cars at the War Eagle. The output was 1833 tons. At the Le Roi timbering is continuing all over the property. Old stopes that had been filled with broken ore have been cleaned out and stulls put in place wherever safety would require. Although shipments have been cut down to permit of this development work, the output of the mine last week amounted to 1050 tons.

At Grand Forks a Rossland company, represented by A. Dick, bought on a bond the Ruby claim for \$15,000, 5 per cent of which was paid in cash, the balance in payments extending over six months.

The Lexington property near Grand Forks was bonded to J. P. Graves of Spokane for \$40,000, of which a percentage was paid in cash. From Sandon the ore shipments for the week were 470 tons. The shipments from McQuigan for December to the 22d were 156 tons. From Three Forks last week the shipments were 250 tons.

LOWER CALIFORNIA.

The Ibarra G. M. Co. is said to have struck a rich body of ore in the Otilla at the 600 level, the deepest shaft in Lower California. The company was on the point of giving up the whole camp and dismantling its plant when this new body of ore, apparently leading to still larger finds, was uncovered.

MEXICO.

M. J. Cons is working eighty men in Las Catalanas mine, near Suqui Grande, Sonora. The ore is shipped. Near La Barranca he is developing another mine, in which he has cut a 10-foot vein of \$10 gold ore, which can be cheaply reduced by cyanide process.

Commercial Paragraphs.

The first of four duplex electric pumps being constructed at the Jeanesville Iron Works, Jeanesville, for the Colorado Fuel & Iron Co., Walsenburg, Colo., has been satisfactorily tested. The pump itself weighs 16,500 pounds and the electric motor 6300 pounds. It is 19½ feet long by 5½ feet wide and has a capacity of 390 gallons per minute against a head of 150 pounds. The motor is a 50 H. P. Pump and motor are connected by a double cut steel gear.

With the beginning of the year comes a change in the title of one of Denver's representative firms. The well-known establishment of Wm. Ainsworth, manufacturer of assay and analytical balances and sole manufacturer of Brunton's Patent Pocket Mine Transit, will, after to-morrow, be known as Wm. Ainsworth & Sons. Eighteen years of successful experience has given that firm enviable acquaintance, and assayers, engineers and miners have long learned to rely upon their representations and the quality of their supplies.

In the issue of the 10th inst. appeared an illustrated account of dry crushing at a South African gold mine, a specially written article, giving detailed description of the manner of crushing the ore dry. It is deemed of sufficient importance in supplying an omission in the article to state that the crushing machinery for the plant referred to was furnished by the Gates Iron Works of Chicago, being the first prominent installation in that

section of that grade of crushing rolls. The same firm has recently received an order from the Broken Hill Proprietary Co., N. S. W., for nine sets of their 36-inch high-grade rolls; in addition to that order the Gates people have furnished the same mining company five of their large breakers in the past six weeks.

Trade Publications.

"Sinaloa Illustrated" — "Sinaloa Illustrated," descriptive of the mines, agriculture, manufactures and commerce of the State of Sinaloa, Mexico, is the title and scope of an unusually fine folio just issued under the direction of the Government of Sinaloa by J. R. Southworth, 23 First St., San Francisco, being the second of a series setting forth the resources of the Mexican Republic. The work is finely printed, the reading articles appearing in parallel columns of Spanish and English and the illustrations receiving appropriate attention. Many of the views and much of the material are the result of arduous personal effort on the part of the editor. Mr. Southworth preferred getting his facts and photos at first hand, and visited several parts of the State of Sinaloa for fresh and authentic material for his book—a work that should aid in creating and maintaining cordial trade relations with our sister republic.

Recently Declared Mining Dividends.

Croesus G. M. Co., California, 15 cents per share, \$35,000; payable immediately.

Associated, Colorado, \$12,000; Dec. 26.

Creston Leasing, Colorado, \$10,000; Dec. 26.

Gold Coin, Colorado, \$10,000; Dec. 26.

Yellow Aster, California, November dividend, \$10,000; payable immediately.

Ophir Hill M. Co., Utah, \$20,000; Dec. 27.

Boston & Colorado Smelting Co., 75 cents per share, 1½ per cent; payable Jan. 3.

Horn Silver M. Co., Utah, quarterly dividend, 5 cents per share, \$20,000; Dec. 31. Total paid since organization, \$5,230,000.

Con. Tiger & Poorman, Idaho, \$20,000; Dec. 20.



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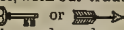
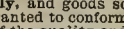
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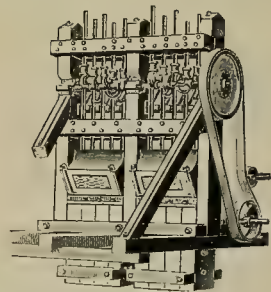
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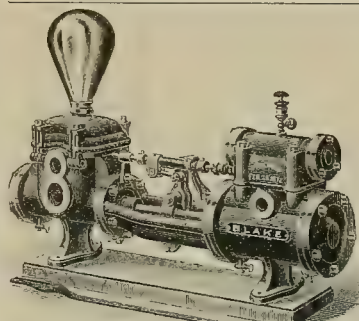
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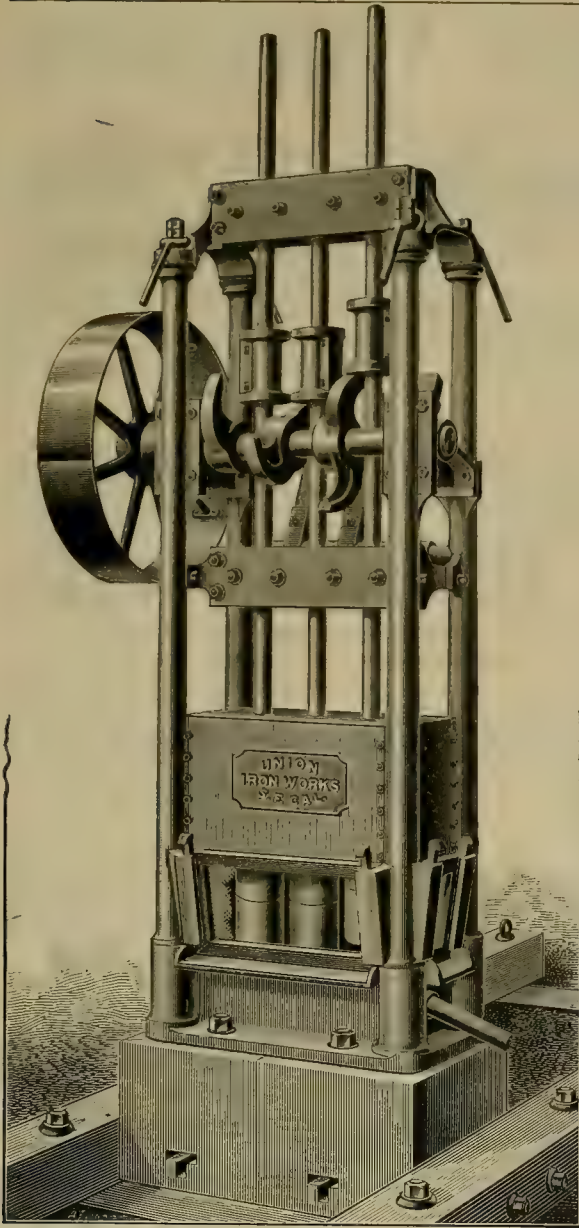
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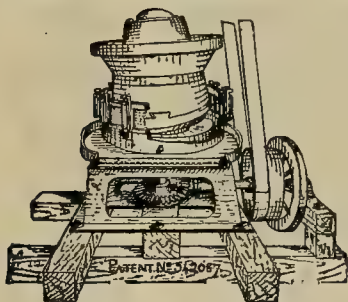
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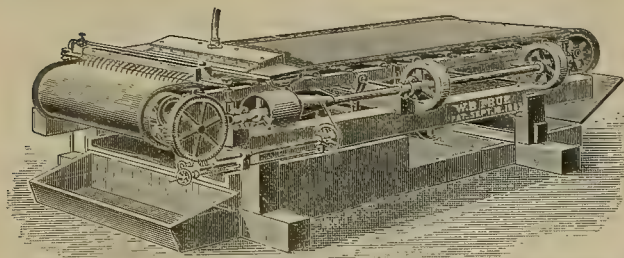
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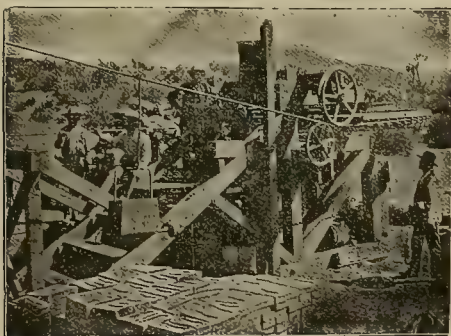
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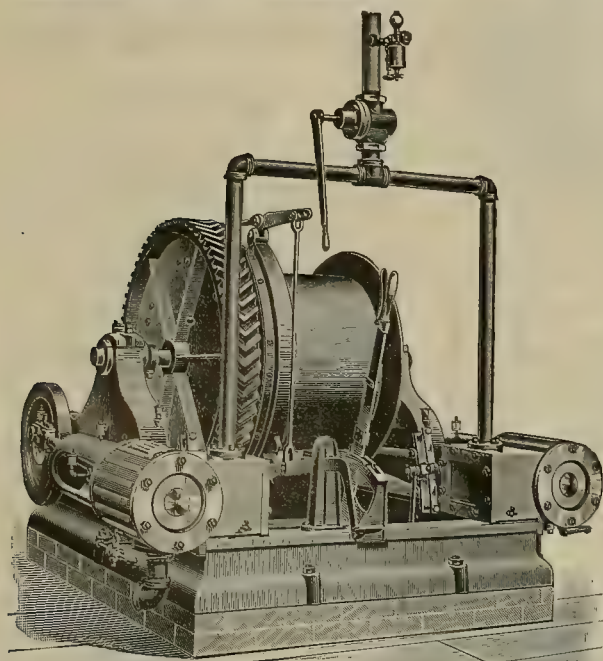
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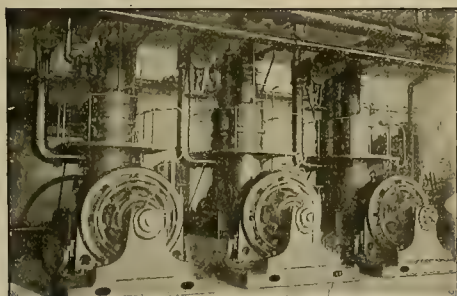
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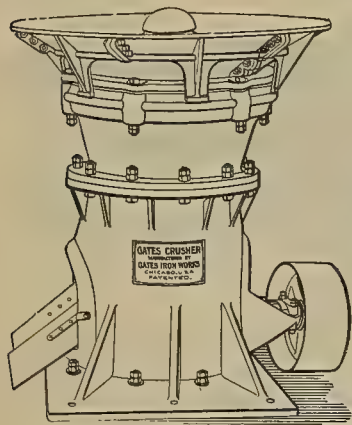
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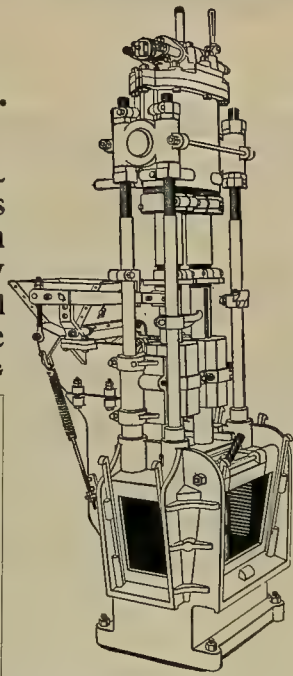
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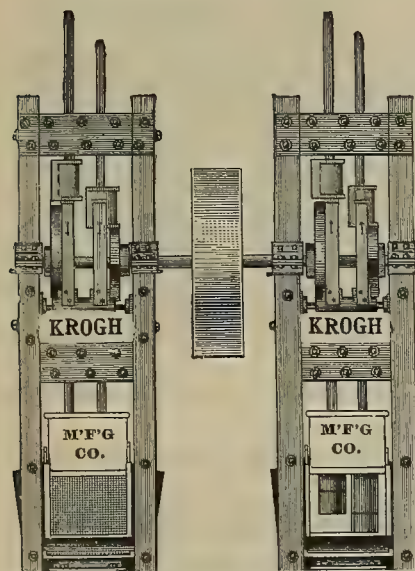
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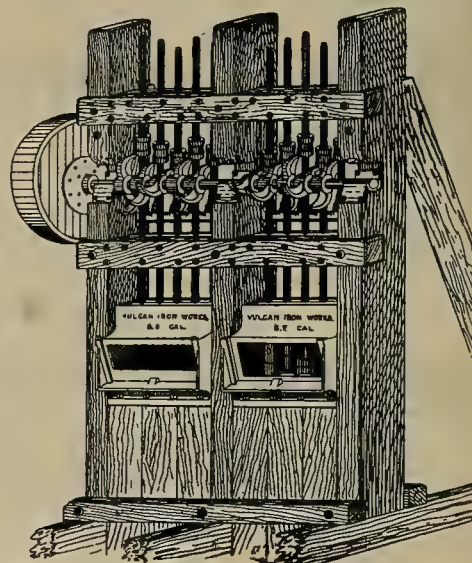
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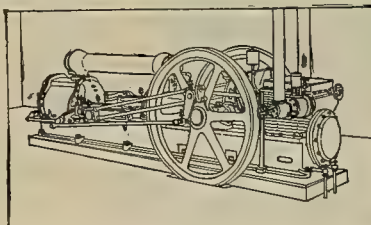
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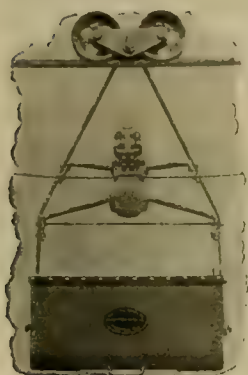
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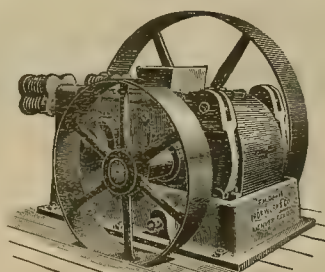
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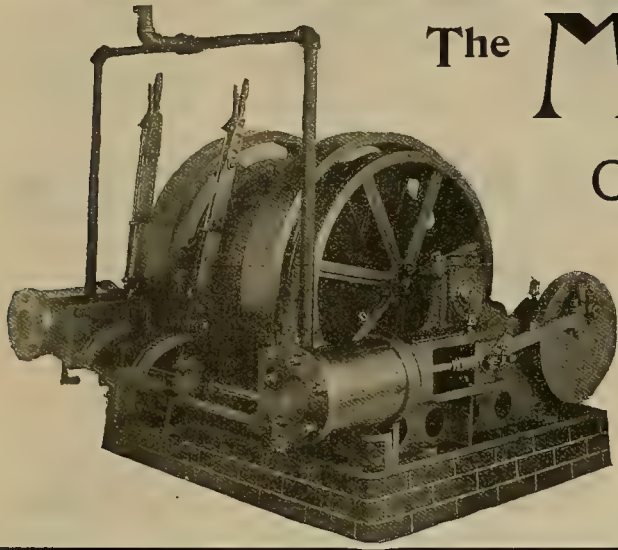


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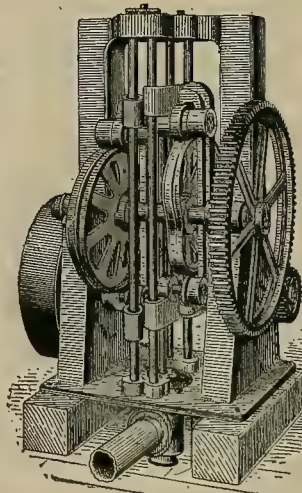
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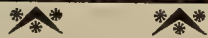
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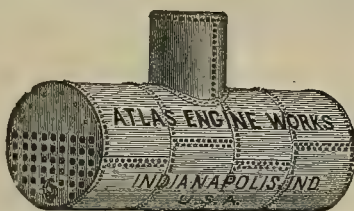
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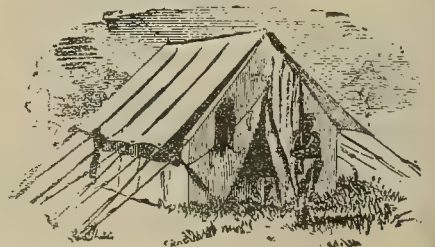
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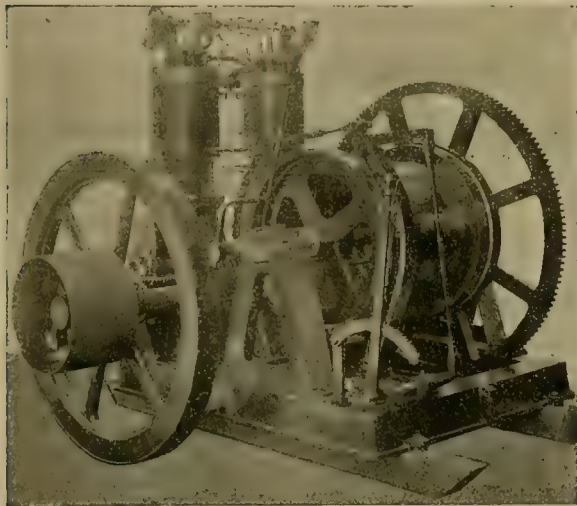
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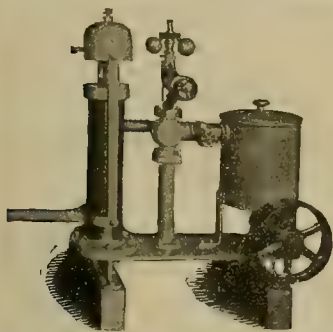
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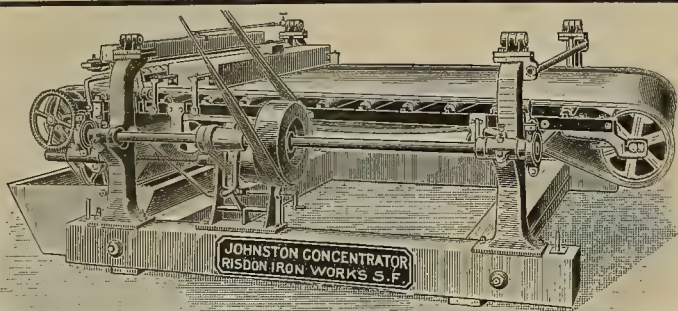
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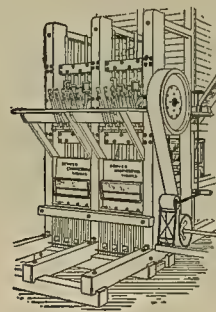
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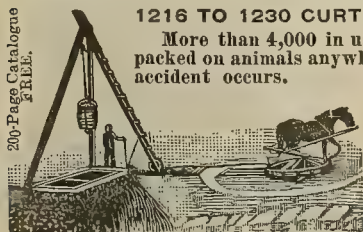
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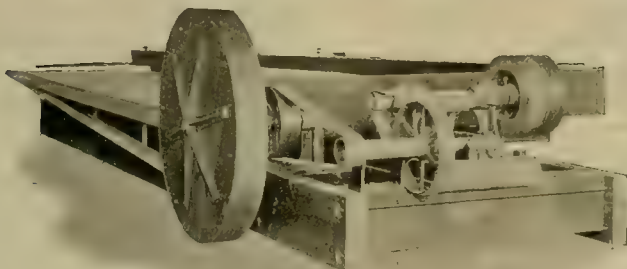
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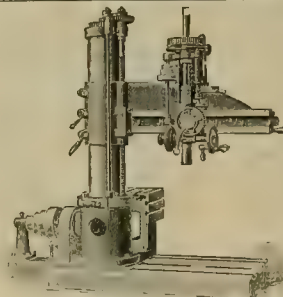
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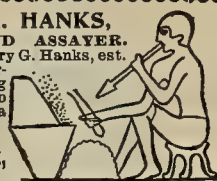
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2819 California St., San Francisco, Cal.

EXPERT EXAMINATIONS OF ORES
Etc., as to their adaptability to
CYANIDE TREATMENT.

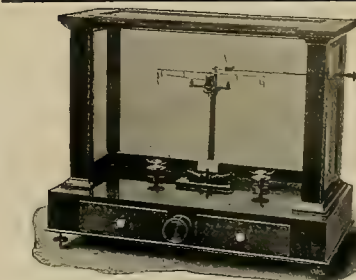
Analyses, Assays, Advice about Methods, Plants,
and all Expert Work relating to the subject.
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THE KEITH
Electro-Cyanide Process
Avoids the Labor, Wastes and Expense incident
to Zinc Precipitation and to other Electrolytic
Methods. Only slight alterations to existing
plants necessary to enable the use of this process.
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CYANIDE
Peroxide of Sodium
Hypo-sulphite of Soda
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And other Chemicals for Mining Purposes.



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SENSIBILITY, 1.50 MILLIGRAMME.

Eight-inch beam, single rider attachment, and
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Send for Photos and Prices of this and
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**THE GOLD and SILVER EXTRACTION
COMPANY, OF AMERICA, LTD.**
CAPITAL, - \$550,000.

The Original Cyanide Process.
SIMPLE. RELIABLE. ECONOMICAL.



Gold Medal, Columbian Exposition, 1893.
MINE OWNERS and others having Refractory
and Low Grade Gold and Silver Ores and Tailings
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Samples assayed and fully reported upon. Par-
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Manufacturers and Importers of
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FURNACES, SCALES,
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Acids. A full stock always on hand.
Nitric Acid, sp. gr. 1.42; Muriatic Acid, sp. gr. 1.20;
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Manufacturers, Importers and Dealers in
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SIZES ON HAND:
24-inch,
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Boesch Lamp Co.,
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**Hoskins' Patent Hydro-Carbon
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No dust. No ashes.
Cheap, effective, eco-
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Manufacturer of the Celebrated

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WHICH FOR STRENGTH AND TRACTION POWER HAS NO EQUAL.



Especially Adapted for
MINING MACHINERY
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It Is Unaffected by Water, Heat or Steam.
EVERY BELT GUARANTEED.
Write for Prices. Samples Free.

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Standard Electric Mining Apparatus OF THE WORLD.

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Mines Operated by Our Apparatus are
Operated Economically, Safely
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If you want your iron or wood work
in perfect condition, keep
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P & B PAINT.

Nothing "just as good."

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MALLEABLE IRON BUCKETS, Electric Coal Mining and
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Machinery designed and erected to suit existing conditions and
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Denver, 1328 17th St.
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THE BEST (MINE PUMPS) IN THE WORLD.

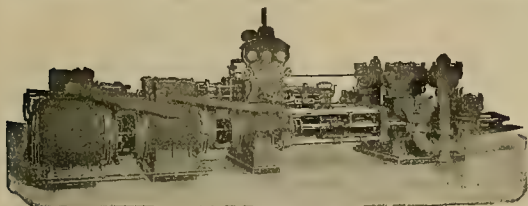
We carry in our Denver store a stock of Cameron Pattern Sinkers and Duplex Station Pumps.

Write for Catalogue and
Estimates.

Jeansville Iron Works Co.,
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Western Office,
Columbia Hotel Building,
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A. MIDDLEBROOK, Manager.



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You may pay for Experience

but the man who's wide-awake, gets it at some
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If you're going to pump—tell us. What we
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PUMP, BELL, BRASS AND MACHINE WORKS,
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Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.



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These castings are extensively used in all the mining States and
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To Gold Miners!

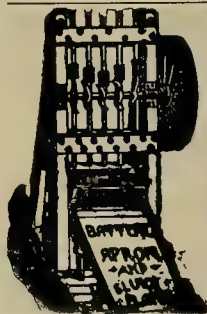
Silver Plated Copper Amalgamating Plates
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ONLY BEST COPPER AND REFINED SILVER USED. OLD MINING
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GOLD, SILVER, NICKEL, COPPER & BRASS PLATING.

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Telephone. Main 5981. Send for Circular.



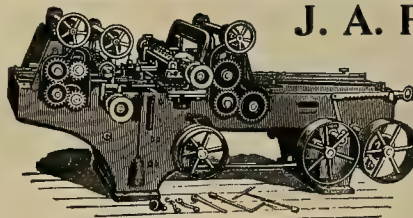
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Wood Working Machinery

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Box Factories, Planing Mills,
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Double Cylinder Planer and Moulder.

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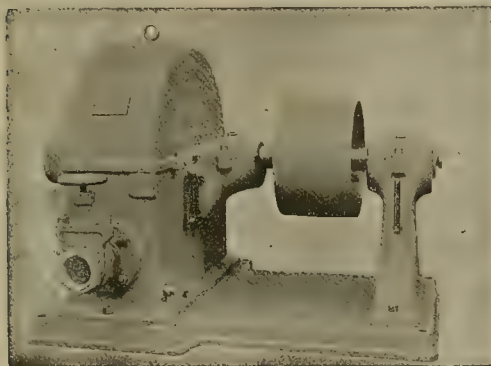


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Gives exclusive attention to the development and utilization of water powers by the most modern, economic and improved methods.

An experience of more than fifteen years, involving both the theory and practice of hydraulic engineering as relates to power development in its widest range of application, is at the service of its customers.

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Wheels
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Aggregating some 700,000 H. P.

ELECTRIC POWER TRANSMISSION.

Pelton wheels afford the most reliable and efficient power for such service and are running the majority of stations of this character in the United States, as well as most foreign countries.

Highest efficiency and absolute regulation guaranteed under the most extreme variations of load.

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IMPROVED Gold Pans.



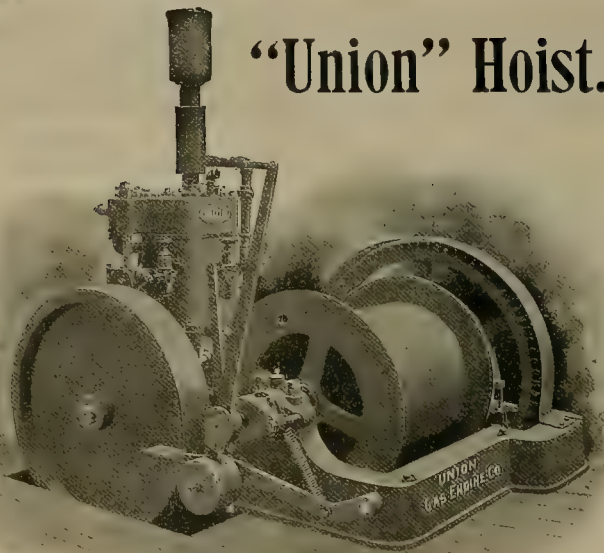
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JOSHUA HENDY MACHINE WORKS,
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"Union" Hoist.



The above cut represents our 10 h. p. Double Cylinder Engine of latest type, and Hoist combined on strong iron base. This hoist is designed to raise one ton 125 feet per minute from an inclined shaft, or 1500 pounds at the same speed vertical lift. The drum will hold over 600 feet of 3/4-inch cable. The outfit weighs 3500 pounds.

THE UNION GAS ENGINE CO.

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"Union" Gas Engines,

Which use either Manufactured or Natural Gas, Ordinary Stove Gasoline (Naphtha or Benzine), Distillate or Kerosene.

STATIONARY ENGINES for All Kinds of Work, Built in Sizes from 3 to 300 h. p.

"UNION" COMBINED HOISTS in Sizes from 2 to 40 h. p.

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HOISTS and COMPRESSORS Can Be Built in Larger Sizes to Order.

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TEN YEARS' EXPERIENCE Building Gas and Oil Engines.

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LIGHT DRAUGHT STEAMERS.

Write for Particulars.

H. ENGELBRECHT, Successor to
SAN FRANCISCO LAUNCH CO.,
North Point and Stockton Streets,
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TURBINE AND CASCADE WATER WHEEL

Adapted to all Heads from

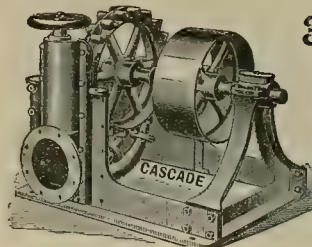
3 Feet to 2000 Feet.

Our experience of 33 YEARS building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

Send for a Pamphlet of either Wheel and write full particulars.

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NEW HAVEN Manufacturing Company, NEW HAVEN, CONN.

Iron : Working : Tools.

Engine Lathes, Pulley Turning Lathes, Iron Planers,
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For Testing Placer Ground.

Sinks and drives 6, 8 or 10-inch pipe through boulders; takes all the loose material out, including gold, as the hole is sunk. Does the work at a very small cost. Drills water and oil wells and mineral test wells through any kind of rock to 1500 feet. Several sizes.

Write for Catalogue and full information.

KEYSTONE DRILLER CO., Beaver Falls, Pa.

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 29, 1898.

SILVER.—London, 27 3/16d; New York, 59; San Francisco, 59; Mexican Dollars, 47 1/2 @ 48. New York exchange, sight, 15; telegraphic, 17 1/2 cents premium.

The imports of treasure at San Francisco for the first eleven months of 1898 amounted to \$32,339,719 against \$12,320,849 for the same period in 1897. Included in the imports this year was \$24,337,278 in gold coin from Australia. The mail steamer next due brings \$2,500,000 more. Such large shipments of gold from Australia to San Francisco suggests to Bradstreet that the movement in question is taking the place of direct transfers of specie from the European financial centers to New York. Under existing circumstances, in connection with our foreign-trade balances and the action of the exchange market, it is fair to presume that operations of the same character, possibly on even a larger scale, are likely to mark the coming season. While the gold imports from Australia are an indirect way of settling part of the balances which Europe owes the United States, they have the advantage of avoiding any disturbance of the London or continental money markets which might readily follow gold withdrawals from the Bank of England, an effect which is decidedly undesirable when Europe and London in particular are evincing such a renewed disposition to purchase American securities.

LEAD.—New York reports, "firm," \$3.85 bid, \$3.90 asked. The firm naming the settling price for leading miners and smelters at the West quotes Lead \$3.67 1/2.

Local, pipe, 6 @ 6 1/4 c; sheet, 6 1/2 @ 7 c; pig, 5 1/2 c; bar, 6 c.

COPPER.—New York reports Lake "firmer," \$12.90 bid, \$13 asked. Local, bar 20 c per lb.

IRON.—American, soft, \$21.75 and \$23.75 per ton; Scotch, \$24.25. Local bar, 2 1/4 c per lb.

SPELTER.—8 1/2 @ 9.

TIN.—Pig, 22 c per lb.; Bar, 25 c.

ANTIMONY.—14.

BABBITT METAL.—No. 3, 7 c.

QUICKSILVER.—Steady. Local, \$41.00; export, \$37.50 @ \$38.00; carload lots, special rates.

POWDER.—F. o. b. San Francisco: No. 1, 70% nitro-glycerine, per lb., in carload lots, 15 1/2 c; less than one ton, 17 1/4 c. No. 1* 60% carload lots, 13 1/2 c; less than one ton, 15 1/2 c. No. 1** 50%, carload lots, 11 1/2 c; less than one ton, 13 1/2 c. No. 2, 40%, carload lots, 10 c; less than one ton, 12 c. No. 2* 35%, carload lots, 9 1/2 c; less than one ton, 11 1/2 c. No. 2** 30%, carload lots, 9 c; less than one ton, 11 c. Black blasting powder in carload lots, minimum car 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

FUSE.—Triple tape, \$5.10 per 1000 feet; double tape, \$4.35; single tape, \$3.45; Hemp, \$3; Cement No. 2, \$4.35; Cement No. 1, \$3.45.

CAPS.—3x, \$5.50 per 1000; 4x, \$6.50; 5x, \$3; Lion, \$9.

COAL.—San Francisco coast, yard prices: Wellington.....\$8 00 Coos Bay.....\$5 00 Seattle.....\$6 00 Subsidized.....\$7 50 Cargo lots, Eastern and foreign: Wallend.....\$7 50 Cumberland.....\$9 00 Brymbo.....\$7 50 Cannel.....\$9 50 Pennsylvania, hd., 14 50 Welsh Anthracite, 12 50 Scotch.....\$8 00 Rock Springs.....\$7 60

Mines or prospects operated on contract to purchase, or under lease, or fixed royalty or percentage. MONEY loaned, mines, MINING companies organized, their property exported, financed and managed, MINES, prospects, mineral lands, mining securities, contracts, bonds, stocks, leases and options bought and sold or negotiated, EXAMINE mines, prospects and mineral lands as to their value, method of working and condition of their titles. Assay and chemical work done.

EDW. N. BREITUNG, Marquette, Mich.
Cable address Edhe Codes, Lieber's Bedford,
McNiel's A B C Universal Commercial. U. S. A.

FOR SALE.

4 Woodbury Concentrators with new belts.
Machines in good condition. For price and particulars, apply to EDWARD GOODWIN, Supt. Montauk Con. G. M. Co., Newcastle, Cal.

FOR SALE CHEAP.

2 Edison Bi-Polar Dynamos, 540 Lamps, with Switchboard and Apparatus Complete;
1 50-H. P. McIntosh & Seymour Engine;
2 60-H. P. Babcock and Wilson Boilers;
All in first-class condition. Address
PACIFIC TELEPHONE & TELEGRAPH CO.,
216 Bush Street, San Francisco, Cal.

J. D. BETHUNE,

(Late Associate Justice Supreme Court.)

Attorney at Law,
Mining Law,
PRESCOTT, ARIZONA.

A Valuable Gold Property for Sale.

UTAH
Mines—Dividend Paying
and Investment Stock.
W. E. HUBBARD & CO., 15 W. 2d So. Street,
SALT LAKE CITY.

ANTIMONY.

We buy Antimony Ore in any quantity and pay prompt CASH for same. Write us and let us know what you have.

Chapman Smelting Works Co.,
(INCORPORATED.)
422 Battery Street, San Francisco, Cal.

COKE.—Foreign, \$13; domestic, \$12 per ton.

OILS.—California Castor, pure, cs., \$1.08 per gal.; bbl., \$1.08; pure No. 2, cs., 85c; bbl., 80c; Baker's AA Castor Oil, in case lots of 200 gals. and upward, \$1.06; less than 200 gals., \$1.10; in bbls., 4c per gal. less than case; Baker's Crystal, \$1.26; China Nut, 52c; Linseed, strictly pure, boiled, bbl., 44c; cs., 49c; raw, bbl., 42c; cs., 47c; lots of 5 bbls., 1c less; Lucol, boiled, bbl., 38c; cs., 43c; raw, bbl., 36c; cs., 41c; lots of 5 bbls., 1c less. Kerosene—Pearl, cs., per gal., 17 1/2 c; Astral, 17 1/2 c; Star, 17 1/2 c; Eocene, 19 1/2 c; Extra Star, 21 1/2 c; Elaine, 23 1/2 c; Water White, bulk, in tanks, 11 1/2 c; Mineral Seal, iron bbls., 21c; wooden bbls., 23 1/2 c; cs., 20c; Mineral Sperm, 27c; Deodorized Stove Gasoline, bulk, 13c; do., cs., 18c; 86 deg. Gasoline, bulk, 20c; do., cs., 25c; 63 deg. Naphtha or Benzine, deodorized, in bulk, per gal., 11 1/2 c; do., in cs., 16 1/2 c; Lard Oil, Extra Winter Strained, bbl., 56c; cs., 61c; No. 1 bbl., 46c; cs., 51c; Neatfoot Oil, bbl., 65c; cs., 70c; No. 1 bbl., 55c; cs., 60c; Sperm, crude, 60c; Natural White, 65c; Bleached do., 70c; Whale Oil, Natural White, 40c; Bleached do., 45c; Cocoa, cs., 55c; Pacific Rubber Mixed Paints, white and house colors, \$1.25 @ 1.35 per gal.; wagon colors, \$2 @ 2.25.

CHEMICALS.—Cyanide of potassium, jobbing, 30 @ 31c per lb.; carloads, 29c; in 10-lb. tins 37c; sulphuric acid, 2 1/2 c per lb. 66% B.; soda ash, \$1.60 per 100 lbs. 58%; hypsulphite of soda, 2 1/2 c per lb.; blue vitriol, 4 1/2 c per lb.; borax, refined, 5 @ 6c per lb.; chloride of potash, 9 1/2 @ 10c; roll sulphur, 2 1/2 c; alum, \$1.90 @ 2.00; flour sulphur, French, 2 1/2 @ 3 1/2 c; California refined, 1 1/2 @ 1 1/4 c; nitric acid, in carboys 8c per lb.; caustic soda, in 10-lb. tins 15c per lb.; Cal. s. soda, bbls., 65c; sks., 60c @ 100 lbs; chloride of lime, spot, 2.10 @ 2.25c; saltpeter, 15c; chlorate of potash, 25c; caustic potash, 12c.

CANDLES.—Electric Light Candles—6s, 16 oz., 7 1/2 c; 6s, 14 oz., 6 1/2 c; 6s, 12 oz., 5 1/2 c; 6s, 10 oz., 4 1/2 c; Granite (Mining) Candles—6s, 16 oz., 8 1/2 c; 6s, 14 oz., 7 1/2 c; 6s, 12 oz., 6 1/2 c; 6s, 10 oz., 5 1/2 c. Paraffine Wax Candles—1s, 2s, 4s, 6, 12s, white, 8c; colored, 9c.

NAILS.—List per keg: No. 20 to 60d, wire, \$2.40; cut, \$2.25; 10 to 20d, wire, \$2.45; cut, \$2.30; 8d, wire, \$2.50; cut, \$2.35; 6 and 7d, wire, \$2.60; cut, \$2.45; 4 and 5d, wire, \$2.70; cut, \$2.55; 3d, wire, \$2.85; cut, \$2.70; 2d, wire, \$3.10; cut, \$2.95. In carload lots, 10c per keg less.

San Francisco Stock Board Sales.

SAN FRANCISCO, Dec. 29, 1898.

9:30 A. M. SESSION.

| | |
|------------------------------|---------------------------|
| 100 Best & Belcher.....46c | 200 Sierra Nevada.....88c |
| 1200 C. Cal. & Va.....\$1 15 | 200 Union Con.....31c |
| 500 Gould & Curry.....25c | 400 Yellow Jacket.....25c |
| 600 Hale & Norcross.....10c | |

2:30 P. M. SESSION.

| | |
|-------------------------------|---------------------------|
| 200 Ophir.....51c | 200 Confidence.....67c |
| 50 Mexican.....31c | 700 Sierra Nevada.....90c |
| 1000 Best & Belcher.....37c | 600 Union Con.....32c |
| 200 Con. Cal. & Va.....\$1 20 | 300 Challenge.....17c |
| 1000 Yellow Jacket.....27c | |

Quicksilver

FOR SALE IN LOTS TO SUIT.

Agents for Redington Quicksilver Mine.

REDINGTON & COMPANY, Wholesale Drugists, 23-25-27 Second Street, San Francisco.

ANNUAL MEETING.

The Regular Annual Meeting of the Stockholders of the CONSOLIDATED ST. GOTHARD GOLD MINING COMPANY will be held at the office of the company, 113 Crocker building, San Francisco, California, on THURSDAY, the 12th day of January, 1899, at the hour of 2 o'clock P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Monday, January 9th, at 4 o'clock P. M. J. P. HOLLING, Secretary. Office—113 Crocker building, San Francisco, California.

Dutch Mining and Milling Company.

The Regular Annual Meeting of the Dutch Mining and Milling Company will be held at the office of the company, No. 319 California St., City and County of San Francisco, State of California, on MONDAY, the 16th day of January, 1899, at the hour of 3 o'clock P. M. on said day, for the purpose of electing a Board of Directors for the ensuing year, and also for the transaction of such other business as may be brought before the meeting. Transfer books close Thursday, January 13th, 1899, at 3 o'clock P. M. GEO. W. GERRARD, Secretary. Dated San Francisco, December 31st, 1898.

THE CALIFORNIA DEBRIS COMMISSION having received applications to mine by the hydraulic process from Rocco Molinari, in the Humburg Gulch Mine, near Volcano, Amador Co., to deposit tailings in Humburg Gulch; from J. B. Meek, in the Grizzly Hill Mine, near Volcano, Amador Co., to deposit tailings in Misery Creek; from Lewis Emery, Jr., in the Emery Placer Mine, near Mountain Ranch, Calaveras Co., to deposit tailings in Murray Creek; and from Archie Newell, in the Newell Claim, near Oleta, Amador Co., to deposit tailings in Deadman Creek, gives notice that a meeting will be held at Room 53 Flood Building, San Francisco, Cal., on January 9, 1899, at 1:30 P. M.

Silver City Reduction Co.,

SILVER CITY, GRANT COUNTY, NEW MEXICO.

Purchasers and Smelters of Gold, Silver and Copper Ores.

This Plant is Owned and Operated by the Estate of the Late Senator George Hearst of California.

TUBBS CORDAGE CO.

(A CORPORATION.)

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Duplex Rope, Tarred Manila Rope, Ray Rope, Whale Line, etc., etc. Extra sizes and lengths made to order on short notice.
611 and 613 Front St., San Francisco, Cal.

Placer Miners' Attention

Is called to the fact that we are purchasers of

OSM-IRIDIUM

In lots of one ounce and upwards.

SELBY SMELTING & LEAD CO., 416 Montgomery Street, San Francisco.

FRESNO, June 25, 1898.

Hercules Gas Engine Works,
San Francisco, Cal.

DEAR SIR:—

The fifteen-horse power gasoline engine and hoist purchased from you is doing fine work and is perfectly satisfactory in every respect.

Yours truly,

TUOLUMNE MOTHER LODGE
M. & D. CO.,

Per N. W. Moodey, Pres.

We have two large books full of testimonials; they speak better for the HERCULES than we can. Our works are the largest in the country. We have built and sold over 3500 engines; they are the standard everywhere. Any size up to 200 H. P. Stationary, Hoisting and Marine.

Hercules Gas Engine Works,

305 MARKET STREET,

SAN FRANCISCO, CAL.

W. PELLEW HARVEY, F. C. S.

The Vancouver Assay Office and Ore Testing Works.

MINING ENGINEER, METALLURGIST AND ASSAYER.

Making Tests by Amalgamation and Cyanidation. Ores Purchased. Assays and Analyses.

Representative for:

Vivian & Sons, Swansea; The Elliott's Metal Co., Wales; The MacArthur-Forrest Process (Cyanide).

OFFICES: VANCOUVER AND VICTORIA, B. C.

Assessment Notices.

INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business San Francisco, California; location of works, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 8th day of December, 1898, an assessment (No. 32) of 25 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of January, 1899, will be delinquent, and advertised for sale at public auction, and unless payment is made before will be sold on THURSDAY, the 28th day of March, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, CHARLES E. ANDERSON, Secretary.

Office—Mills building, room 31, 16th floor, San Francisco, California.

JUNCTION MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3rd day of December, 1898, an assessment (No. 22) of three (3c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the secretary, at the office of the company, 106 Leidesdorff street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 9th day of January, 1899, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of January, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, CALVERT MEADE, Secretary.

Office—106 Leidesdorff street, San Francisco, California.

NATIONAL CONS. MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Rich Gulch, Shasta County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 5th day of December, 1898, an assessment (No. 5) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, 773 Mission street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of January, 1899, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 15th day of February, 1899, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, GEO. W. FLISSNER, Secretary.

Office—773 Mission street, San Francisco, California.

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DELINQUENT SALE NOTICE.

ARRASTRAVILLE MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Tuolumne County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 2) levied on the 15th day of November, 1898, the several amounts set opposite the names of the respective shareholders, as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|--------------------|-----------|-------------|---------|
| William Day..... | 602 | 100 | \$10 00 |
| George Straut..... | 625 | 1,000 | 100 00 |
| George Straut..... | 648 | 500 | 50 00 |
| E. P. Hill..... | 637 | 150 | 15 00 |

And in accordance with law, and an order from the Board of Directors, made on the 15th day of November, 1898, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, 213 Jackson street, San Francisco, California, on TUESDAY, the 17th day of January, 1899, at the hour of 3 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale. J. MIDDLETON, Secretary. Office—213 Jackson St., San Francisco, California.

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